Savannah River NUCLEAR SOLUTIONS℠
FLUOR • NEWPORT NEWS NUCLEAR • HONEYWELL

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)

SEMS Number: 93

SRNS-RP-2021-00548

Revision 1

April 2022

DISCLAIMER

This report was prepared by Savannah River Nuclear Solutions, LLC (SRNS) for the United States Department of Energy under Contract No. DE-AC09-08SR22470 and is an account of work performed under that contract. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees assumes any legal liability or responsibility for any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process or services by trademark, name, manufacturer or otherwise does not necessarily constitute or imply endorsement recommendation, or favoring of same by SRNS or the United States Government or any agency thereof.

Printed in the United States of America

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

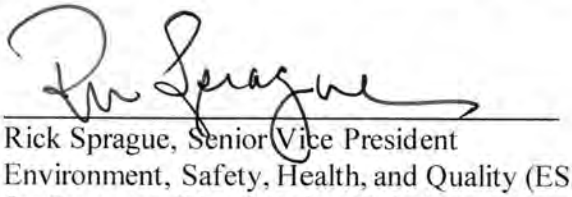
CERTIFICATION

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, April 2022

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

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



6/10/2022

Rick Sprague, Senior Vice President
Environment, Safety, Health, and Quality (ESH&Q)
for Savannah River Nuclear Solutions, LLC
as the Co-Operator with the U. S. Department of Energy
Savannah River Operations Office

Date Signed



6/14/2022

David J. Bender, Director
Infrastructure and Area Completion Division
U. S. Department of Energy
Savannah River Operations Office
Co-Operator and Owner

Date Signed

This page intentionally left blank.

EXECUTIVE SUMMARY

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)/Remedial Investigation Report (RI) with Baseline Risk Assessment (BRA) and Corrective Measures Study (CMS)/Feasibility Study (FS) has been prepared 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 (also known as [aka] Ford Building) Operable Unit (OU) [ECODS N-1, CSSLP, and Ford Building OU] located at Savannah River Site (SRS) in Aiken, South Carolina (Figure ES-1). This combined document incorporates elements of two typically stand-alone documents – the RFI/RI Report with BRA and the CMS/FS. A Core Team of representatives from the United States Department of Energy (USDOE), the U.S. Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC) agreed to this combined and accelerated strategy for the ECODS N-1, CSSLP, and Ford Building OU.

This document presents a summary of data collected for development of the RFI/RI/BRA/CMS/FS, describes the nature and extent of contamination, provides an assessment of the potential risk to human health and ecological receptors, identifies remedial action objectives (RAOs), and evaluates potential remedial alternatives for the ECODS N-1, CSSLP, and Ford Building OU.

ECODS N-1 (Figure ES-1) was used to dispose of materials (including asbestos) associated with the construction and operation of N Area. Historical aerial photographs indicate that the area where the subunit is located was farmland prior to construction of the SRS and identified the ECODS N-1 as being in use from approximately August 1952 to June 1954. Some sections of the ECODS N-1 subunit may have also been used as burn pits for disposal of combustible waste.

The CSSLP (Figure ES-1) was cleared in 1951 and was used for equipment laydown and rubble storage, in addition to a burning area which remained active until the mid-2000s. A surface water impoundment was created between 1992 and 1994 within the CSSLP subunit to capture surface water run-off from the upgradient disturbed soils. During operation, the CSSLP was used to stockpile and burn various unknown types and quantities of scrap wood which may have included treated lumber and creosote-treated wood. Some time between 1985 and 1998, burning operations

at the CSSLP were limited to untreated wood products, such as shipping pallets, and the ash that was generated at the CSSLP was collected and disposed of off-unit at SRS.. All of the debris (including construction debris, plastics, and metal shavings) has been removed and dispositioned offsite (WSRC 2001a).

The Ford Building is located within the N Area facility boundary. The Ford Building (Figure ES-1) was built in the 1950s for testing of Ford Company-manufactured motor control packages for control rod drive mechanisms prior to their installation in the SRS reactors. During the early 1960s, the building was repurposed to repair contaminated leaking heat exchangers from SRS. Removal of equipment and cleanup of contaminated areas occurred intermittently in 1998, 2012, and 2014. From 2019 through May 2021, Ford Building was decommissioned using the Integrated Sampling Model. Following D&D of the Ford Building, an engineered concrete cover was installed over the Ford Building remnant slab area (SRNS 2021).

The RI is based on soil, sediment, and surface water samples collected from the three subunits of the ECODS N-1, CSSLP, and Ford Building OU. Groundwater is not a part of the ECODS N-1, CSSLP, and Ford Building OU, and will be addressed as part of the Central Shops Groundwater OU. However, groundwater in the vicinity of the OU was evaluated to support the contaminant fate and transport analysis.

The following summarizes the risks at these three subunits determined during the remedial investigation:

- At the ECODS N-1 subunit, asbestos containing material is present in the pits that has been determined to pose a risk to human health if the material becomes exposed.
- At the CSSLP subunit, arsenic presents an unacceptable risk to human health in both the surface soils for the Upland Area and and sediment for the Surface Water Impoundment Area. Surface water does not present an unacceptable risk to human health or the environment.
- At the Ford Building subunit, polychlorinated biphenyls (PCBs) (Aroclors 1254 and 1260) and cesium-137(+D) previously presented an unacceptable risk to human health at the Ford Building remnant slab prior to placement of the engineered concrete cover. In addition,

cobalt-60 presents an unacceptable risk to human health in surface soils around the perimeter of the Ford Building slab.

The CMS/FS portion of this document identifies remedial technologies, provides a screening of potential remedial alternatives, and provides a detailed analysis of the remedial alternatives retained following the screening process. These remedial alternatives were ranked relative to each other using the nine criteria established by USEPA (Tables ES-1 through ES-3). The remedial alternatives are unit-specific actions that achieve the RAOs and satisfy the requirements of the National Contingency Plan. The remedial alternatives evaluated for the ECODS N-1, CSSLP, and Ford Building OU include No Action, Land Use Controls, Containment, and Excavation and Disposal response actions. These response actions may be implemented singly or in combination.

The preferred remedial alternative(s) will be presented in the Statement of Basis/Proposed Plan based on information contained in this report and comments received from the USEPA, SCDHEC, and the public prior to selecting the final remedial alternative(s) in the Record of Decision.

This page is intentionally left blank.

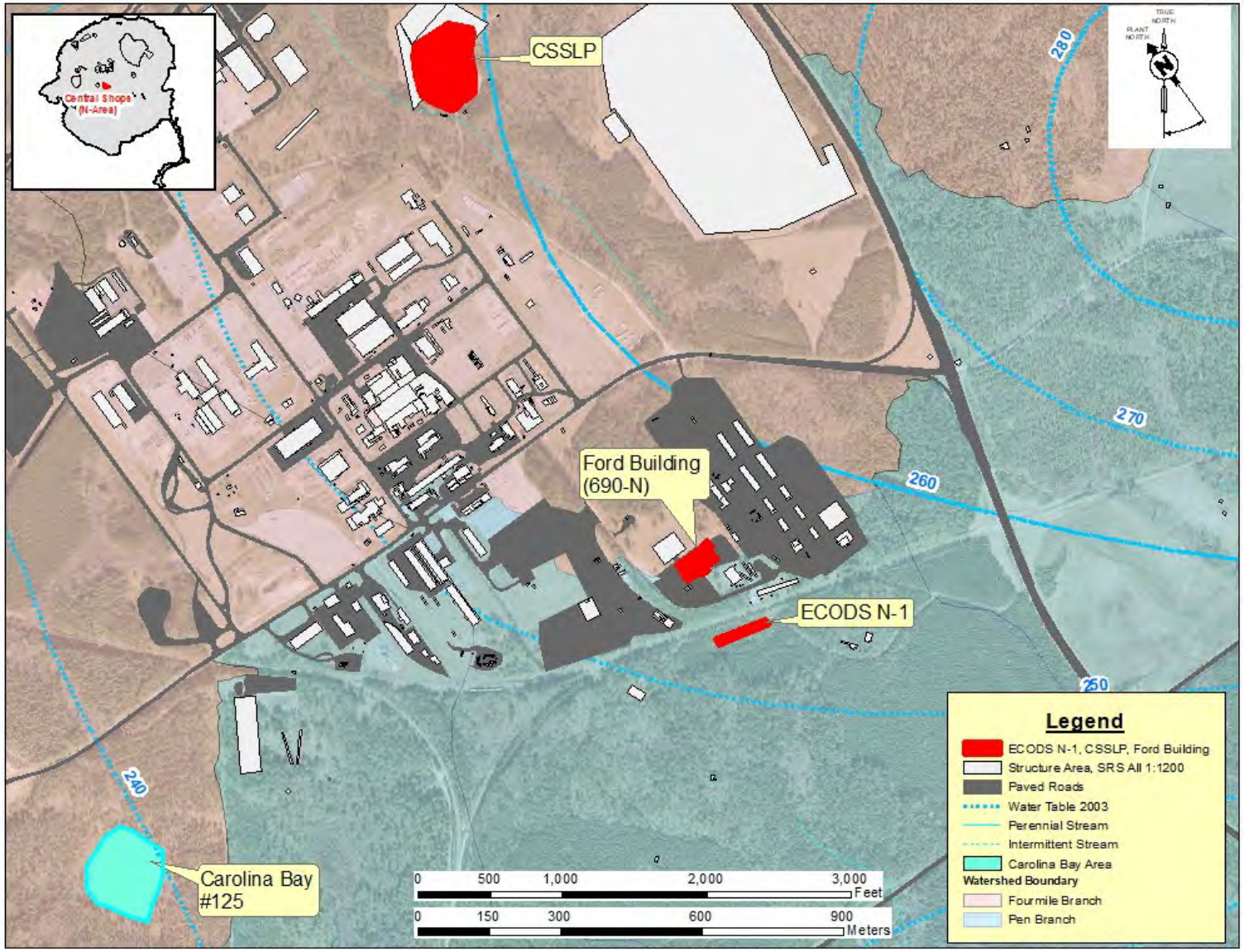


Figure ES-1. ECODS N-1, CSSLP, and Ford Building OU Location Map

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

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

Note: Numeric range 1 through 5, where 1= worst and 5 = best

TABLE OF CONTENTS

Section **Page**

1.0 Introduction 1-1

1.1 Organization of Report 1-2
1.2 Regulatory Background 1-3
1.3 Unit History 1-4
1.4 Land Use 1-8
1.5 Natural Resource Trustees Injury Evaluation 1-8

2.0 Site Description 2-1

2.1 Physical Setting 2-1
2.2 Geology and Hydrogeology 2-4
2.3 Conceptual Site Model 2-7

3.0 Remedial Investigation 3-1

3.1 ECODS N-1, Central Shops Scrap Lumber Pile, Ford Building Operable Unit Investigation Overview 3-1
3.2 Site Characterization and Data Usability 3-1
3.3 Contaminant Fate and Transport Analysis 3-8
3.4 Human Health Risk Assessment Methodology 3-9
3.5 Ecological Risk Assessment Methodology 3-11
3.6 Principal Threat Source Material Methodology 3-12
3.7 Early Construction and Operational Disposal Sites N-1 Subunit 3-13
3.8 Central Shops Scrap Lumber Pile (631-2G) Subunit 3-18
3.9 Ford Building Subunit 3-26
3.10 Summary of Refined Constituents of Concern and Refined Conceptual Site Models 3-32
3.11 Applicable or Relevant and Appropriate Requirements Evaluation 3-34

4.0 Remedial Action Objectives and Preliminary Remediation GoalS 4-1

4.1 Remedial Action Objectives 4-1
4.2 Preliminary Remediation Goal Development 4-4
4.3 Most Restrictive and Most Likely Preliminary Remediation Goals 4-6

5.0 Corrective Measures Study / Feasibility Study 5-1

5.1 Identification and Screening of Technologies 5-2
5.2 Development and Screening of Alternatives 5-6
5.3 Detailed Analysis of Alternatives 5-17
5.4 Comparative Analysis of Alternatives 5-43

6.0 RFI/RI/BRA/CMS/FS Summary/Conclusions 6-1

6.1 Implementation Schedule 6-3

7.0 References 7-1

LIST OF FIGURES

Figure		Page
Figure 1-1.	ECODS N-1, CSSLP and Ford Building OU Location	1-11
Figure 1-2.	ECODS N-1 2010 Aerial Photo	1-12
Figure 1-3.	Photograph of ECODS N-1 (1953)	1-13
Figure 1-4.	Central Shops Scrap Lumber Pile 2010 Aerial Photo	1-14
Figure 1-5.	Central Shops Scrap Lumber Pile 1996 Aerial Photo	1-15
Figure 1-6.	Ford Building 2020-2021	1-16
Figure 1-7.	Ford Building 1989 Aerial Photo	1-17
Figure 2-1.	Central Shops (N Area) Surface Features	2-13
Figure 2-2.	Central Shops (N Area) Surface Water Run-Off	2-14
Figure 2-3.	Lithostratigraphic and Hydrostratigraphic Unit Comparisons	2-15
Figure 2-4.	Soil Series in the Central Shops (N Area)	2-17
Figure 2-5.	Preliminary Conceptual Site Model for the ECODS N-1 Subunit	2-19
Figure 2-6.	Preliminary Conceptual Site Model for the Central Shops Scrap Lumber Pile (632-1G) Subunit	2-20
Figure 2-7.	Preliminary Conceptual Site Model for the Ford Building Subunit	2-21
Figure 3-1.	ECODS N-1 Sample Locations	3-37
Figure 3-2.	Central Shops Scrap Lumber Pile (631-2G) Sample Locations	3-38
Figure 3-3.	Ford Building Sample Locations	3-39
Figure 3-4.	Revised Conceptual Site Model for the ECODS N-1 Subunit	3-41
Figure 3-5.	Revised Conceptual Site Model for the Central Shops Scrap Lumber Pile (631-2G) Subunit	3-42
Figure 3-6.	Revised Conceptual Site Model for the Ford Building Subunit	3-43
Figure 5-1.	Alternative B-4 Excavation and (Hot Spot Removal) and Disposal	5-49
Figure 5-2.	Transportation Routes to Clean Soil and Solid Waste Disposal Facilities at CSSLP Subunit	5-50
Figure 5-3.	Transportation Routes to Clean Soil and Solid Waste Disposal Facilities at Ford Building Subunit	5-51

LIST OF TABLES

Table		Page
Table 1-1.	Savannah River Site Natural Resource Trustees and Their Responsibilities	1-18
Table 2-1.	TES Plant Species Known to Occur on SRS	2-23
Table 2-2.	TES Animal Species Known to Occur in Barnwell County	2-25
Table 2-3.	Average Temperature (°F) for SRS	2-27
Table 2-4.	Average Precipitation for SRS past 30 yrs (inches, 773-A) (SRNL 2020)	2-28
Table 4-1.	Cleanup Levels (PRGs) for ECODS N-1, CSSLP, and Ford Building OU	4-7
Table 5-1.	Alternative Screening for ECODS N-1 Subunit	5-53
Table 5-2.	Alternative Screening for CSSLP Subunit	5-54
Table 5-3.	Alternative Screening for Ford Building Subunit	5-55
Table 5-4.	Summary of Potential ARARs for the ECODS N-1, CSSLP and Ford Building OU	5-57
Table 5-5.	Comparison of the ECODS N-1 Subunit Alternatives to the CERCLA Criteria	5-61
Table 5-6.	Comparison of the CSSLP Subunit Alternatives to the CERCLA Criteria	5-63
Table 5-7.	Comparison of the Ford Building Subunit Alternatives to the CERCLA Criteria	5-65
Table 5-8	Comparative Alternative Analysis for ECODS N-1 Subunit	5-67
Table 5-9	Comparative Alternative Analysis for CSSLP Subunit	5-68
Table 5-10	Comparative Alternative Analysis for Ford Building Subunit	5-69

LIST OF APPENDICES

Appendix		Page
Appendix A.	Investigation Data	A-1
Appendix B.	Contaminant Fate and Transport	B-1
Appendix C.	Human Health Risk Assessment	C-1
Appendix D.	Ecological Risk Assessment	D-1
Appendix E.	Principal Threat Source Material Evaluation	E-1
Appendix F.	Risk-Based Cleanup Level Calculations	F-1
Appendix G.	Natural Resource Injury Evaluation Checklist	G-1
Appendix H.	Hexavalent Chromium Uncertainty Analysis	H-1
Appendix I.	Detailed Cost Estimates	I-1
Appendix J.	Data Usability Report	J-1

This page intentionally left blank.

LIST OF ABBREVIATIONS AND ACRONYMS

~	approximate, approximately
<	less than
ac	acres
ACM	asbestos containing material
ARAR	applicable, relevant and appropriate requirement
ARF	Administrative Record File
bgs	below ground surface
BMP	Best Management Practice
BRA	Baseline Risk Assessment
°C	degrees Celsius
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CM	contaminant migration
cm	Centimeter
CMI/RAIP	Corrective Measures Implementation/Remedial Action Implementation Plan
CMS	Corrective Measures Study
COC	constituent of concern
COPC	constituent of potential concern
COPEC	constituent of potential ecological concern
CSBRP	Central Shops Burning/Rubble Pits (631-1G and 631-3G)
CSM	Conceptual Site Model
CSSLP	Central Shops Scrap Lumber Pile (631-2G)
D&D	deactivation and decommissioning
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DUR	data usability report
ECO	ecological
ECODS	early construction and operational disposal site
EPC	exposure point concentration
ERA	Ecological Risk Assessment
ESV	ecological screening value
°F	degrees Fahrenheit
FBSB	Ford Building Seepage Basin
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	feet
GA	Gordon Aquifer
GCU	Gordon Confining Unit
ha	hectare
HH	human health
HHRA	Human Health Risk Assessment
HI	hazard index
HQ	hazard quotient

LIST OF ABBREVIATIONS AND ACRONYMS *(Continued)*

in	inch
km	kilometer
kV	kilovolt
L	liter
LUC	land use control
LUCIP	Land Use Control Implementation Plan
m	meter
m^2	square meters
m^3	cubic meters
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mi	mile
NBN	no building number
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NRIE	Natural Resource Injury Evaluation
O&M	operation and maintenance
OU	operable unit
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
PP	Proposed Plan
PRG	Preliminary Remediation Goal
PTSM	Principal Threat Source Material
QC	quality control
RAIP	Remedial Action Implementation Plan
RAO	remedial action objective
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RG	remedial goal
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
RSV	refinement screening value
SB	Statement of Basis
SCDHEC	South Carolina Department of Health and Environmental Control
SRNL	Savannah River National Laboratory
SRS	Savannah River Site
SVOC	semivolatile organic compound
TAL	Target Analyte List
TBC	to be considered

LIST OF ABBREVIATIONS AND ACRONYMS (Continued)

TCL	Target Compound List
TES	Threatened, Endangered and Sensitive (species)
TL	threshold level
UCL	upper confidence limit
USC	unit-specific constituent
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
UTRA	Upper Three Runs Aquifer
VOC	volatile organic compound
WP	Work Plan
WSRC	Washington Savannah River Company
WSRC	Westinghouse Savannah River Company
yd^3	cubic yards

This page intentionally left blank.

1.0 INTRODUCTION

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)/Remedial Investigation Report (RI) with Baseline Risk Assessment (BRA) and Corrective Measures Study (CMS)/Feasibility Study (FS) has been prepared for the Early Construction and Operational Disposal Site (No Building Number [NBN]) (ECODS) N-1, Central Shops Scrap Lumber Pile (631-2G) (CSSLP), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (OU), located in N Area at the Savannah River Site (SRS) (Figure 1-1).

The primary goal of the ECODS N-1, CSSLP, and Ford Building OU RFI/RI/BRA/CMS/FS combined document is to provide sufficient information to support a Statement of Basis (SB)/ Proposed Plan (PP) and a Record of Decision (ROD) for remedy selection at the ECODS N-1, CSSLP, and Ford Building OU. The requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) constitute the applicable regulatory framework for this document. The format and content of this document have been developed to accommodate decisions made by Core Team representatives from the U.S. Environmental Protection Agency (USEPA), South Carolina Department of Health and Environmental Control (SCDHEC), and the U.S. Department of Energy (USDOE) – Savannah River.

The ECODS N-1, CSSLP, and Ford Building OU RFI/RI/BRA/CMS/FS combined document describes the evaluations and decisions made during the scoping process, summarizes the characterization activities, discusses the results of the contaminant migration and risk evaluations, identifies the specific problems warranting response action, and proposes remedial alternatives for the ECODS N-1, CSSLP, and Ford Building OU subunits requiring cleanup. For evaluation purposes, the ECODS N-1, CSSLP, and Ford Building OU was segregated into the following three subunits: 1) ECODS N-1, 2) CSSLP, and 3) Ford Building. Groundwater is not a subunit of the ECODS N-1, CSSLP, and Ford Building OU and will be addressed as part of the Central Shops Groundwater OU.

A significant amount of data exists for the ECODS N-1, CSSLP, and Ford Building OU, including Site Evaluation data collected in 2001 for the ECODS N-1 subunit; deactivation and decommissioning (D&D) data collected in 2014 for the Ford Building (690-N); and both pre-Work

Plan (WP) characterization data collected in 2019 and RFI/RI WP characterization data collected in 2020 for the ECODS N-1, CSSLP, and the Ford Building (690-N) subunits.

1.1 Organization of Report

The contents of this document generally follow the guidelines established in the *Environmental Compliance and Area Completion Projects Regulatory Document Handbook* (SRNS 2012). However, several sections of the document were modified to accommodate the merging of the RFI/RI/BRA/CMS/FS information into a single combined document and improve readability.

Chapter 1, *Introduction*, broadly discusses the purpose and organization of the report, regulatory background, unit description, and land use. Chapter 2, *Site Description*, provides a review of the physical setting, geology and hydrogeology, and a generic conceptual site model (CSM) description. Chapter 3, *Remedial Investigation*, provides information on the characterization efforts, nature and extent of contamination, and results of the risk assessment and Principal Threat Source Material (PTSM) evaluations for each of the individual subunits. Chapter 4, *Remedial Action Objectives and Preliminary Remediation Goals*, discusses the remedial action objectives (RAOs), preliminary remediation goals (PRGs) (i.e., cleanup levels), and applicable or relevant and appropriate requirements (ARARs). Chapter 5 is the *Corrective Measures Study and Feasibility Study*. This chapter includes the identification, screening, and detailed analysis of remedial alternatives. Chapter 6, *RFI/RI//BRA/CMS/FS Summary/Conclusions*, provides a summary of the complete report including the OU strategy and implementation schedule. The list of document references is provided in Chapter 7, *References*.

Supporting information includes:

- Investigation Data (Appendix A)
- Contaminant Fate and Transport (Appendix B)
- Human Health Risk Assessment (Appendix C)
- Ecological Risk Assessment (Appendix D)
- Principal Threat Source Material Evaluation (Appendix E)

- Cleanup Level Calculations (Preliminary Remediation Goals) (Appendix F)
- Natural Resource Injury Evaluation (NRIE) Checklist (Appendix G)
- Hexavalent Chromium Uncertainty Analysis (Appendix H)
- Detailed Cost Estimates (Appendix I)
- Data Usability Report (Appendix J)

Appendices A through J are pertinent to supporting the conclusions presented in the RFI/RI/BRA/CMS/FS.

1.2 Regulatory Background

On December 21, 1989, SRS was included on the National Priorities List making the entire SRS subject to the provisions and requirements of CERCLA. In accordance with Section 120 of CERCLA, the USDOE negotiated a Federal Facility Agreement (FFA) (FFA 1993) with the USEPA and SCDHEC to coordinate cleanup activities at SRS as one comprehensive strategy. The FFA expanded the site investigation process that was established under the RCRA permit (first issued in 1987) to address 1) releases at or from units not included in the RCRA permit, and 2) releases of hazardous or radioactive substances or both not regulated by the RCRA permit. Due to the known process history of this OU, the ECODS N-1, CSSLP, and Ford Building OU is identified as a RCRA/CERCLA waste unit in Appendix C of the SRS FFA.

Characterization activities for soil, sediment, and surface water media were conducted at the ECODS N-1, CSSLP, and Ford Building OU in 2001, 2014, 2019, and 2020. A scoping meeting was held on December 18, 2019, with the Core Team to review the results of 2001 and 2019 characterization efforts. The Core Team identified additional samples and analyses, including site-specific background samples for hexavalent chromium, that were needed to address data gaps. A sampling and analysis plan was developed to address these data gaps and characterization activities were implemented from September 2020 through October 2020 (SRNS 2020). Prior to development of this RFI/RI/BRA/CMS/FS combined document, a scoping meeting was held with the Core Team on August 11, 2021, to determine whether the data gaps had been adequately

addressed, to review the results of the risk assessment and contaminant migration evaluations, and to reach agreement on the problems warranting action and remedial alternatives.

The *Savannah River Site Federal Facility Agreement Community Involvement Plan* (WSRC 1996) facilitates public participation in the decision-making processes. Public participation requirements (Sections 113 and 117 of CERCLA) include the establishment of an Administrative Record File (ARF) that documents the selection of cleanup alternatives and provides for review and comment by the public on those alternatives. This RFI/RI/BRA/CMS/FS combined document is part of the ARF and will be available to the public at USDOE's Public Reading Rooms at the University of South Carolina-Aiken, in Aiken, South Carolina, and the Thomas Cooper Library in Columbia, South Carolina. A notice will be published in local newspapers when information is being compiled regarding the investigation and cleanup of the ECODS N-1, CSSLP, and Ford Building OU. Additional repositories may be added and/or locations changed to better meet the needs of the public.

1.3 Unit History

The ECODS N-1, CSSLP, and Ford Building OU consists of three subunits located in three distinct locations within and near N Area (Central Shops). The OU is located in an area of relatively flat terrain (Figure 1-1). The ECODS N-1 subunit is located in an area that is wooded with heavy underbrush. The CSSLP subunit is south of the closed Central Shops Burning/Rubble Pits (631-1G and 631-3G) (CSBRP) OU. The area surrounding the CSSLP is wooded with heavy underbrush; a small intermittent tributary lies just south of the CSSLP subunit. The Ford Building subunit, and surrounding area, is an industrial area within the boundary of N Area (Central Shops). Each of the subunits is discussed in more detail in the following sections.

1.3.1 ECODS N-1 (NBN)

ECODS N-1 subunit is one of twenty-five 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 (Figure 1-2). ECODS N-1 was used to dispose of materials associated with the construction and operation of N Area. Historical aerial photographs revealed the ECODS N-1 as being in use from approximately August 1952 to June 1954 (Figure 1-3). ECODS N-1 is located

in a relatively flat area that gradually slopes to the south. Waste disposed of in ECODS N-1 was buried in two trenches each ~46 meters (m [150 feet {ft}]) long and located end-to-end. It is ~107 m long by 15 m wide (350 ft long by 50 ft wide) and covers ~0.18 hectares (ha [0.45 acres {ac}). ECODS N-1 was logged by the U.S. Forest Service in 2000 and is currently a wooded area containing mature pine trees providing a moderate habitat quality for ecological receptors.

A Site Evaluation for ECODS N-1 (NBN) (WSRC 2001c) was conducted in January of 2001. It was determined that potential impacts to human health or the environment from contaminants in soil could be present. Therefore, problems warranting further investigation and action associated with ECODS N-1 were identified. Based on these findings, in accordance with 300.420(b)(l)(I) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the ECODS N-1 was removed from FFA Appendix G.1, Areas to Be Investigated, and placed in Appendix C, RCRA/CERCLA Units for further action.

1.3.2 Central Shops Scrap Lumber Pile (631-2G)

The CSSLP subunit lies in a southwestern sloping plain adjacent to the CSBRP OU (Figure 1-4); it is split into two areas, the Upland Area and the Surface Water Impoundment Area (Figure 1-5). The Upland Area measures 91.4 m by 91.4 m (300 ft by 300 ft) and covers ~1.35 ha (3.34 ac). The CSSLP was cleared in 1951 and remained active until the mid-2000s. Prior to 1951, the area was farmland. Historically, the CSSLP was used to burn various unknown types and quantities of wood which may have included treated lumber and creosote-treated wood. Since 1975, operating procedures called for the area to receive inert, nonhazardous materials. The ash that was generated during the burning of scrap lumber was placed in the adjacent CSBRP OU until the pits were closed (~1985). Some time between 1985 and 1998, burning operations at the CSSLP were limited to untreated wood products, such as shipping pallets, and the ash that was generated at the CSSLP was collected and disposed of off-unit at SRS.

The CSSLP Surface Water Impoundment Area was created between 1992 and 1994 to collect rainwater runoff from the surrounding area (Figure 1-5). The Surface Water Impoundment Area is ~0.41 ha (1.02 ac); it lies just southwest of and adjacent to the Upland Area and south of the CSBRP OU (Figure 1-4). Surface water runoff from the Upland Area and the CSBRP OU flow

into the Surface Water Impoundment Area. The CSBRP OU was closed under a ROD in 2002 (WSRC 2002) while the CSSLP remained active. The USDOE, USEPA, and SCDHEC agreed to address the Surface Water Impoundment Area when characterization efforts were initiated for the Upland Area. Therefore, the Surface Water Impoundment Area is included with the CSSLP subunit and is addressed as part of the ECODS N-1, CSSLP, and Ford Building OU.

Several debris piles within the CSSLP were located in the wooded areas near an intermittent stream. The debris piles were up to 6 m (20 ft) in diameter at the base and were about 3 m (10 ft) high. In some of the piles, metal shavings and other debris were clearly evident under a thin cover of leaves. All the debris (including construction debris, plastics, and metal shavings) was removed in 11 skid pans to a landfill or recycled (WSRC 2001a).

1.3.3 Ford Building

The Ford Building (Figure 1-6) was located within the N Area facility boundary. It was a one-story metal frame structure on a concrete pad, covering ~900 square meters (m^2 [9,700 square feet {ft^2}) (Figure 1-7). The primary area of the building consisted of a machine shop with offices, storage rooms, restrooms and a service area. The administrative plan for the Ford Building structure slated the building to undergo D&D using the Integrated Sampling Model. Following demolition of the Ford Building to the building remnant slab, an engineered concrete cover was installed over the remnant slab area extending out 0.3 m (1 ft) from the building edge (SRNS 2021). Post-decommissioning facility remnants (including the building slab) will be closed as part of the ECODS N-1, CSSLP, and Ford Building OU. Ancillary equipment and other areas that will also be included in the closure process of this OU are: 1) a 13.8 kilovolt (kV) Substation (652-44N), located north of 690-N, 2) a Fuel Oil Tank Containment Dike, located south of 690-N, 3) shielding remnants, located southwest of 690-N, and 4) the 745-N Excess Equipment Yard, located north of 690-N (Figure 1-4). The fuel oil tank has been removed and only the concrete dike remains. The 13.8 kV Substation (652-44N) has been dismantled and only the concrete pad and retention walls remain.

The Ford Building was built in the 1950s and used originally for testing of Ford Company-manufactured motor control packages for control rod drive mechanisms prior to their installation

in the SRS reactors (Figure 1-3). During the early 1960s, the SRS reactors were operating at higher power levels and prompted conversion of this facility for repair/rework of failed heat exchangers. A sealed-shell steel hut included machine shops and equipment to refurbish the heat exchangers as well as a High Efficiency Particulate Air (HEPA) filter system to maintain a slight negative pressure. This mission continued until the early 1970s when the procurement of new heat exchangers for the SRS reactors terminated the mission of the facility. In the 1980s, it housed construction crews that performed minor repairs and the building was mostly used to store equipment and miscellaneous supplies. During the early 1990s, the heat exchanger repair operation was reactivated for about six months to address a minor leak in a K-Reactor heat exchanger. The building was then utilized to store excess equipment (in waste containers [e.g., Sealands] and/or bagged/wrapped in plastic) that was chemically and/or radiologically contaminated. Services and utilities to the facility included domestic water, fire water, electrical power, sanitary sewer and process sewer.

The repair work that occurred in the Ford Building generated wastewater contaminated with low levels of radioactivity and trace quantities of non-radioactive organic and inorganic compounds. The wastewater was either released to the Ford Building Seepage Basin (FBSB) (904-91G) through an underground tank and process sewer pipeline or transferred to other SRS operations for proper disposal. The FBSB (904-91G) and associated underground tank and pipeline were remediated in 1998 as documented in the *Record of Decision Remedial Alternative Selection for the Ford Building Seepage Basin (904-91G) Operable Unit* (WSRC 2001b).

The USDOE, USEPA, and SCDHEC reached agreement in 2019 that the Ford Building would undergo D&D using the Integrated Sampling Model and will be closed as part of the ECODS N-1, CSSLP, and Ford Building OU. Deactivation and demolition removed all building components to the building slab, which remained in place. The D&D work was completed in 2021 followed by the installation of an engineered concrete cover that extends out 0.3 m (1 ft) from the remnant slab edge (SRNS 2021). Ancillary equipment and other areas that are included with the Ford Building subunit are the remnants of 1) a 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 745-N Excess Equipment Yard was originally constructed in 1958 as part of a temporary metal (hangar style) building for clean storage. The building was demolished, and the remaining concrete pad was utilized to store reactor process heat exchangers that were either awaiting repair or had been repaired (SRNS 2014a). The 745-N Excess Equipment Yard included 49 reactor heat exchangers, a Handi-House entry point, a contaminated Model 845-DLS filter/transport trailer, and the deionizer trailer. The concrete pad and the associated equipment excluding the deionizer trailer has since been removed from N Area (SRNS 2013). The deionizer trailer is currently located southwest of the Ford Building and is planned to be dispositioned as a portable equipment item. The 745-N Excess Equipment Yard currently contains no equipment, and the area consists of a grassy field.

1.4 Land Use

The ECODS N-1, CSSLP, and Ford Building OU is located in an area designated for industrial use as defined by the *Land Use Control Assurance Plan for the Savannah River Site* (WSRC 1999). No current or projected future development of the OU is planned. Land use controls (LUCs) will be part of any remedial action, as appropriate, to ensure prevention of unrestricted use (e.g., residential). Any potential future resident (or residential use) referred to in this report is only hypothetical. Groundwater is not part of the OU and will be addressed as part of the Central Shops Groundwater OU. There is no current or projected future use of the groundwater as a drinking water source.

1.5 Natural Resource Trustees Injury Evaluation

The potential for natural resource injuries is documented by completing the NRIE Checklist (Appendix G). The purpose of the NRIE Checklist is to identify potential natural resource injuries associated with CERCLA remedial activities. If potential injuries are identified, consideration is given as to whether trustee involvement is needed. The checklist is a starting point in potential injury identification and is not intended to be all-inclusive. The checklist has been designed as a series of questions to help identify the potential for natural resource injuries and what resources may be affected. It is based on the pre-assessment screen in 43 Code of Federal Regulations (CFR) 11.13.

The USDOE, as a trustee of its land, is responsible for identifying resources of concern. SRS integrates components of the Natural Resource Damage Assessment and RI/FS processes to assess potential threats to natural resources during the remedial process. The intent is to prevent potential injuries to natural resources that can occur as the result of remediation activities and to mitigate, to the extent practical, any injuries that have already occurred. The list of trustees for the SRS is included in Table 1-1.

Based on the NRIE Checklist (Appendix G), natural resources have been adversely affected by hazardous substances from the ECODS N-1, CSSLP, and Ford Building OU. Asbestos containing materials (ACM) were identified in the subsurface soils in the ECODS N-1. Arsenic is the only refined contaminant of concern (RCOC) identified in the CSSLP. Additionally, cobalt-60 is identified as a RCOC for perimeter soils at the Ford Building. Remedial alternatives may or may not address injuries to the natural resources and could cause additional injury based on the scope of the action. No irreversible or irretrievable resource losses are known to exist. The impact to natural resources will be considered during the remedial alternative evaluation for the ECODS N-1, CSSLP, and Ford Building OU.

This page is intentionally left blank.

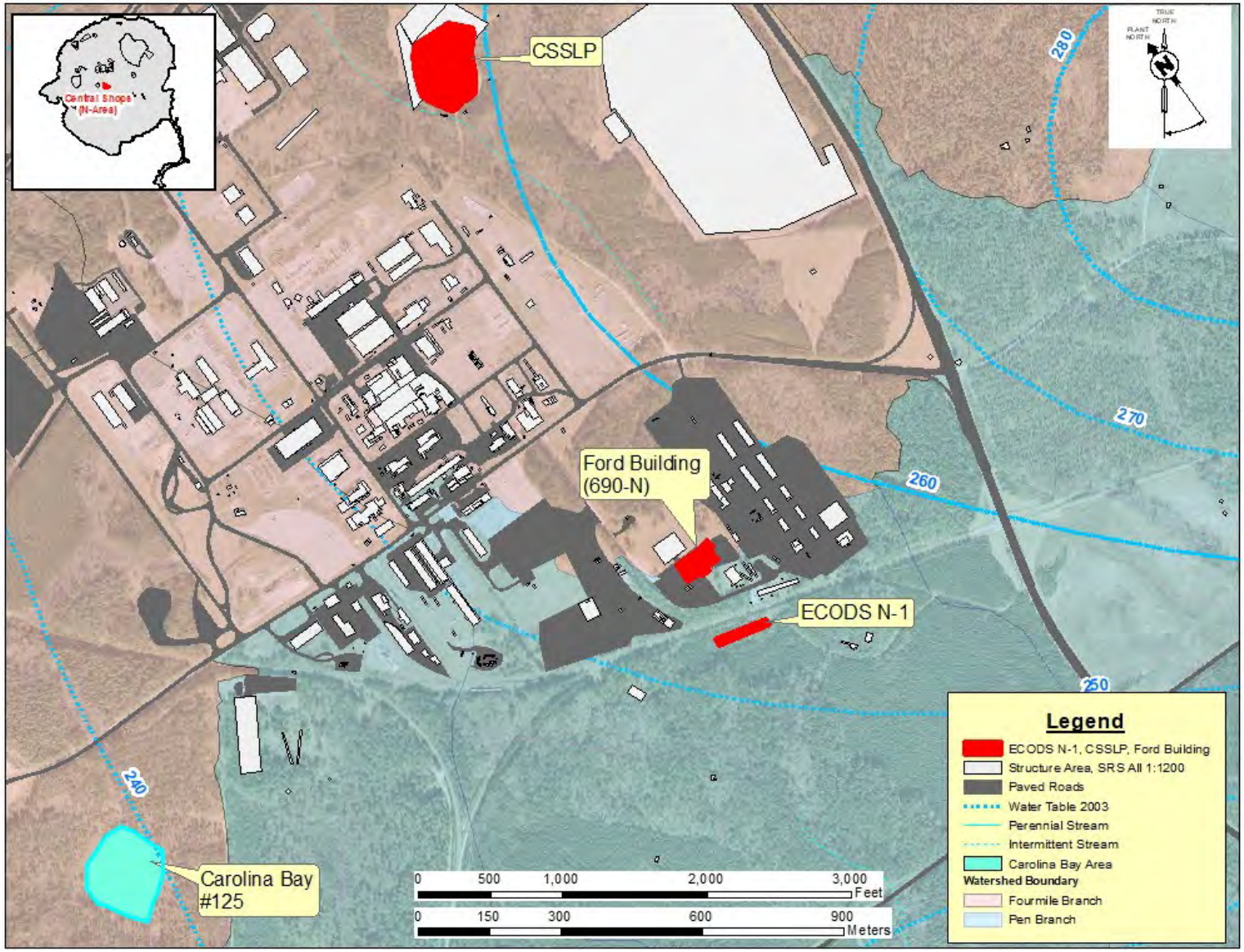


Figure 1-1. ECODS N-1, CSSLP and Ford Building OU Location

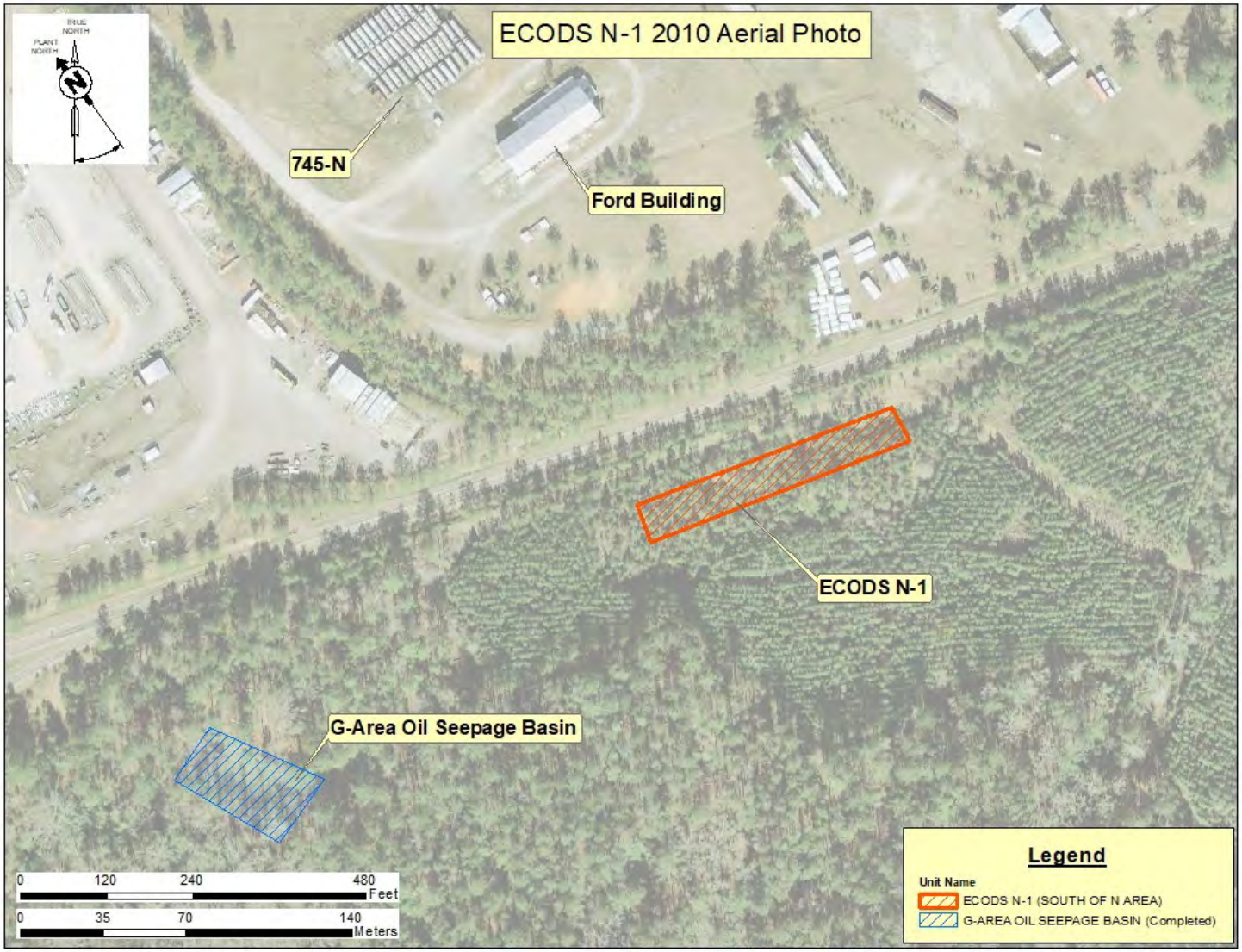


Figure 1-2. ECODS N-1 2010 Aerial Photo



Figure 1-3. Photograph of ECODS N-1 (1953)

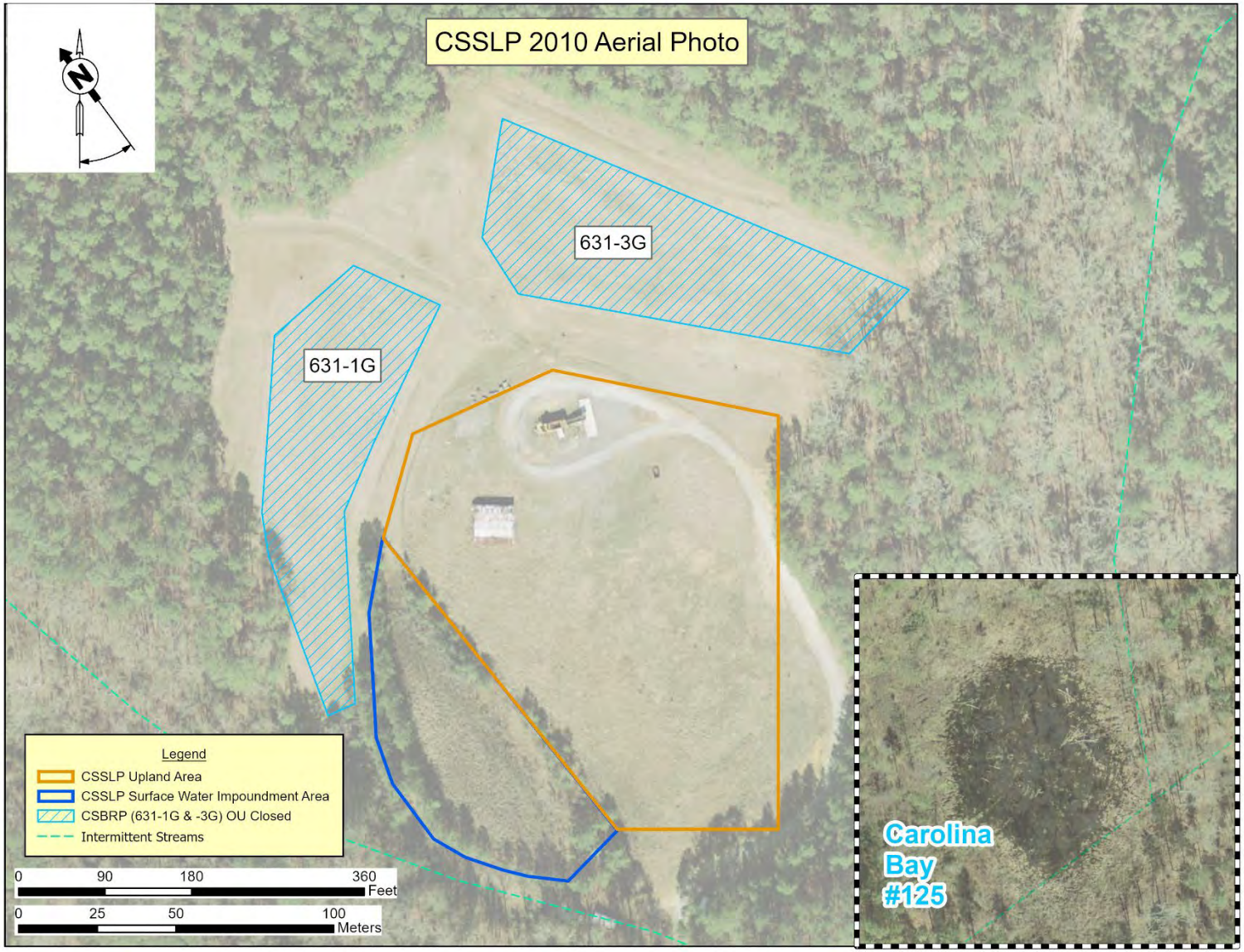


Figure 1-4. Central Shops Scrap Lumber Pile 2010 Aerial Photo

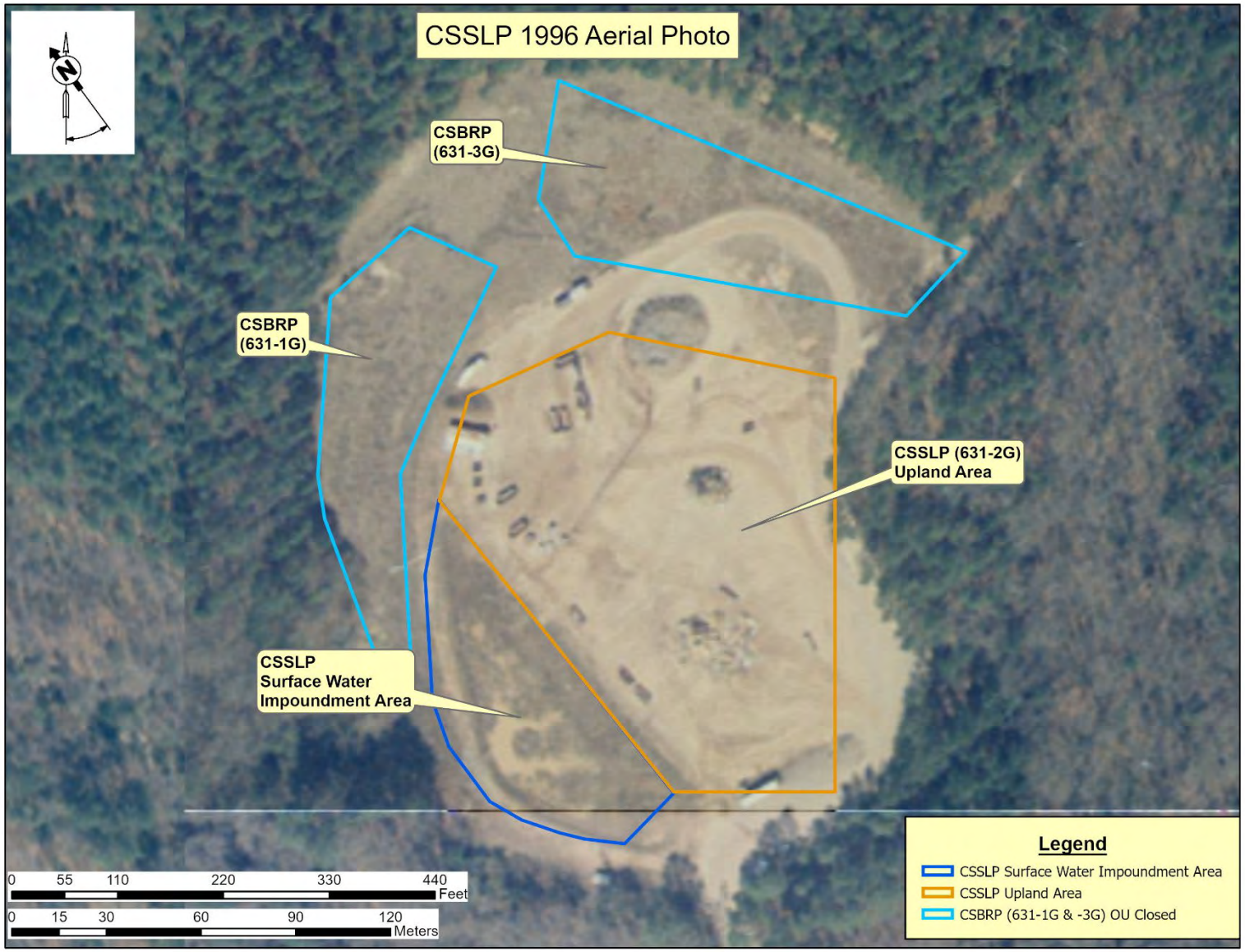


Figure 1-5. Central Shops Scrap Lumber Pile 1996 Aerial Photo

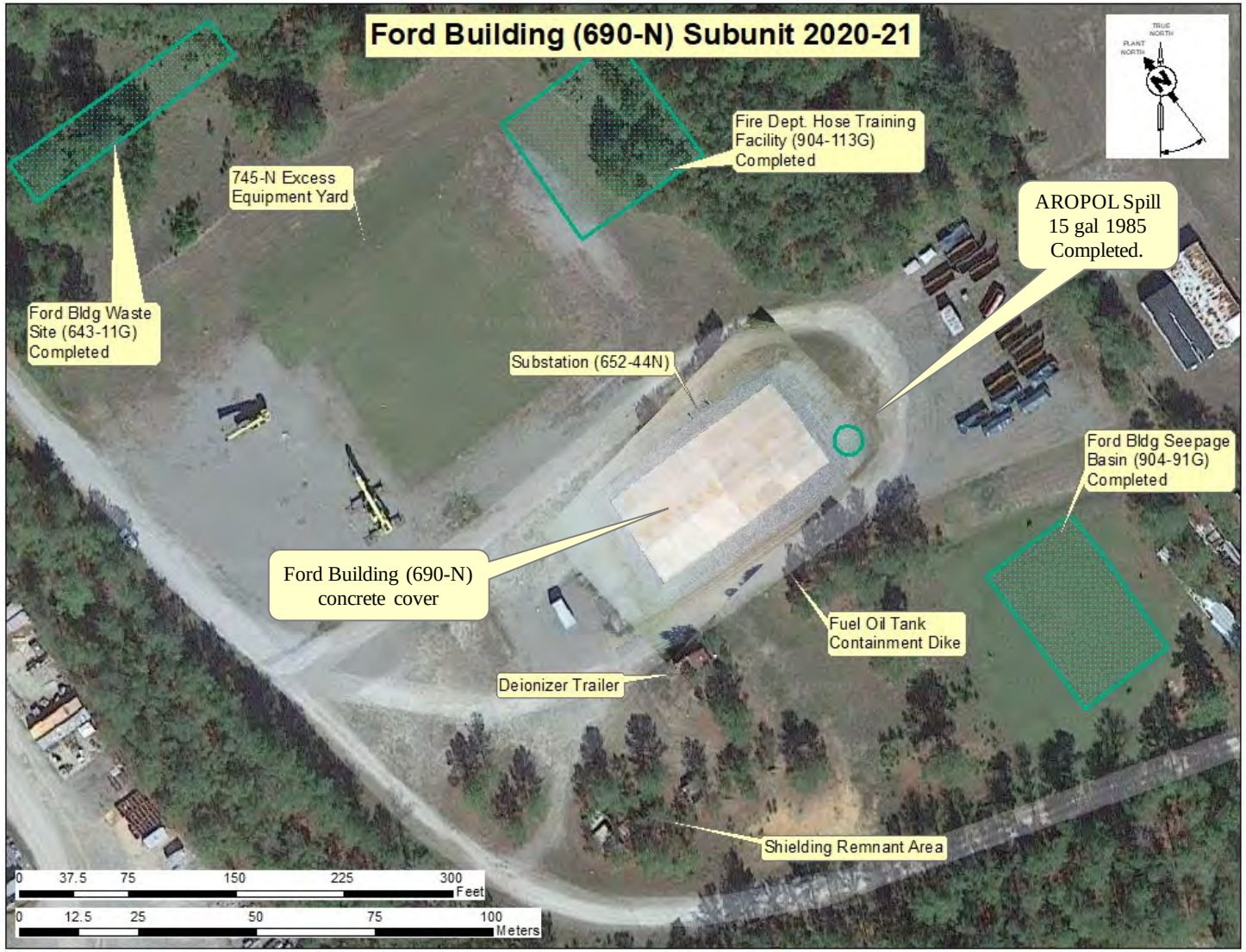


Figure 1-6. Ford Building 2020-2021

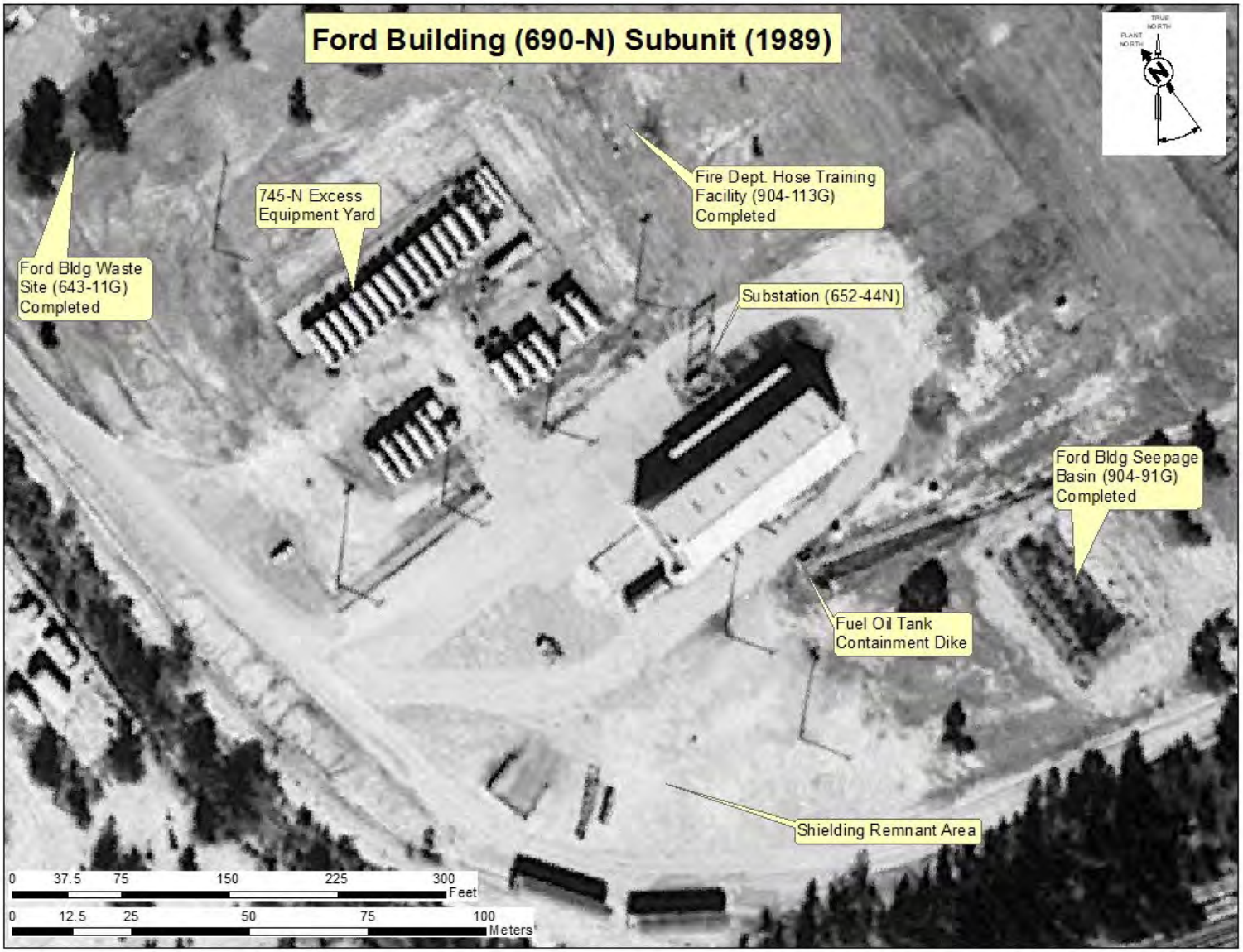


Figure 1-7. Ford Building 1989 Aerial Photo

Table 1-1. Savannah River Site Natural Resource Trustees and Their Responsibilities

Governing Power	Responsibilities
USDOE, Savannah River Operations Office	All-natural resources located on, over, or under land administered by USDOE
South Carolina Office of the Governor	All-natural resources of the State of South Carolina
SCDHEC, Bureau of Land and Waste Management	Geologic resources including soil, groundwater resources (including drinking water sources), air resources, and surface water resources
U.S. Department of the Interior	Threatened and endangered species (includes Red-Cockaded Woodpecker, Bald Eagle, Wood Stork, Shortnose Sturgeon, and Smooth Coneflower), migratory birds, anadromous species, National Park Service land (Fort Pulaski National Monument), Fish and Wildlife Service land (Savannah River National Wildlife Refuge), Tybee Island National Wildlife Refuge, and Orangeburg National Fish Hatchery
South Carolina Department of Natural Resources	Commercial species, game and non-game species, and state sensitive species
Georgia Department of Natural Resources	Savannah River resources, groundwater resources, air resources, and surface water resources
U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA)	Living and non-living natural resources in coastal and marine areas including the following: • All life stages, wherever they occur, of fishery resources on the Exclusive Economic Zone and continental shelf • Anadromous and catadromous species throughout their ranges, rivers, and tributaries to rivers, which historically or presently support the above species • Federally endangered and threatened species, including designated critical habitat and marine mammals for which NOAA has assigned responsibility • Tidal wetlands, salt marshes, estuaries, and all other habitats supporting all fishery and marine resources listed above • Living and non-living resources of National Marine Sanctuaries and National Estuarine Reserves
U.S. Army Corps of Engineers, Charleston, South Carolina District, Savannah, GA District	Savannah River resources, navigable waters resources, and waters of the United States resources

2.0 SITE DESCRIPTION

A discussion of the physical attributes of the ECODS N-1, CSSLP, and Ford Building OU is provided in the following sections. The ECODS N-1, CSSLP, and Ford Building OU physical habitats, ecological setting, surface features, meteorology, unit-specific geology and hydrogeology, surface water hydrology, and sediments/ soils are described and depicted in the following sections.

2.1 Physical Setting

Central Shops (N Area) is located near the center of the SRS and to the east of C Area (Figure 1-1). The terrain is relatively flat and the area surrounding Central Shops (N Area) is wooded with heavy underbrush. The Central Shops (N Area) area is currently designated for industrial use. Figure 2-1 depicts the major surface features of Central Shops (N Area) and surrounding areas.

2.1.1 Habitats and Ecological Setting

The diverse habitats of SRS support a wide range of aquatic, semi-aquatic, and terrestrial biota. As an Environmental Research Park, the SRS has a wealth of site-specific information on a variety of species including threatened, endangered, and sensitive (TES) species. The information includes locational data from geographic information system coverages for plant and select faunal species that is further supported by ground surveys for TES species and other various organisms to support various research efforts including long-term monitoring conducted by the Savannah River Ecology Laboratory. The SRS Natural Resources Management Plan developed by the U. S. Forestry-Savannah River (USFS-SR) prioritizes protection of TES species. The USFS-SR manages the DOE's SRS wildlife, plants, and renewable timber resources so that ecological systems are sustained and protected. They also develop habitat management plans through consultation with the U. S. Fish and Wildlife Service for endangered species management and conduct ground surveys of TES species. Threatened, Endangered, and Sensitive (TES) plants known to be present at SRS are provided in Table 2-1. Table 2-2 lists TES animal species known to occur in Barnwell

County, South Carolina. Along with the extensive ecological data available for SRS, there is area-specific information for N Area including ECODS N-1, CSSLP, and Ford Building OU.

The ECODS N-1 subunit is located in a wooded area. The area was logged in the summer of 2000 but has now re-established as a wooded, primarily mature pine forest (*Pinus spp.*). No threatened, endangered, or sensitive species are known to reside in the area. There are no wetlands or surface water features in the near vicinity. A TES survey was conducted at the Central Shops Burning Rubble Pit (631-6G) (Bumpus and Garner 1994). The survey covers 30.7 ha (75.8 ac) that includes ECODS N-1 and nearby aquatic habitat. No TES species were identified during the survey.

The CSSLP subunit was cleared in 1951 and was used for equipment laydown and rubble storage in addition to a burning area. Prior to 1951, the area was farmland (WSRC 2001c). This subunit is currently covered by immature volunteer pine trees and various shrub species, as well as grasses and herbaceous vegetation. Scattered volunteer trees in the area include pines (*Pinus spp.*), wax myrtle (*Myrica cerifera*), cottonwood (*Populus deltoides*), and wild plum (*Prunus spp.)* The areas that had been cleared for operational activities provide marginal habitat quality for wildlife receptors.

Associated with the CSSLP subunit is a surface depression referred to as the Surface Water Impoundment Area. This area maintains wetland-associated species such as cattails (*Typha spp.*), bulrush (*Scirpus spp*), with scattered trees including sycamore (*Platanus occidentalis*), wax myrtle (*Myrica cerifera*), and black willow (*Salix nigra*). Water levels fluctuate in the depressional area depending on rainfall. This impoundment area flows, as rainwater becomes available, into an intermittent stream that ultimately discharges to Fourmile Branch. The intermittently flowing stream (less than [<] 2-m [6.56-ft] width) is capable of supporting a very limited diversity of aquatic life due to fluctuations in water levels. Toxicity tests (aquatic and sediment) were conducted in the Surface Water Impoundment Area, wetland area and intermittent stream and the results are presented in the RFI/RI with BRA for the CSBRP (631-1G and 631-3G) (WSRC 1998). A TES survey was conducted at the Central Shops Burning/Rubble Pits (631-1G, 631-3G, 631-5G) (Imm 1998a) as well as the CSBRP (631-6G) (Bumpus and Garner 1994). No TES species were identified during the surveys.

The Ford Building subunit is located in an area characterized by grasses and herbaceous vegetation with volunteer pine trees (*Pinus spp*.) and various shrub species. There is no aquatic habitat associated with the Ford Building subunit. The predominant structure is a concrete cover and gravel skirt over the Ford Building remnant slab. This area has minimal viable habitat for ecological receptors. A TES survey was conducted at the Ford Building Seepage Basin and surrounding area (Imm 1998b). The survey did not reveal any TES species within the urban-industrial landscape.

2.1.2 Surface Features

The ECODS N-1 surface elevation is 90 m (295.2 ft) mean sea level (msl) and the land gently slopes to the south and southeast from the ECODS N-1. There is a railroad line ~22 m (72 ft) to the north of the ECODS N-1 and the ECODS N-1 lies just outside the southern Central Shops (N Area) boundary. Surface water runoff is to the south-southeast into an intermittent stream that discharges to Pen Branch within the Pen Branch Watershed (Figure 1-1).

The CSSLP lies just outside the northeast boundary of Central Shops (N Area). The CSSLP surface elevation is 85 m (278.8 ft) msl and the land gently slopes to the southwest toward an unnamed intermittent stream within the Fourmile Branch Watershed. The CSSLP Surface Water Impoundment Area also flows periodically into the intermittent stream which flows northwest and discharges into Fourmile Branch.

The Ford Building is in the southeastern portion of the Central Shops Area on a topographic ridge between Pen Branch and Fourmile Branch. The Ford Building surface elevation is 93 m (305 ft) msl and the land gently slopes radially downgradient from the Ford Building. The Ford Building subunit lies on a topographic ridge between the Pen Branch and Fourmile Branch watersheds (Figure 2-2).

2.1.3 Meteorology

The climate of the central Savannah River area is humid and subtropical. It is characterized by hot summers and mild winters. Outbreaks of severe thunderstorms occur more frequently during

the spring; rainfall is evenly distributed throughout the year (SRNL 2020). Except for the Savannah River valley, there are no topographic features that would significantly influence the general climate.

Meteorological monitoring has been conducted at the SRS since the 1950s. Monthly averages of temperature and precipitation based on a 30-year historical record of observations are presented in the Table 2-2 and Table 2-3, respectively. During the summer months, temperatures at SRS typically exceed 32.2 degrees Celsius (°C [90 degrees Fahrenheit {°F}]) in daytime, dropping to near 21.1 °C (70 °F) at night. On average, fall and spring temperatures vary between 21.1 °C (70 °F) and 29.4 °C (85 °F) during the daytime and 7.2 °C (45 °F) and 18.3 °C (65 °F) in the night. Winter daytime temperatures are generally near 15.6 °C (60 °F) with nighttime temperature near 4.4 °C (40 °F). The 30-year average rainfall is 47.24 inches, with record low annual rainfall of 32.1 inches in 2010, and a record high annual rainfall of 63.97 inches in 2003. Average precipitation is relatively consistent throughout the year, with slightly higher rainfall occurring during the summer months when the humidity levels are higher.

2.2 Geology and Hydrogeology

This section describes the geology, hydrogeology, surface water hydrology, and soil types for the ECODS N-1, CSSLP, and Ford Building OU.

2.2.1 Geology

SRS is situated on the Atlantic Coastal Plain, a wedge of unconsolidated and semi consolidated sediments that thickens toward the southeast. Investigations into regional and SRS geology are summarized in the *Hydrogeologic Framework of West-Central South Carolina* and other reports (Aadland et al. 1995; Fallaw and Price 1995; Stieve and Stephenson 1995).

As shown on Figure 2-3, the shallow geologic units associated with the ECODS N-1, CSSLP, and Ford Building OU include the middle to late Tertiary Age Dry Branch Formation, Tobacco Road Formation, and "Upland Unit" (correlative to the Altamaha Formation). The Dry Branch Formation in the area of the ECODS N-1, CSSLP, and Ford Building OU is ~18.3m (60-ft) thick.

Locally, this formation consists of coarse to medium grained, poorly to moderately sorted sand and silt with minor amounts of clay matrix. Interbedded sandy and silty clay layers (0.3 to 3.0 m [1 to 10 ft] thick) are abundant, and pebble layers occur locally. The Dry Branch Formation includes a semi-continuous clay horizon referred to in many SRS reports as the "tan clay." The "tan clay" is ~7 m (23 ft) thick at the ECODS N-1, CSSLP, and Ford Building OU. The sediments of the Dry Branch Formation appear to have been deposited in a lower delta plain or shallow shelf environment (Aadland et al. 1995). The top of the Dry Branch Formation contains a relatively well-sorted medium sand known as the Irwinton Sand. The uppermost Dry Branch Formation is highly channelized and the contact with the overlying "Upland Unit" is irregular.

Overlying the Dry Branch Formation, the Tobacco Road Formation is ~12.2 m (40 ft) thick and consists of moderately to poorly sorted, red, brown, tan, purple, and orange, fine to coarse, clayey quartz sand. Pebble layers are common, as are clay laminae and beds. Trace fossils, possibly *Ophiomorpha* burrows, are abundant in parts of the formation. Sediments have the characteristics of a shallow marine deposit.

The informally named "Upland Unit" consists of poorly sorted, silty, clayey sand, pebbly sand, and conglomerate. This unit caps hills in higher elevations over much of SRS and throughout all of the Central Shops (N Area), where the average thickness is 12.2 m (40 ft). The color is variable, and facies changes are abrupt; weathered feldspar is abundant in places. Due to the highly eroded and channelized nature of the underlying Tobacco Road Formation, the thickness of the "Upland Unit" changes abruptly. The "Upland Unit" appears to have been deposited in a fluvial environment.

2.2.2 Groundwater Hydrogeology

The unconsolidated marine and fluvial sediments of the Atlantic coastal plain underlying the ECODS N-1, CSSLP, and Ford Building OU and all of SRS are a variably stratified, heterogeneous sequence of sand, clay, limestone, and gravel layers. In terms of hydrostratigraphy, the uppermost sediments make up the Floridan Aquifer System. In the ECODS N-1, CSSLP, and Ford Building OU, the Floridan Aquifer System consists of, in ascending order, the Gordon Aquifer (GA), the

Gordon Confining Unit (GCU), and the Upper Three Runs Aquifer (UTRA) (Figure 2-3). The Floridan Aquifer System is separated from lower aquifer units by the Crouch Branch Confining Unit, which is a competent aquitard.

2.2.3 Surface Water Hydrology

The five major streams that drain from the SRS to the Savannah River are the Upper Three Runs, Fourmile Branch, Pen Branch, Steel Creek, and Lower Three Runs. The ECODS N-1, CSSLP, and Ford Building OU is in an area of relatively flat topographic relief gently sloping to the southeast toward the Pen Branch Watershed and the northwest toward the Fourmile Branch Watershed (Figure 2-2). The regional area does contain various poorly drained surface depressions such as Carolina bays.

2.2.4 Unit Soils

The soils within the ECODS N-1, CSSLP, and Ford Building OU are classified as Entisols and Ultisols. The Entisol soil series located within the ECODS N-1, CSSLP, and Ford Building OU is the Udorthents soil series. Entisols are associated with areas of relatively recent geologic formation. These soils are typically associated with areas of land development and areas where disturbance of the land occurs either naturally or by man (i.e., erosion, deposition, excavation or construction activities). The Udorthents series is present at the ECODS N-1, CSSLP, and Ford Building OU (Figure 2-4).

Ultisols are soils that are rich in clay, some mineral nutrients and metal oxides, and typically have a humus-rich surface horizon. These soils are generally well-formed and associated with areas of older geological settings. The Dothan series is the only Ultisol soil series located near the ECODS N-1, CSSLP, and Ford Building OU; however, it covers the majority of the area around the ECODS N-1, CSSLP, and Ford Building OU and surrounding area to the east and west (Figure 2-4).

2.2.4.1 Unit-Specific Hydrogeology

The unconsolidated marine and fluvial sediments of the Atlantic coastal plain underlying the ECODS N-1, CSSLP, and Ford Building OU and all of SRS are a variably stratified, heterogeneous sequence of sand, clay, limestone, and gravel layers. In terms of hydrostratigraphy, the uppermost sediments make up the Floridan Aquifer System. In the ECODS N-1, CSSLP, and Ford Building OU, the Floridan Aquifer System consists of, in ascending order, the GA, the GCU, and the UTRA (Figure 2-3). The Floridan Aquifer System is separated from lower aquifer units by the Crouch Branch Confining Unit, which is a competent aquitard.

2.3 Conceptual Site Model

The CSM is an objective framework for assessing data pertinent to the investigation. The preliminary CSMs for the ECODS N-1, CSSLP, and Ford Building OU (Figures 2-5 through 2-7) identify and evaluate suspected sources of contamination, contaminant release mechanisms, potentially affected media (secondary sources of contamination), potential exposure pathways, and potential human and ecological receptors that are evaluated in the risk assessment.

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

1. Primary Sources
2. Primary Sources Environmental Release Mechanisms
3. Secondary Sources
4. Secondary Sources Environmental Release Mechanisms
5. Exposure media (soil, sediment, surface water, etc.)
6. Exposure route (external radiation, ingestion, dermal contact, inhalation, etc.)
7. Receptor (resident, worker, wildlife, etc.)

If any of these elements are missing, the pathway is incomplete and is not considered further in the 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 important in terms of identifying all 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.

2.3.1 Primary Sources of Contamination

ECODS N-1 subunit is one of twenty-five 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 from August 1952 until June 1954. Construction debris, whether identified or potential, comprise the primary sources of contamination for the ECODS N-1 subunit.

The CSSLP subunit was cleared in 1951 and was used for equipment laydown and rubble storage, in addition to a burning area which remained active up until the mid-2000s. Prior to 1951, the area was used as farmland. Scrap lumber, wood combustion products, and wood treatment chemicals, whether identified or potential, comprise the primary sources of contamination for the CSSLP subunit.

The Ford Building subunit was built in the 1950s and used exclusively for testing of Ford Company-manufactured motor control packages for control rod drive mechanisms prior to their installation in the SRS reactors. During the early 1960s this facility was converted for reactor heat exchanger repair/rework. This mission continued until the early 1970s when the procurement of new heat exchangers for the SRS reactors terminated the mission of the facility. Polychlorinated biphenyls (PCBs [Aroclors]) from the early machinery, industrial contaminants, expansion joint caulk containing PCBs, and radionuclides from the heat exchangers comprise the primary sources of contamination for the Ford Building subunit primarily associated with the remnant building slab and are covered by an engineered concrete cover.

2.3.2 Primary Sources Environmental Release Mechanisms

Environmental release mechanisms evaluated as primary sources of contamination to the ECODS N-1 subunit were solid construction wastes disposed of in the ECODS N-1 subunit during SRS Central Shops construction activities in the 1950s. All environmental release mechanisms for primary sources of contamination have been inactive since 1954.

Environmental release mechanisms evaluated as primary sources of contamination to the CSSLP subunit were solid wastes (e.g., wood scraps) disposed of and burned in the CSSLP subunit starting in the 1950s and ending in the mid-2000s. All environmental release mechanisms for primary sources of contamination have been inactive since 2007.

For the Ford Building, the repair work that occurred in 690-N generated wastewater contaminated with low levels of radioactivity and trace quantities of non-radioactive organic and inorganic compounds. Environmental release mechanisms evaluated as primary sources of contamination to the Ford Building subunit were liquid wastes (PCB-containing oil from machines) starting in the 1950s and ending in the 1980s, and low-level radioactive wastes (e.g., residual water/scale inside reactor heat exchangers) disposed of in the Ford Building subunit starting in the 1970s and ending in the mid-2010s. Environmental release mechanisms for primary sources of contamination from heat exchangers have been inactive since 2012, and environmental release mechanisms for primary sources of contamination from machinery with PCB-containing oil have been inactive since 1998.

2.3.3 Secondary Sources of Contamination

As a primary source contacts other media, secondary sources of contamination can potentially be created. At the ECODS N-1, CSSLP, and Ford Building OU, receipt of liquid wastes during the Central Shops construction debris disposal, scrap lumber disposal and heat exchanger repairs had the potential to create secondary sources including surface water, groundwater, sediment, and soil.

2.3.4 Secondary Sources Environmental Release Mechanisms

At the ECODS N-1, CSSLP, and Ford Building OU, potential secondary release mechanisms included volatilization during burning operations, biotic uptake, fugitive dust by wind or other soil surface disturbances including soil excavation and subunit operations.

2.3.5 Exposure Media

ECODS N-1, CSSLP, Ford Building OU exposure media include air vapor, biota, surface water, surface sediment, surface soil, and soil to a depth of 9.0 m (30 ft) bgs.

2.3.6 Exposure Routes

ECODS N-1, CSSLP, Ford Building OU exposure routes include inhalation, external radiation, ingestion, and dermal contact.

2.3.7 Receptors (Human and Ecological)

The industrial worker is the most appropriate receptor scenario for assessing potential risks associated with the sediment and soil of the ECODS N-1, CSSLP, Ford Building OU. The resident scenario is protective of the industrial worker since the resident is a more conservative scenario to assess potential risk to human receptors. Surface water is also conservatively evaluated under a residential scenario. A comparison of exposure assumptions to potential human exposure scenarios at SRS is provided below:

Potential Receptor	Years	Days/Year	Hours/Day	Exposure Hours
OU Resident	26	350	24	218,400
OU Industrial Worker	25	250	8	50,000

Potential ecological receptors for ECODS N-1, CSSLP, Ford Building OU include terrestrial and aquatic/semi-aquatic wildlife.

Complete exposure pathways to potential human receptors and ecological receptors for evaluation in this document are included in the preliminary CSMs (Figures 2-5 through 2-7). The refined CSMs, which include the RCOCs, are included in Chapter 3.

This page is intentionally left blank.

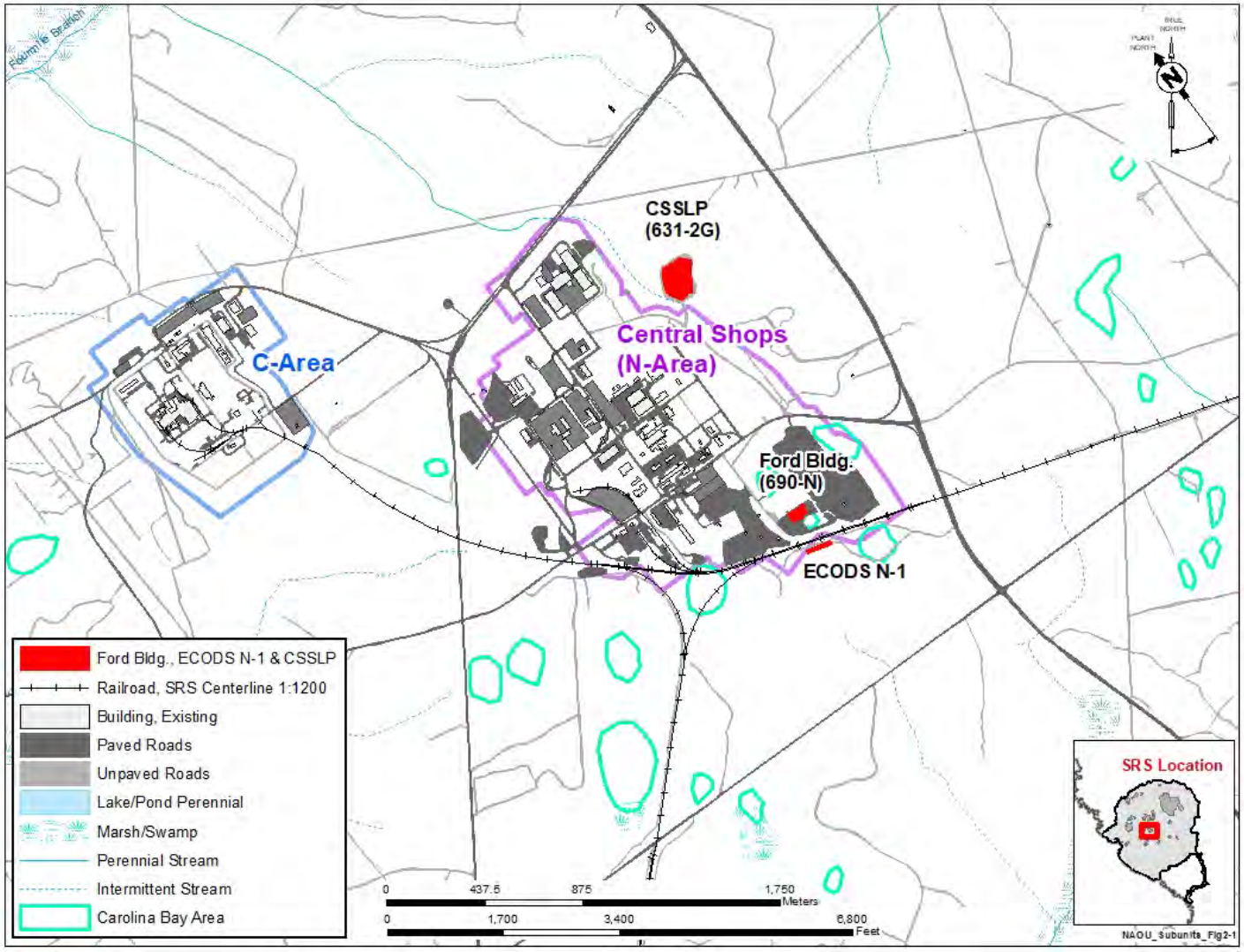


Figure 2-1. Central Shops (N Area) Surface Features

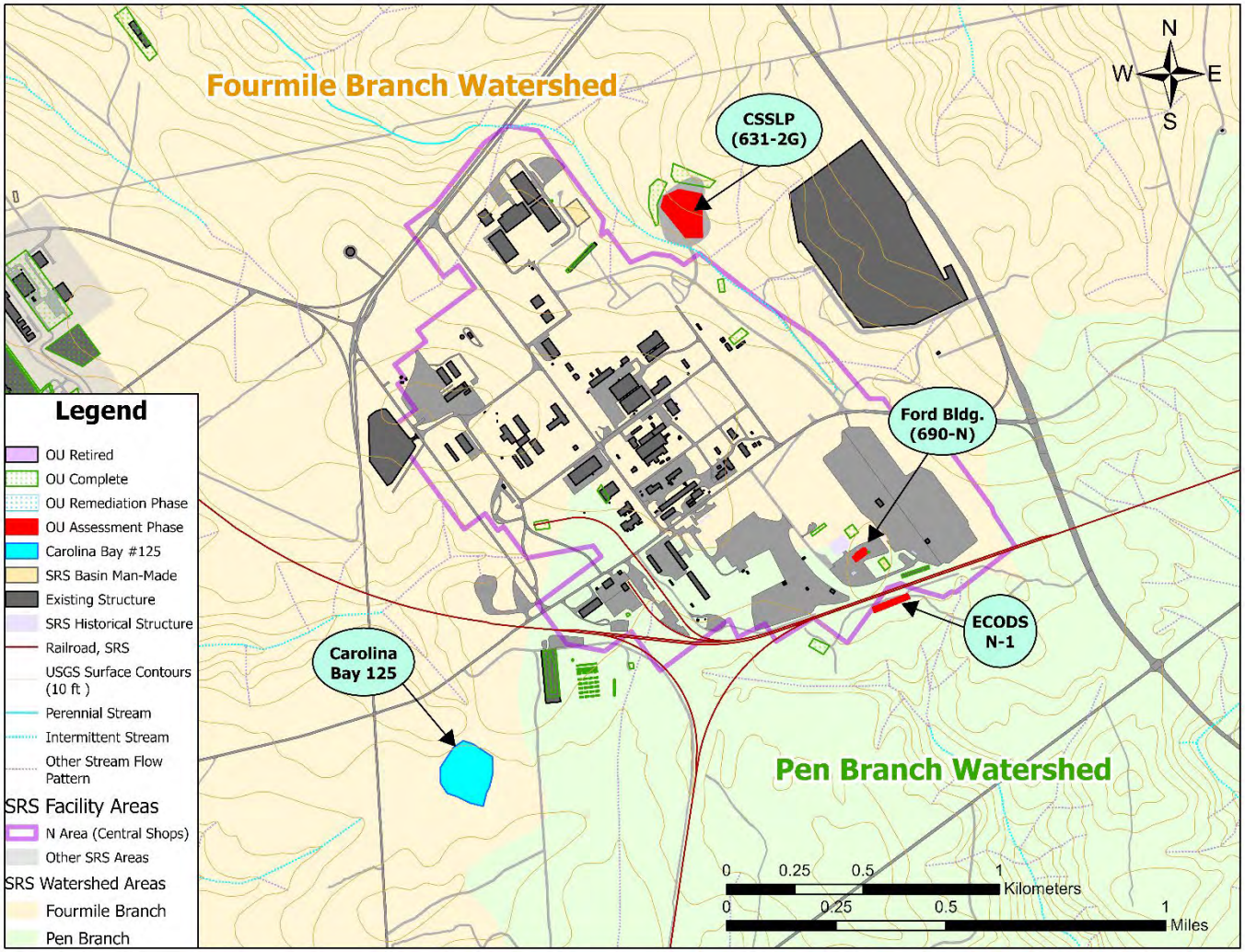


Figure 2-2. Central Shops (N Area) Surface Water Run-Off

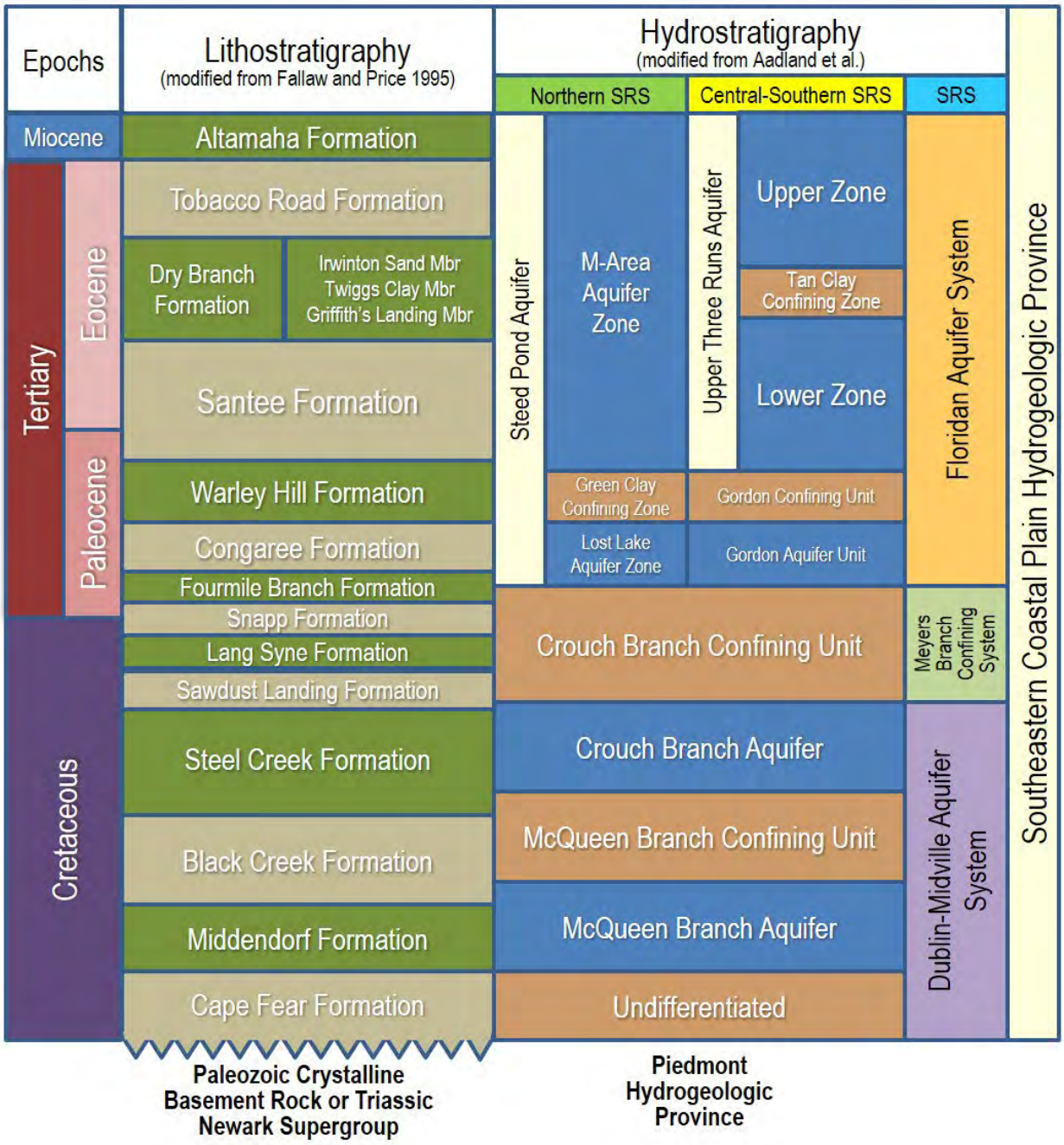


Figure 2-3. Lithostratigraphic and Hydrostratigraphic Unit Comparisons

This page is intentionally left blank.

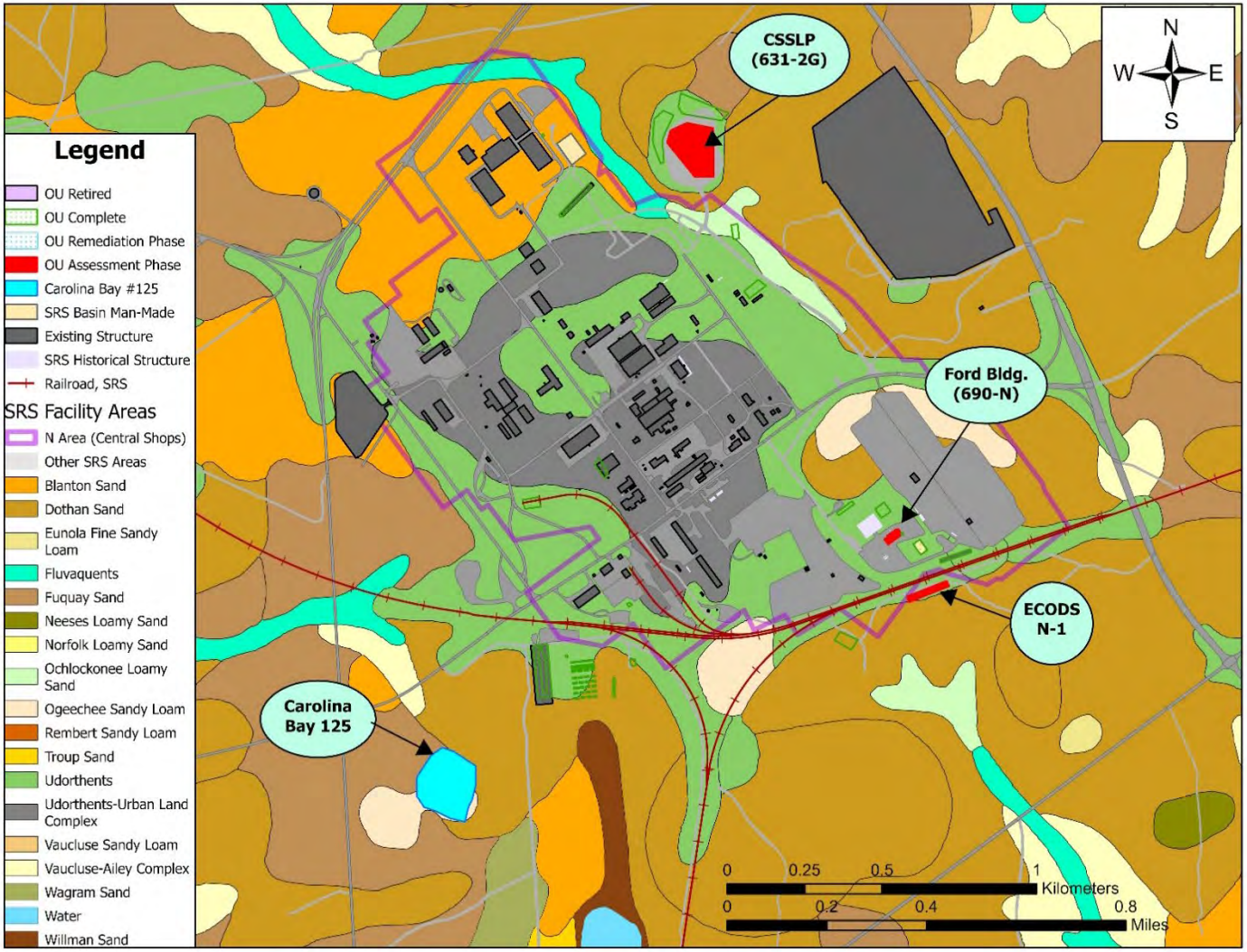


Figure 2-4. Soil Series in the Central Shops (N Area)

This page is intentionally left blank.

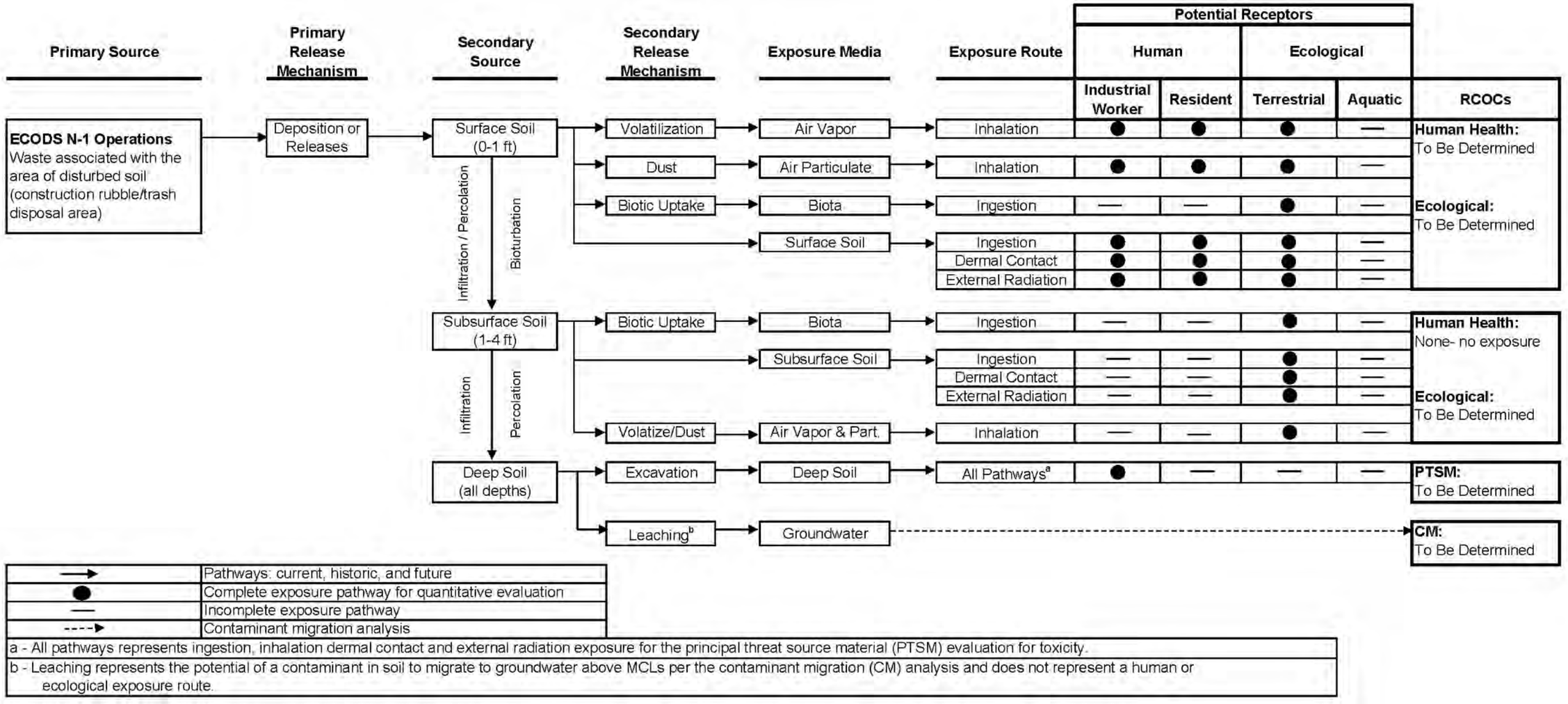


Figure 2-5. Preliminary Conceptual Site Model for the ECODS N-1 Subunit

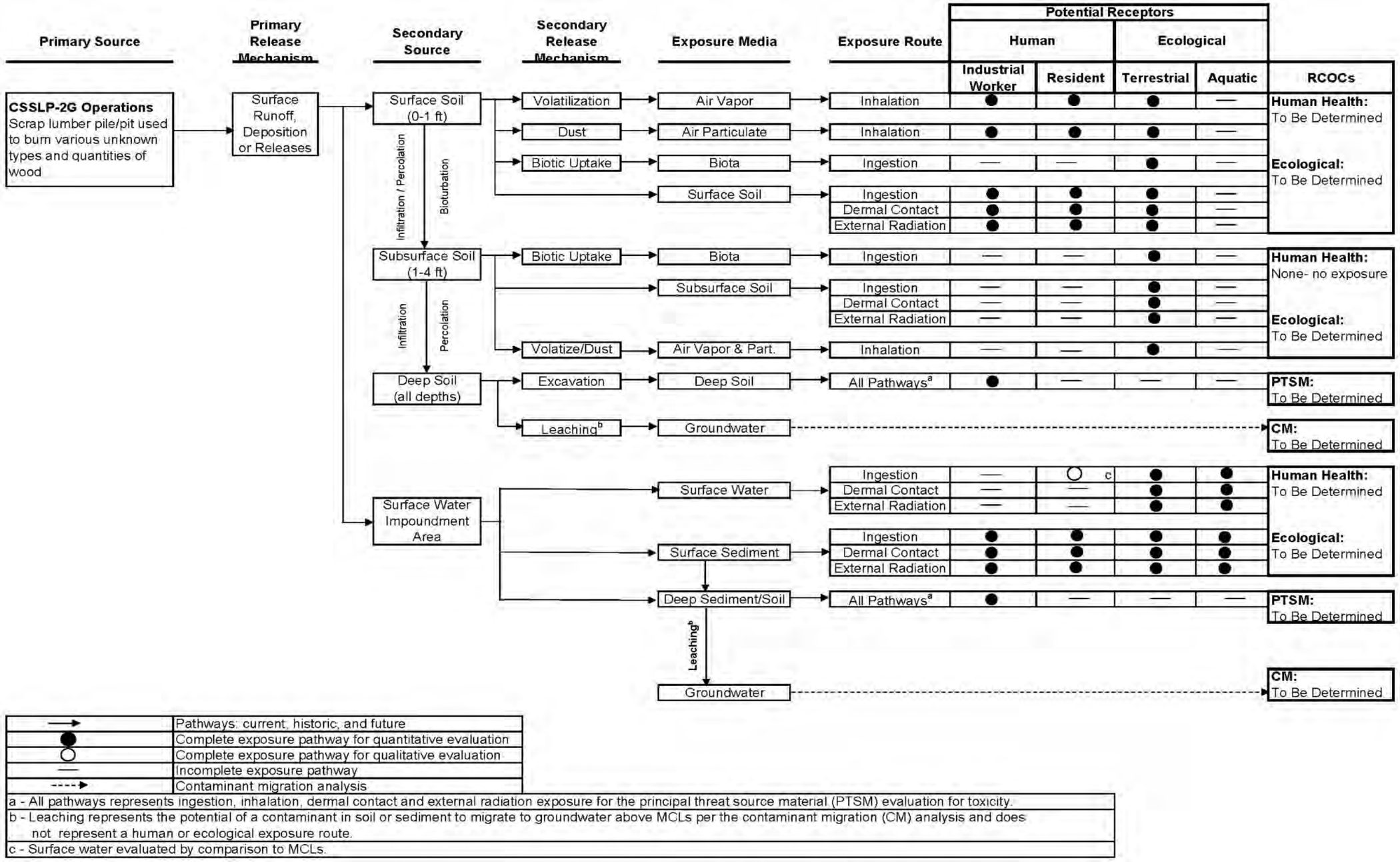


Figure 2-6. Preliminary Conceptual Site Model for the Central Shops Scrap Lumber Pile (632-1G) Subunit

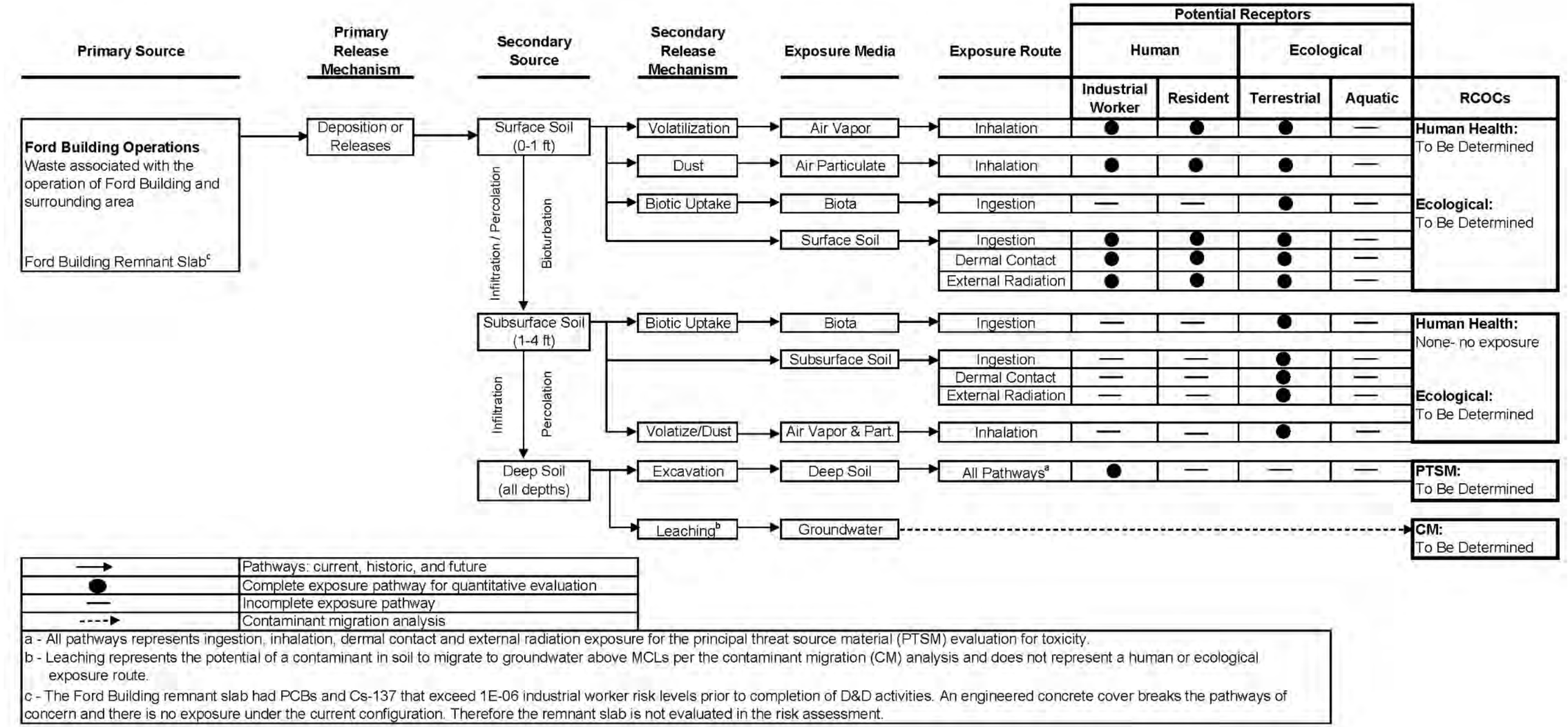


Figure 2-7. Preliminary Conceptual Site Model for the Ford Building Subunit

This page is intentionally left blank

Table 2-1. TES Plant Species Known to Occur on SRS

Species	Habitat
Striped garlic (*Allium cuthbertii*)	Sandhills, granite domes, flat rocks.
Gerardia (*Agalinus decemloba*)	Dry clayey or sandy woods
Incised groovebur (*Agrimonia incisa*)	Pinelands
Dutchman's pipe (*Aristolochia macrophylla*)	Cove forests
Great Indian plantain (*Arnoglossum muehlenbergii*)	Cove forests, other mesic forests
Hairy milkpea (*Astragalus villosus*)	Sandhills and other dry, sandy places
Sandhills milkpea (*Astragalus michauxii*)	Sandhills
Lanceleaf wild indigo (*Baptisia lanceolata*)	Sandhills
Chapman's sedge (*Carex chapmanii*)	Edges of calcareous pine savannas, calcareous slopes and bottomlands, mesic hammocks, stream terraces
Collins sedge (*Carex collinsii*)	Bogs and Carolina bays
Cypress-knee sedge (*Carex decomposita*)	Blackwater swamp forests, river sloughs
Long sedge (*Carex folliculata*)	Bogs, boggy forests
Eastern few-fruit sedge (*Carex oligocarpa*)	Rich forests, over calcareous or mafic rocks
Nutmeg hickory (*Carya myristiciformis*)	Calcareous nonriverine swamps, oak flatwoods
Rose coreopsis (*Coreopsis rosea*)	Upland depression ponds
Elliott's croton (*Croton elliottii*)	Shores of clay-based Carolina bays
Carolina larkspur (*Delphinium carolinianum*)	Limestone glades
Smooth purple coneflower (*Echinacea laevigata*)	Open woodlands and glades over mafic or calcareous rocks
Little bur-head (*Echinodorus tenellum* var. *parvulus*)	Drawdown zones of coastal plain ponds, pineland ponds, blackwater riverbanks
Southern swamp privet (*Forestiera acuminata*)	Swamp forests
Green-fringe orchid (*Platanthera lacera*)	Swamps, bogs, seepages
Two-wing silverbell (*Halesia diptera*)	Bottomland forests, forested edges of brackish marshes

Table 2-1. TES Plant Species Known to Occur on SRS *(Continued/End)*

Species	Habitat
Little silverbell (*Halesia parviflora*)	Moist slopes, coves, creek-banks, bottomlands
Pondberry (*Lindera melissifolia*)	Wet flats and depressions, generally with pocosin shrubs
Bog spicebush (*Lindera subcoriacea*)	Peaty seepage bogs in headwaters of blackwater streams, with pocosin shrubs
Boykin's lobelia (*Lobelia boykinii*)	Cypress ponds and depression meadows
Spatulate seedbox (*Ludwigia spathulata*)	Sinkhole ponds, cypress-gum ponds, depression meadows, boggy shores
Carolina birds-in-a-nest (*Macbridea caroliniana*)	Swamp forests
Canada moonseed (*Menispermum canadense*)	Moist nutrient-rich forests, especially on floodplains or lower slopes
Indian olive (*Nestronia umbellula*)	Relatively mesic sites in sandhills
Sandhill lily (*Nolina georgiana*)	Sandhills
American nailwort (*Paronychia americana*)	Sandhills
Durand oak (*Quercus durandii*)	Alluvial and slope forests
Three-awned meadow-beauty (*Rhexia aristosa*)	Clay-based Carolina bays, depression meadows, and limesink ponds
West Indies meadow-beauty (*Rhexia cubensis*)	Limesink ponds
Oconee azalea (*Rhododendron flammeum*)	Sandhills, upland forests on slopes, ridges, stream bluffs
Drowned horned rush (*Rhynchospora inundata*)	Limesink depression ponds, intermittently flooded depression meadows
Slender arrowhead (*Sagittaria isoetiformis*)	Pineland ponds, clay-based Carolina bays, other seasonally flooded depressions
Sweet pitcher plant (*Sarracenia rubra*)	Seepage bogs and savannas
Canby's bulrush (*Scirpus etuberculatus*)	Beaver ponds, on peat in small depression ponds, in flowing blackwater streams
Baldwin's nut rush (*Scleria baldwinii*)	Wet savannas, under pines or pond cypress
Least trillium (*Trillium pusillum*)	Dry to dry-mesic forests and woodlands
Florida bladderwort (*Utricularia floridana*)	In deep water of natural Carolina bay lakes, other natural lakes, and limesink ponds
Dwarf bladderwort (*Utricularia olivacea*)	In floating mats (often algal) in water of limesink ponds, artificial lakes, or beaver ponds

Table 2-2. TES Animal Species Known to Occur in Barnwell County

Scientific Name	Common Name	State Protection Status
Vertebrate Animals		
Clemmys guttata	Spotted Turtle	Threatened
Condylura cristata	Star-nosed Mole	
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Endangered
Egretta caerulea	Little Blue Heron	
Haliaeetus leucocephalus	Bald Eagle	Threatened
Hyla avivoca	Bird-voiced Treefrog	
Neotoma floridana	Eastern Woodrat	
Picoides borealis	Red-cockaded Woodpecker	Endangered
Rana capito	Gopher Frog	Endangered
Sciurus niger	Eastern Fox Squirrel	
Invertebrate Animals		
Anodonta couperiana	Barrel Floater	
Elliptio congaraea	Carolina Slabshell	
Lampsilis cariosa	Yellow Lampmussel	
Lampsilis splendida	Rayed Pink Fatmucket	
Pyganodon cataracta	Eastern Floater	
Utterbackia imbecillis	Paper Pondshell	
Villosa delumbis	Eastern Creekshell	
Villosa vibex	Southern Rainbow	

This page is intentionally left blank.

Table 2-3. Average Temperature (°F) for SRS

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1991	56.1	65.5	71.6	78.9	85.9	89.4	92.4	89.5	87.3	78.3	65.1	63.2	76.9
1992	58.5	63.6	68.3	75.6	81.5	87.3	92.9	88.3	84.4	74.6	65.4	54.8	74.6
1993	59.1	55.9	62.6	70.5	79.9	88.7	94.7	90.5	85.0	71.8	64.4	52.7	73.0
1994	51.8	59.4	72.3	80.5	81.2	91.4	90.6	89.5	86.0	75.3	71.4	60.5	75.8
1995	59.2	60.1	72.8	80.8	87.4	84.4	91.4	87.0	80.5	76.5	62.5	55.3	74.8
1996	55.5	59.3	58.7	74.5	85.9	89.2	90.0	85.7	83.1	73.3	62.7	61.2	73.3
1997	58.9	63.9	74.8	73.5	80.1	83.0	91.7	90.9	86.3	72.9	60.6	54.9	74.3
1998	56.9	59.5	63.2	71.5	87.4	95.0	94.8	92.5	87.8	81.9	71.6	64.6	77.2
1999	64.2	63.8	65.4	77.6	81.5	86.2	90.0	93.5	83.6	73.3	68.1	59.2	75.5
2000	54.4	66.1	72.5	74.6	89.8	93.0	93.2	90.1	82.2	79.3	65.3	49.2	75.8
2001	57.4	65.0	65.7	77.9	86.2	87.3	89.6	91.8	83.2	77.7	74.8	65.3	76.8
2002	62.5	62.6	72.9	82.4	83.5	89.9	94.0	91.1	86.4	76.1	63.9	55.6	76.7
2003	53.9	59.6	69.5	76.7	82.7	89.4	89.5	90.8	84.7	76.6	72.4	57.5	75.3
2004	57.8	56.4	72.6	79.6	89.1	91.9	94.4	89.3	82.8	76.5	68.6	60.2	76.6
2005	59.0	59.7	64.9	72.5	82.7	86.1	88.1	87.1	88.3	73.7	67.9	55.7	73.8
2006	61.4	57.2	67.9	80.6	83.4	89.5	94.1	93.3	84.8	75.7	67.9	64.4	76.7
2007	59.5	59.7	73.7	76.7	84.5	89.9	89.3	96.5	88.0	80.8	68.9	65.1	77.7
2008	55.7	65.1	69.6	75.4	84.3	95.2	92.3	90.7	85.4	75.0	63.6	64.0	76.4
2009	56.5	61.4	68.4	75.9	82.2	93.0	92.2	91.2	86.2	74.2	67.4	54.8	75.3
2010	53.5	53.1	65.3	81.2	86.5	94.0	95.5	92.3	91.2	80.4	69.3	52.2	76.2
2011	53.0	64.3	69.4	81.6	86.1	95.9	96.3	96.1	87.7	74.4	69.5	64.1	78.2
2012	63.0	65.1	76.7	79.5	85.5	87.4	94.7	88.5	85.6	77.5	65.6	62.6	77.7
2013	65.0	59.0	62.7	75.9	80.6	87.6	87.5	87.6	87.1	78.1	66.1	62.5	75.0
2014	52.9	61.4	64.9	77.0	85.4	90.3	89.6	89.9	83.5	78.4	62.7	61.5	74.8
2015	54.7	54.7	69.1	77.7	85.8	92.9	95.3	91.6	85.2	75.7	70.1	70.4	76.9
2016	55.0	61.8	75.2	77.6	82.8	92.0	96.8	93.4	88.4	80.2	70.5	59.7	77.8
2017	64.5	69.9	70.4	80.7	83.8	88.3	92.0	89.2	86.2	78.9	68.4	58.3	77.5
2018	55.1	69.5	65.4	73.8	85.2	91.6	91.0	91.1	89.9	78.3	61.9	58.6	76.0
2019	58.0	66.0	68.6	77.0	89.4	88.5	93.9	92.0	92.2	81.2	63.4	61.2	77.6
2020	60.8	61.1	72.8	75.7	81.5	87.5	93.5	90.6	83.3	79.6	71.8	57.6	76.3
30-yr Average	57.8	61.7	68.9	77.1	84.4	89.9	92.4	90.7	85.9	76.9	67.1	59.6	76.0
Record Monthly Low	51.8	53.1	58.7	70.5	79.9	83.0	87.5	85.7	80.5	71.8	60.6	49.2	73.0
Year of Monthly Low	1994	2010	1996	1993	1993	1997	2013	1996	1995	1993	1997	2000	1993
Record Monthly High	65.0	69.9	76.7	82.4	89.8	95.9	96.8	96.5	92.2	81.9	74.8	70.4	78.2
Year of Monthly High	2013	2017	2012	2002	2000	2011	2016	2007	2019	1998	2001	2015	2011
Record Daily High	82.0	83.0	90.0	94.0	100.0	108.0	103.0	107.0	99.0	99.0	86.0	82.0	
Year of Daily High	2002	1997	1995	2002	2019	2012	2010	2007	2010	2019	2003	1998	
Record Daily Low	10.0	12.0	16.0	30.0	43.0	54.0	58.0	56.0	46.0	31.0	21.0	17.0	
Year of Daily Low	1994	1996	1996	2007	1997	1996	2008	2004	1999	2001	2014	2000	

Table 2-4. Average Precipitation for SRS past 30 yrs (inches, 773-A) (SRNL 2020)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	7.03	1.84	7.89	4.73	3.06	2.17	7.89	9.26	4.40	0.99	1.55	3.32	54.13
1992	4.45	3.89	2.98	2.40	1.34	6.27	3.69	4.83	6.38	3.11	7.78	2.86	49.98
1993	7.45	3.62	8.37	1.74	1.43	3.27	3.12	2.23	7.29	0.99	1.87	1.81	43.19
1994	4.80	3.91	6.42	1.05	1.45	5.08	7.47	3.47	0.99	10.01	3.05	4.62	52.32
1995	6.96	7.97	0.92	1.28	1.77	8.15	5.71	6.92	5.75	2.64	2.38	4.47	54.92
1996	3.18	2.43	6.24	1.42	1.23	3.46	5.20	4.83	4.05	1.95	1.17	2.70	37.86
1997	4.42	5.35	2.88	3.05	2.23	9.58	6.00	4.00	5.59	3.90	4.76	7.91	59.67
1998	7.83	7.18	5.61	6.28	3.53	3.76	4.49	4.34	8.43	0.52	0.77	1.76	54.50
1999	5.71	2.75	2.55	1.66	2.82	5.21	4.97	3.86	5.02	2.38	1.04	1.47	39.44
2000	6.53	0.61	3.84	1.43	0.20	4.86	2.49	5.11	7.82	0.00	3.50	1.94	38.33
2001	2.80	2.52	7.27	0.96	4.79	4.87	5.42	1.60	3.34	0.12	1.16	1.20	36.05
2002	2.97	2.23	3.88	2.10	2.87	3.25	3.92	4.59	3.88	2.62	4.73	4.32	41.36
2003	2.32	5.03	8.65	9.19	7.17	9.47	5.94	5.16	4.29	3.31	1.52	1.92	63.97
2004	3.79	6.28	1.44	1.94	2.50	8.71	4.66	2.74	8.72	0.66	4.74	1.72	47.90
2005	1.78	4.87	5.42	2.16	3.22	5.56	6.28	3.86	0.05	3.35	2.79	4.77	44.11
2006	2.94	2.83	2.90	2.98	1.60	7.23	2.59	2.54	2.43	3.48	2.61	5.03	39.16
2007	3.66	2.70	2.14	2.29	1.04	5.04	5.49	4.08	2.30	1.42	0.48	8.05	38.69
2008	3.81	4.10	3.74	3.58	3.22	0.46	4.37	5.03	2.63	4.59	6.37	3.60	45.50
2009	2.19	1.94	4.58	4.17	4.90	4.11	4.16	2.73	5.18	3.66	6.59	10.30	54.51
2010	4.54	2.13	2.49	1.14	2.19	7.33	2.81	3.70	1.72	0.53	2.06	1.47	32.11
2011	2.08	4.47	6.38	2.54	2.88	1.85	1.66	2.53	4.33	2.00	2.11	1.81	34.64
2012	2.02	1.45	2.53	1.53	7.37	3.65	3.00	7.13	2.88	0.64	1.65	5.06	38.91
2013	1.28	9.63	3.21	4.74	2.39	11.64	6.50	6.51	1.52	0.93	1.75	4.37	54.47
2014	3.40	4.39	4.13	4.76	3.65	9.90	4.00	4.40	5.39	0.93	3.96	5.36	54.27
2015	3.28	4.60	2.96	4.10	0.52	4.06	4.08	3.80	4.29	5.45	5.40	5.27	47.81
2016	2.06	4.04	3.08	4.19	4.92	2.73	3.12	3.71	7.90	5.02	0.80	5.62	47.19
2017	9.59	2.29	1.85	5.50	4.47	2.78	7.81	4.06	6.52	1.11	1.89	5.30	53.17
2018	3.03	2.26	3.88	4.82	5.50	4.56	2.92	3.77	4.83	5.59	7.99	6.22	55.37
2019	5.36	0.51	2.65	3.99	2.07	7.86	1.06	7.35	0.95	3.70	3.44	8.78	47.72
2020	4.10	10.54	5.05	5.45	2.61	3.19	7.63	5.41	6.50	0.94	1.84	2.56	55.82
30-yr Average	4.18	3.95	4.20	3.24	2.96	5.34	4.62	4.45	4.51	2.55	3.06	4.19	47.24
Record Lowest	1.28	0.51	0.92	0.96	0.20	0.46	1.06	1.60	0.05	0.00	0.48	1.20	32.11
Year of Record Low	2013	2019	1995	2001	2000	2008	2019	2001	2005	2000	2007	2001	2010
Record Highest	9.59	10.54	8.65	9.19	7.37	11.64	7.81	7.35	8.72	10.01	7.99	10.30	63.97
Year of Record High	2017	2020	2003	2003	2012	2013	2017	2019	2004	1994	2018	2009	2003

3.0 REMEDIAL INVESTIGATION

This chapter describes the data collected and evaluated at the subunits that were investigated during the ECODS N-1, CSSLP, and Ford Building OU characterization event.

3.1 ECODS N-1, Central Shops Scrap Lumber Pile, Ford Building Operable Unit Investigation Overview

A comprehensive approach was implemented to address potential impact to the human health and the environment at the ECODS N-1, CSSLP, and Ford Building OU. Soil, sediment, and surface water samples were collected from the OU. Sediment and surface water samples from a background Carolina Bay (Carolina Bay #125) was also sampled. Figure 2-2, Figure 3-1, Figure 3-2, and Figure 3-3 show the sampling locations for the ECODS N-1, CSSLP, and Ford Building OU.

3.2 Site Characterization and Data Usability

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 includes soil media for ECODS N-1 subunit, CSSLP subunit (Upland Area), and the Ford Building Subunit; and surface water and sediment from the CSSLP subunit (Surface Water Impoundment Area) and Carolina Bay #125.

SRS data usability procedures incorporate the criteria found in the USEPA National Functional Guidelines to verify, validate, and qualify analytical data to assess its usability for risk and remedial management decisions. Adherence to this complex list of procedures and guidelines establishes: (a) if data meets the specific technical and quality control (QC) criteria established by the data quality objectives and laboratory quality assurance project plans ; and (b) the usability of any data not meeting the specific technical and QC criteria. All data is qualified for usability using USEPA Functional Guidelines. Adherence to the guideline requirements and the USDOE Audit

Program for analytical laboratories allows the data to be qualified based upon a set of nationally established functional guideline qualifiers for uniformity.

The Data Usability Reports (DURs) for the 2019 Pre-Workplan Characterization Samples and the 2020 Workplan Characterization Samples are presented in Appendix J. The reports concluded that data quality objectives were met, and that the data is considered useable for the purposes of remedial decision-making in the RFI/RI/BRA. In addition, the *Site Evaluation Report for Early Construction and Operational Disposal Site (ECODS) N-1 (NBN) (U)* presents a Laboratory Quality Discussion (Section IV) and a Site Evaluation Validation Report (Section V) for the samples that were collected in 2001 (WSRC 2001c).

3.2.1 ECODS N-1 (NBN)

A Site Evaluation characterization effort at the ECODS N-1 (NBN) was conducted in January 2001 and collected ninety soil samples, including 9 field duplicate samples, at twenty-seven locations. Twenty-four locations were in a systematic grid pattern within the ECODS N-1 boundary, and the other three were background locations. The bottom of the ECODS N-1 unit is ~1.8-2.4 m (6-8 ft) deep. Three sample intervals were collected at each location: 0.0 to 0.3 m (0 to 1 ft); 0.3 to 1.2 m (1 to 4 ft); and 2.4 to 3.0 m (8 to 10 ft). All samples were analyzed for the Target Analyte List (TAL) of inorganic constituents and the Target Compound List (TCL) of organic compounds, pesticides, herbicides, and PCBs. As documented in the *Site Evaluation Report for Early Construction and Operational Disposal Site (ECODS) N-1 (NBN)* (WSRC 2001c), primarily metals (antimony, arsenic, cadmium, iron and lead) exceeded their respective toxicity screening and background levels in soil.

A pre-Work Plan characterization was conducted in June 2019 through August 2019, and sample locations were biased to the locations that exceeded the screening criteria in the 2001 Site Evaluation report and to vertically and horizontally bound the locations with elevated metal results. Locations along the western and southern boundary, ECN1-28 through ECN1-41, were sampled to find the vertical and horizontal extent of contamination. 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], 3 to 3.7 m

[10 to 12 ft], and 5.5 to 6.1 m [18 to 20 ft]) soil samples received TAL analyses. Specific analyses for hexavalent chromium were also collected in the 2.4 to 3 m (8 to 10 ft) interval at six locations, ECN1-31, ECN1-32 and ECN1-36 through ECN1-39. Hexavalent chromium analyses were performed on the 2019 samples collected adjacent to the 2001 samples that showed elevated total chromium levels, because of the history of burning activities. Preliminary screening of the 2019 pre-WP characterization data again identified primarily metals (including hexavalent chromium) in soils that may constitute a problem warranting action for human and ecological receptors.

The 2020 RFI/RI Workplan (SRNS 2020) characterization was also a biased sampling effort focusing on elevated metals sample locations within the ECODS N-1 unit and the need for subunit specific background samples. Twenty-four soil samples were collected from the ECODS N-1 subunit including surface samples (0.0 to 0.3 m [0 to 1 ft]), shallow subsurface samples (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface samples (2.4 to 3.0 m [8 to 10 ft] and 3.0 to 3.6 m [10 to 12 ft]) from three locations inside the subunit and three background locations outside of the unit boundary. The 2020 characterization samples were analyzed for TAL metals (including hexavalent chromium) and visually examined for the presence of asbestos.

Data supporting the evaluation of ECODS N-1 include the 2001 Site Evaluation Report (27 locations: ECN1-01 through ECN1-27) (WSRC 2001c); 2019 Pre-Work Plan Characterization (14 locations: ECN1-28 through ECN1-41); and 2020 Work Plan Characterization (6 locations: ECN1-42 through ECN1-47) (SRNS 2020) resulting in soil data for 41 locations (ECN1-1 through ECN1-24, ECN1-28 through ECN1-44) for the 0 to 0.3 m (0 to 1 ft), 0.3 to 1.2 m (1 to 4 ft), 2.4 to 3.0 m (8 to 10 ft), 3 to 3.7 m (10 to 12 ft), and 5.5 to 6.1 m (18 to 20 ft) soil intervals. Unit-specific background data collected for ECODS N-1 include 0 to 0.3 m (0 to 1 ft), 0.3 to 1.2 m (1 to 4 ft), 2.4 to 3.0 m (8 to 10ft), 3.0- to 3.7m (10 to 12 ft) depth intervals from 6 locations (ECN1-25, -26, -27, -45, -46, -47) (Figure 3-1).

3.2.2 Central Shops Scrap Lumber Pile (631-2G)

A pre-Work Plan characterization was conducted at the CSSLP in June 2019 through August 2019. Surface and subsurface soil samples were collected at nineteen locations based on a grid pattern to

cover the area. Sampling locations (CSSLP-1 through CSSLP-19) were laid out in a grid pattem ~30.5-m (100-ft) apart across the unit. 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]) soil samples received TAL, TCL and radiological indicator parameters (gross alpha and nonvolatile beta) analyses. Preliminary screening of the 2019 pre-WP characterization data identified primarily metals that may constitute a problem warranting action for human and ecological receptors.

As part of CSBRP OU investigations, sediment and surface water samples were collected at four locations in the Surface Water Impoundment Area in 1997 and re-sampled for metals in 1999. Because of ongoing operations at CSSLP, the USEPA, SCDHEC, and USDOE agreed to address the Surface Water Impoundment Area when the 2020 characterization efforts were initiated for the CSSLP. The RFI/RI Workplan (SRNS 2020) characterization better defined the nature and extent of contamination at some 2019 sample locations and identified if elevated metal (including hexavalent chromium) results are due to native soil conditions or related to unit operations. At six (6) locations inside the CSSLP subunit and three (3) background locations outside of the unit boundary, thirty (30) soil samples were collected in 2020. Sample locations within the subunit focused on previously identified locations of elevated metal concentrations. The following four (4) soil intervals were sampled: surface samples (0.0 to 0.3-m [0 to 1 ft]), shallow subsurface samples (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface samples (2.4 to 3.0 m [8 to 10 ft] and 3.0 to 3.6 m [10 to 12 ft]). All soil samples were analyzed for TAL metals analyses, including hexavalent chromium, because of the history of burning material and the elevated 2019 chromium results.

Additional data were also collected for the CSSLP (631-2G) Surface Water Impoundment Area (SRNS 2020). Sample locations within the Surface Water Impoundment Area targeted locations identified with elevated metal results in 1997 and 1999. At four (4) locations inside the Surface Water Impoundment Area and at three (3) background locations from Carolina Bay #125, the following two sediment intervals were sampled: 0.0 to 0.3 m (0 to 1 ft) and 0.3 to 1.2 m (1 to 4 ft). A total of fourteen (14) sediment samples were collected for the Surface Water Impoundment Area and Carolina Bay #125. All sediment samples were analyzed for TAL metals (including hexavalent chromium), TCL and radiological indicators (gross alpha and nonvolatile beta).

Surface water samples were collected at three (3) of the four (4) locations within the CSSLP (631-2G) Surface Water Impoundment Area and one (1) of the three (3) planned background locations from Carolina Bay #125. One (1) of the surface water locations at the CSSLP Surface Water Impoundment Area was not sampled due to the presence of significant safety hazards for the samplers at that specific location. At Carolina Bay #125, two (2) of the planned locations were dry, so the three (3) background samples were collected from a general area near location CB125-02, with each sample collected approximately one week apart. Two (2) samples (filtered and unfiltered) were collected at each sampled location for a total of six (6) surface water samples collected from the Surface Water Impoundment Area and six (6) surface water samples at the Carolina Bay #125. All surface water samples were analyzed for TAL metals (including hexavalent chromium), TCL and radiological indicators (gross alpha and nonvolatile beta).

Data supporting the evaluation of the CSSLP include 2019 pre-WP characterization (19 locations, CSSLP-1 through CSSLP-19); 2020 WP characterization (16 locations: CSSLP-20 through CSSLP-32, CBBKG-1 through CBBKG-3) for two (2) subunits: 1) CSSLP Upland Area (25 sampling locations (CSSLP-1 through CSSLP-19, CSSLP-27 through CSSLP-32) for the 0 to 0.3 m (0 to 1 ft) and 0.3 to 1.2 m (1 to 4 ft) intervals for soil, and 2) CSSLP Surface Water Impoundment Area, 4 locations (CSSLP-20 through CSSLP-23) for sediment (0 to 0.3 m [0 to 1 ft] and 0.3 to 1.2 m [1 to 4 ft]), and surface water (unfiltered and filtered). The CSSLP also has unit-specific background data for soil from three sampling locations (CSSLP-24 through CSSLP-26) from the 0 to 1 and 1 to 4 ft intervals. Unit specific background sediment (0 to 0.3 m [0 to 1 ft] and 0.3 to 1.2 m [1 to 4 ft] depth intervals) samples were collected from three (3) locations from Carolina Bay #125 to support the Surface Water Impoundment Area evaluation (Figure 3-2). Due to drying conditions, three (3) unit specific background surface water samples (unfiltered and filtered) were collected one-week apart at one (1) location (CB125-002) from Carolina Bay #125 to support the Surface Water Impoundment Area evaluation (Figure 3-2). The location of the Carolina Bay #125 in relation to the CSSLP is shown in Figure 2-2.

3.2.3 Ford Building

In 2019, representatives from the USDOE, USEPA, and SCDHEC reached agreement that the Ford Building (690-N), excluding the building slab, would undergo D&D using the Integrated Sampling Model (SRNS 2019a). As described in the *Characterization Report Building 690-N (Ford Building) and Ancillary Equipment and Facilities* (SRNS 2014b) and the *Human Health Risk Screening Evaluation for 690-N Ford Building* (SRNS 2019b), concrete samples were collected in 2014 inside the Ford Building (690-N) at 21 locations at two intervals (0 to 15.2 cm [0 to 6 in] and 15.2 to 30.5 cm [6 to 12 in]). Soil samples were collected at the same 21 locations beneath the concrete slab at two soil intervals (0 to 15.2 cm [0 to 6 in] and 15.2 to 30.5 cm [6 to 12 in]). All concrete and soil samples were analyzed for the following constituents: Toxicity Characteristic Leaching Procedure RCRA metals, volatile organic compounds (VOCs), semi-VOCs (SVOCs), PCBs, gross alpha, nonvolatile beta, tritium, and inorganic anions (bromide, chloride, fluoride, nitrate, nitrites, orthophosphate and sulfate). Additionally, some samples were analyzed for alpha spectroscopy radionuclides (americium, curium, neptunium, plutonium, and uranium), gamma spectroscopy radionuclides, and beta-emitting specific radionuclides (carbon-14, nickel-59, nickel-63, plutonium-241, selenium-79, strontium-90, technetium-99). These data were analyzed at approved labs using standard methods, though the data were not validated. The concrete and soils data were used to evaluate contaminant migration (CM) risk and conduct a HH risk screening evaluation for the Ford Building (690-N) concrete slab and underlying soils in support of the D&D strategy for the facility (SRNS 2019b).

The HH screening evaluation for the Ford Building remnant slab and underlying soils in support of the D&D strategy identified concrete with PCBs (Aroclor 1254, maximum detection in concrete = 15 mg/kg, residential risk = 6.3E-06, industrial worker risk = 1.5E-06; Aroclor 1260 maximum detection in concrete = 5.5 mg/kg, residential risk = 2.3E-06, industrial worker risk < 1E-06) and cesium-137 (maximum detection in concrete = 1.75 pCi/g, residential risk = 2.8E-05 , industrial worker risk = 1.7E-05) at levels that warrant concern with respect to human health (SRNS 2019a). No HH constituents of concern (COCs) were identified for underlying soils. No CM COCs were

identified as part of the evaluation for the Ford Building (690-N) remnant slab and underlying soils in support of the D&D strategy.

In 2021, the D&D phase of the Ford Building (690-N) was completed and documented in the *Decommissioning Project Final Report Building 690-N, Process Heat Exchanger Repair Facility* (SRNS 2020). The facility structure was demolished to its slab and an engineered concrete cover was installed over the entire concrete remnant slab extending out 0.3 m (1 ft) from the building edge (SRNS 2021). A radiological survey after the structure was demolished did not detect any contamination in the surrounding soil. The 6-inch concrete cover breaks the direct exposure pathway to PCBs and Cs-137 for human receptors. There is no HH exposure risk under the current configuration.

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). As part of the 2019 pre-Work Plan characterization effort, soils samples were taken in surface and subsurface soils around the Ford Building and ancillary remnants at thirty-eight locations. 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 9.1 m [8 to 30 ft]) soil samples within the area received TAL, TCL-SVOC, TCL-VOC, TCL-PCB, and radiological indicator parameters (gross alpha and nonvolatile beta). Preliminary screening of the 2019 pre-Work Plan characterization data identified metals and radionuclides in soils that may constitute a problem warranting action for human and ecological receptors. Data supporting the Ford Building evaluation include 2019 pre-Work Plan characterization data collected from 38 locations (FBFA-1 through FBFA-38) for the 0 to 0.3 m (0 to 1 ft) and 0.3 to 1.2 m (1 to 4 ft) soil intervals (Figure 3-3). No site-specific background data is needed for the Ford Building because the SRS background soils report provides sufficient data (WSRC 2006).

3.2.4 Unit-Specific Constituent Screening

A data evaluation to determine the nature and extent of contamination at the ECODS N-1, CSSLP, and Ford Building OU was conducted by comparing soil and sediment data for all depth intervals

to SRS background data presented in Appendix B-2 (all depths) of the approved *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006). A constituent for which the maximum concentration is greater than twice the SRS background mean concentration is more likely to be present from unit-related activities and is identified as a unit-specific constituent (USC). Constituents for which no background concentrations are available are also identified as USCs if detected at one or more location and depth interval. Constituents identified as USCs are evaluated in the contaminant fate and transport analysis.

The USCs identified for the ECODS N-1, CSSLP, and Ford Building OU are provided in Appendix A. The nature and extent of unit-related contaminants is discussed in more detail in Sections 3.7.3, 3.8.3, and 3.9.3.

3.3 Contaminant Fate and Transport Analysis

Simulations of contaminant transport through the vadose zone were completed for each specific ECODS N-1, CSSLP, and Ford Building OU subunit using VZCOMML© (V.4.0), a multi-layer vadose zone CM modeling program developed by SRS . VZCOMML© is intended to provide a conservative initial screening. Constituents retained throughout VZCOMML© simulations and after discussions of uncertainty were further evaluated using GoldSim® (Version 12.1, GTG 2018). GoldSim® provides a more accurate and robust model to simulate contaminant fate and transport (Appendix B).

For the VZCOMML© Tier 1 screening, each subunit was modeled under 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). Constituents predicted by the model to impact groundwater at concentrations exceeding action levels were retained as Tier I CM constituents of potential concern (COPCs). A less conservative set of assumptions was used for the Tier II analysis to predict constituents that will impact groundwater at concentrations exceeding action levels within the evaluation time of 1,000 years (Appendix B). Constituents predicted to exceed action levels in the Tier II screening were retained as Tier II CM COCs.

Tier II CM COCs were then evaluated further based on site specific data and professional judgement to further refine the list of COCs in an Uncertainty Analysis (Appendix B). Any remaining CM COCs were evaluated with a more robust GoldSim® model. If constituents were predicted to impact groundwater within 1,000 years and above respective action levels by the GoldSim® model, they would have been retained as CM refined RCOCs and would be considered in the problems warranting action. For the ECODS N-1, CSSLP, and Ford Building OU subunits, there were no RCOCs determined in the CM analysis.

3.4 Human Health Risk Assessment Methodology

The purpose of the human health risk assessment (HHRA) is to assess the potential for adverse effects to various human receptors associated with exposure to contaminants present at the ECODS N-1, CSSLP, and Ford Building OU (Appendix C). The evaluation for each subunit estimates the risk potential in the absence of remedial actions and provides a basis for determining whether remedial action is necessary. Statistical data summaries for each media of concern by subunit are used in the process (Appendix A). The HHRA includes the following steps:

- Identification of potential human receptors
- Identification of COPCs
- Identification of COCs
- Identification of RCOCs

Risk-based threshold levels (TLs) used in this assessment are obtained from the USEPA Regional Screening Levels (RSLs) website (USEPA 2020a) for chemicals and from USEPA PRGs website (USEPA 2020b) for radiological constituents. The TLs are applied to both soil and sediment media.

For surface soil and sediment COPC screening, maximum detected concentrations from the 0 to 0.3 m (0 to 1 ft) sampling interval are compared to residential risk-based TLs, as well as two times (2X) the average background concentrations for each constituent. Those constituents that exceed both the TLs for sediment/surface soil and the background values are identified as COPCs and are

carried forward into risk or hazard calculations for resident and industrial worker receptors, consistent with the subunit specific CSMs presented in Chapter 2. As discussed in Chapter 2, the most likely human receptor for risks associated with the ECODS N-1, CSSLP, and Ford Building OU subunits is the industrial worker. For risk management purposes, a risk evaluation was also conducted for a hypothetical future resident.

Exposure point concentrations (EPCs), which are concentrations in an exposure medium to which a receptor may be exposed, consist of the lower of either the 95% upper confidence limit (UCL) on the mean concentrations for constituents or the maximum detected concentration used in the formal risk/hazard calculations. Results of the risk and hazard calculations identify human health COCs for either soil or sediment where both the hazard index (HI) and individual constituent hazard quotients (HQs) exceed 1 for noncarcinogens and constituent-specific risk exceeds 1E-06. Constituents identified as COCs are carried forward for further evaluation.

For surface water, maximum detected concentrations are compared to TLs only. Maximum contaminant levels (MCLs) or tap water PRGs/RSLs/ambient water quality criteria in the absence of a MCL are identified as the TLs. Constituents with a maximum detected concentration greater than the TL were identified as COCs and are carried forward for further evaluation.

Individual constituents that are identified as a COC are further evaluated in a refinement step. The refinement step is an uncertainty evaluation that includes an interpretive discussion of the applicable uncertainty factors (line of evidence) and a recommendation whether the constituent should or should not be identified as a RCOC and carried forward for further remedial evaluation. The major categories of uncertainty used in the evaluation include the following:

- Unit-related uncertainty related to the nature and extent of contamination, consistency with history of use, and presence in background
- Data quality and risk assessment uncertainties related to data quality and physical characteristics
- Risk assessment uncertainty related toxicity data and changes in constituent concentrations, or lack thereof, due to natural decay or transformation

The results of this process determine which remedial actions need to be evaluated to protect human health receptors. Remedial action objectives (RAOs) for protection of human health are developed for constituents identified as RCOCs and are discussed in more detail in Chapter 4.

3.5 Ecological Risk Assessment Methodology

The purpose of the ecological risk assessment (ERA) is to assess the potential for adverse effects to terrestrial and aquatic/semiaquatic ecological receptors (wildlife, benthic organisms, and aquatic organisms) associated with potential exposure to contaminants present at the ECODS N-1, CSSLP, and Ford Building OU (Appendix D). The evaluation for each subunit estimates the risk potential to ecological receptors in absence of remedial actions and provides a basis for determining whether remedial action is necessary. The process follows the latest available USEPA guidance (USEPA 2018), as well as input from the staff of USEPA Region 4 and the SCDHEC. Statistical data summaries for each media of concern by subunit are used in the process (Appendix A). The ERA includes the following:

- Identification of risk assessment exposure groups and exposure pathways,
- Identification of potential ecological (wildlife) receptors and assessment endpoints, including terrestrial and aquatic
- Identification of constituents of potential ecological concern (COPECs)
- Identification of COPCs
- Identification of RCOCs

Risk-based TLs used in the ERA are no observed adverse effects level and lowest observed adverse effects level values obtained from the USEPA Region 4 ERA Supplemental Guidance March 2018 Update (USEPA 2018) and the Los Alamos National Laboratory (LANL) EcoRisk Database (LANL 2017).

The ERA is conducted by comparing constituent concentrations in environmental media within each subunit, including soil, sediment and surface water with regulatory or technically defensible

screening values called ecological screening values (ESVs), as well as 2X the mean concentration in SRS soil background. Constituents that are less than an ESV are eliminated from further consideration in the ERA, while those that both exceed an ESV, and background are identified as COPECs and are retained for further examination by calculating refinement-level hazard (ecological HQs) using refinement screening values (RSVs). Constituents with a refinement HQ greater than 1 are identified as COPCs and brought forward in an uncertainty evaluation.

A recommendation of whether a constituent is identified as a RCOC is made following a refinement step. This step considers the following lines of evidence (same as HHRA):

- Unit-related uncertainty related to the nature and extent of contamination, consistency with history of use, and presence in background
- Data quality and risk assessment uncertainties related to data quality and physical characteristics
- Risk assessment uncertainty related to toxicity data and changes in constituent concentrations, or lack thereof, due to natural decay or transformation

The results of this process identifies if a remedial action will need to be evaluated to protect ecological receptors. RAOs for protection of ecological receptors are developed for constituents identified as RCOCs as discussed in more detail in Chapter 4.

3.6 Principal Threat Source Material Methodology

The PTSM evaluation for the ECODS N-1, CSSLP, Ford Building OU is presented in Appendix E. The concept of principal threat waste and low-level threat waste, as developed by the USEPA in the NCP (40 CFR 300.430[a][1][iii]), is to be applied on a site-specific basis when characterizing source material. Source materials include or contain hazardous substances, pollutants, or contaminants that act as a reservoir for migration to surface water, or air, or the act as a source for direct exposure. The determination of whether the source materials present at a waste unit would be classified as PTSM is based principally on the USEPA guidance (USEPA 1991).

In determining whether the source should be preliminarily considered PTSM, the evaluation considers the cumulative effects of both the potential risk from carcinogenic constituents and the adverse health effects from noncarcinogens to human receptors. The toxicity assessment of the source material is based on the potential exposure of an industrial worker, which is the most appropriate receptor scenario at the ECODS N-1, CSSLP, and Ford Building OU.

The source material (i.e., in both soil and sediment) from all depth intervals is preliminarily considered to be PTSM if the cumulative risk exceeds one of the following toxicity threshold criteria:

- Carcinogens: greater than 1E-03 industrial worker risk
- Noncarcinogens: industrial worker HI greater than 10

If the threshold criteria for PTSM is not exceeded based on a maximum concentration, then PTSM is not present, and it is not necessary to carry the assessment into an uncertainty evaluation. An uncertainty evaluation is performed on potential PTSM constituents using similar criteria as that used for the identification of human health RCOCs. This evaluation includes, but is not limited to, assessing the potential for natural degradation, or lack thereof, that would reduce concentrations over time, as applicable.

3.7 Early Construction and Operational Disposal Sites N-1 Subunit

3.7.1 ECODS N-1 Subunit Description

ECODS N-1 subunit is one (1) of twenty-five (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 (Figure 1-2). ECODS N-1 is located within the Pen Branch Watershed and was used to dispose of materials associated with the construction and operation of N Area. Historical aerial photographs revealed that the area where the subunit is located was farmland prior to construction of the SRS and identified the ECODS N-1 as being in use from ~August 1952 to June 1954. ECODS N-1 is located in a relatively flat area that gradually slopes to the south. It is

~107 m long by 15 m wide (350 ft long by 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.

3.7.2 ECODS N-1 Subunit Characterization and Data Summary

A Site Evaluation characterization effort in 2001 collected 90 samples from three (3) depth intervals (0.0 to 0.3 m [0 to 1 ft], 0.3 to 1.2 m [1 to 4 ft], and 2.4 to 3.0 m [8 to 10 ft]) at 27 locations for Target Analyte List (TAL) and TCL analyses (Figure 3-1). Benzo(a)pyrene, antimony, arsenic, cadmium, iron, and lead exceeded their respective PRGs and background levels (WSRC 2001c).

In 2019, a pre-WP characterization effort collected soil samples at the surface (0 to 0.3 m [0 to 1 ft]), shallow subsurface (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface (2.4 to 3 m [8 to 10 ft], 3 to 3.7 m [10 to 12 ft]), and 5.4 to 6 m (18 to 20 ft) soils at fourteen (14) locations for TAL analysis (Figure 3-1). Sample locations were biased to locations that exceeded the screening criteria in the 2001 Site Evaluation report and to vertically and horizontally bound 2001 Site Evaluation locations that had elevated metal results (Figure 2). Because of the site history of burning activities at ECODS N-1, hexavalent chromium analyses were performed on the 2019 samples collected adjacent to the 2001 samples that showed elevated total chromium levels at depth (2.4 to 3.0 m [8 to 10 ft]).

The 2020 RFI/RI WP characterization was a biased sampling effort focusing on elevated metals sample locations from the 2019 pre-WP characterization effort and the need for subunit-specific background samples. Twenty-four (24) soil samples were collected from ECODS N-1 subunit including surface (0 to 0.3 m [0 to 1ft]), shallow subsurface (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface samples (2.4 to 3.0 m [8 to 10 ft] and 3.0 to 3.6 m [10 to 12 ft]) from three (3) locations inside the subunit and three (3) background locations outside of the unit boundary (Figure 2). Samples were analyzed for TAL metals (including hexavalent chromium) and a visual inspection for ACM. Suspected ACM was sampled and sent to a laboratory for confirmation analyses.

3.7.3 ECODS N-1 Subunit Nature and Extent of Contamination

Constituents identified as USCs for the ECODS N-1 are shown in Table A.1.7. The primary contaminants at the ECODS N-1 are inorganics (metals) and SVOCs. Suspected ACM was recovered by hand auger at a depth of about 1 m [4 ft] along with other construction debris. Three samples were collected, two samples were verified positive for asbestos, indicating the presence of ACM within the subunit. The maximum soil concentrations above detection were compared against two-times (2X) SRS mean background concentrations, if applicable, to determine if the constituent is a USC. Constituents (e.g., VOCs) above detection limits and without an SRS mean, are considered USCs.

In the surface (0 to 0.3 m [0 to 1 ft]) soil interval the following constituents are identified as USCs in one or more sample: 2-methylnaphthalene, acetone, antimony, Aroclor 1254, Aroclor 1260, arsenic, benzo[g,h,i]perylene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, bis(2ethylhexyl)phthalate, carbon disulfide, chromium, chrysene, copper, cyanide, DDE, DDT, fluoranthene, hexavalent chromium (EPA 7196A and EPA 7199), iron, lead, manganese, mercury, methyl ethyl ketone, nickel, phenanthrene, pyrene, vanadium and zinc.

In the shallow (0.3m to 1.2 m [1 to 4 ft]) subsurface soil interval the following constituents are identified as USCs in one (1) or more sample: 1,1,2,2-tetrachloroethane, acetone, aluminum, antimony, Aroclor 1254, Aroclor 1260, arsenic, ACM, benzo[g,h,i]perylene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, bis(2-ethylhexyl)phthalate, cadmium, calcium, carbon disulfide, chromium, chrysene, copper, cyanide, dibenz[ah]anthracene, di-n-butyl phthalate, fluoranthene, hexavalent chromium (EPA 7196A and EPA 7199), indeno-[1,2,3-cd]pyrene, iron, lead, magnesium, manganese, mercury, nickel, phenanthrene, pyrene, selenium, sodium, vanadium and zinc.

In the deep (2.4 to 3.0 m [8 to 10 ft], 3.0 to 3.6 m [10 to 12 ft]) and 5.5 to 6.1 m [18-20 ft]) subsurface intervals the following constituents are identified as USCs in one (1) or more sample: acetone, aluminum, antimony, arsenic, barium, beryllium, bis(2-ethylhexyl)phthalate, calcium, carbon disulfide, chromium, cobalt, copper, cyanide, hexavalent chromium (EPA 7196A), iron,

lead, manganese, mercury, nickel, selenium, thallium, vanadium and zinc. Soil sampling at the ECODS N-1 is sufficient enough to determine the nature and extent of contamination, and the presence or absence of problems warranting response action. The highest concentrations of contaminants are relatively immobile. A CM analysis has been performed as described in Section 3.7.4. Results of the CM evaluation indicate the contaminants at the ECODS N-1 are not a potential source for groundwater contamination.

3.7.4 ECODS N-1 Subunit Contaminant Fate and Transport Evaluation Results

The following is a summary of the results from the ECODS N-1 subunit CM analysis using VZCOMML® (Appendix B):

- Tier I COPCs: 1,1,2,2-tetrachloroethane, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, Aroclor 1254, Aroclor 1260, antimony, arsenic, cadmium, cobalt, copper, cyanide, iron, lead, manganese, mercury, selenium, thallium, vanadium, and zinc.
- Tier II COCs: None.
- Tier II RCOCs: None.

3.7.5 ECODS N-1 Subunit Human Health Risk Assessment Results

The HHRA includes risk calculations for the resident and industrial worker scenarios for the ECODS N-1 subunit soil media (Appendix C).

Results of each step of the HHRA for soil media for ECODS N-1 are summarized below.

- COPCs: aluminum, antimony, arsenic, chromium VI (7196A and 7199), cyanide, iron, lead, and vanadium. These constituents had maximum detected concentrations that exceeded human health (residential) risk-based screening levels and exceeded two times (2X) SRS mean background concentrations.
- COCs include the following
    - Resident scenario: - arsenic, chromium VI (7196A and 7199)

- Industrial worker scenario: arsenic

- RCOCs include the following:
  - Resident scenario: none
  - Industrial worker scenario: none

3.7.6 ECODS N-1 Subunit Ecological Risk Assessment (ERA) Results

The ERA includes risk calculations for the ecological receptors for the ECODS N-1 subunit soil media (Appendix D).

Results of each step of the ERA for the soil media are summarized below.

- COPECs:
  - Surface soil (0 to 0.3 m [0 to 1 ft]): chromium, Aroclor 1254, Aroclor 1260, bis(2-ethylhexyl)phthalate, copper, chromium, hexavalent chromium (Method 7169A and Method 7199 analyses), cyanide, lead, mercury, nickel, vanadium, and zinc.
  - Subsurface soil (0.3 to 1.2 m [1 to 4 ft]): Aroclor 1260, arsenic, bis(2-ethylhexyl)phthalate, cadmium, chromium, hexavalent chromium (methods 7196A and 7199), copper, cyanide, lead, manganese, mercury, nickel, selenium, vanadium, and zinc.
- COPCs:
  - Surface soil (0 to 0.3 m [0 to 1 ft]): bis(2-ethylhexyl)phthalate, cyanide lead, and vanadium.
  - Subsurface soil (0.3 to 1.2 m [1 to 4 ft]): bis(2-ethylhexyl)phthalate, cadmium, hexavalent chromium (Method 7199), copper, cyanide, lead, selenium, and vanadium.
- RCOCs:
  - Surface soil: none
  - Subsurface soil: none.

3.7.7 ECODS N-1 Subunit Principal Threat Source Material

The PTSM evaluation is presented in Appendix E. The following is a summary of the problems warranting action per the PTSM evaluation:

- Soil media (all depths): No PTSM RCOCs

3.8 Central Shops Scrap Lumber Pile (631-2G) Subunit

3.8.1 CSSLP Subunit Description

The CSSLP (Figure 1-4) was cleared in 1951 and was used for equipment laydown and rubble storage, in addition to a burning area for construction related materials which remained active up until the mid-2000s. Prior to 1951, the area was used as farmland. The CSSLP subunit consists of two (2) areas, the CSSLP Subunit (Upland Area) and the CSSLP Subunit (Surface Water Impoundment Area) (Figure 1-4). The CSSLP subunit lies in a southwestern sloping plain. The Upland Area measures 91.4 m by 91.4 m (300 ft by 300 ft) and covers ~1.35 ha (3.34 ac). The Surface Water Impoundment Area was created between 1992 and 1994 to collect rainwater runoff from the surrounding area (Figure 1-5). The Surface Water Impoundment Area is ~0.41 ha (1.02 ac) and lies just southwest of the Upland Area.

Historically, the CSSLP has been used to burn various unknown types and quantities of wood which may have included treated lumber and creosote-treated wood. Since 1975, its operating procedures have called for the area to receive inert, nonhazardous materials such as nails, hinges, scrap lumber, poles, crates, pallets, and unsalvageable wood products. Several debris piles within the CSSLP were located in the wooded areas near an intermittent stream. The debris piles were up to 6 m (20 ft) in diameter at the base and were about 3 m (10 ft) high. In some of the piles, metal shavings and other debris were clearly evident under a thin cover of leaves. All the debris (including construction debris, plastics, and metal shavings) was removed to a landfill or recycled (WSRC 2001a). Burning operations at the CSSLP were limited to untreated wood products, such as shipping pallets, some-time prior to 1998 and the ash was collected and hauled to the Burma Road Landfill at SRS.

3.8.2 CSSLP Subunit Characterization and Data Summary

A pre-Work Plan characterization was conducted at the CSSLP subunit (Upland Area) in June 2019 through August 2019. Surface and subsurface soil samples were collected at nineteen (19) locations based on a grid pattern to cover the area. Sampling locations (CSSLP-1 through CSSLP-19) were laid out in a grid pattern ~30.5-m (100-ft) apart across the unit. 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]) soil samples received TAL, TCL and radiological indicator parameters (gross alpha and nonvolatile beta) analyses. Preliminary screening of the 2019 pre-Work Plan characterization data identified primarily metals that may constitute a problem warranting action for human and ecological receptors.

The RFI/RI Workplan (SRNS 2020) characterization better defined the nature and extent of contamination in some locations and identified if elevated metal (including hexavalent chromium) results are due to native soil conditions or related to unit operations. At six (6) locations inside the CSSLP subunit and three background locations outside of the unit boundary, thirty (30) soil samples were collected in 2020. Sample locations within the subunit focused on previously identified locations of elevated metal concentrations. The following four (4) soil intervals were sampled: surface samples (0.0 to 0.3 m [0 to 1 ft]), shallow subsurface samples (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface samples (2.4 to 3.0 m [8 to 10 ft] and 3.0 to 3.6 m [10 to 12 ft]). All soil samples were analyzed for TAL metals analyses, including hexavalent chromium because of the history of burning material and the elevated 2019 chromium results.

Additional data were also collected for the CSSLP subunit (Surface Water Impoundment Area) and the background Carolina Bay #125 (SRNS 2020). Sample locations within the Surface Water Impoundment Area targeted locations identified with elevated metal results in 1997 and 1999. At four (4) locations inside the Surface Water Impoundment Area and at three (3) background locations from Carolina Bay #125 the following two sediment intervals were sampled: 0.0 to 0.3 m (0 to 1 ft) and 0.3 to 1.2 m (1 to 4 ft). A total of fourteen (14) sediment samples were collected for the Surface Water Impoundment Area and Carolina Bay #125. All sediment samples were

analyzed for TAL metals (including hexavalent chromium), TCL and radiological indicators (gross alpha and nonvolatile beta).

Surface water samples were collected at three (3) of the four (4) locations within the CSSLP (631-2G) Surface Water Impoundment Area and at all three background locations from Carolina Bay #125. Two samples (filtered and unfiltered) were collected at each location for a total of twelve (12) surface water samples collected from the Surface Water Impoundment Area and Carolina Bay #125. All surface water samples were analyzed for TAL metals (including hexavalent chromium), TCL and radiological indicators (gross alpha and nonvolatile beta).

Data supporting the evaluation of the CSSLP include 2019 pre-workplan characterization (19 locations, CSSLP-1 through CSSLP-19); 2020 WP characterization (16 locations: CSSLP-20 through CSSLP-32, CBBKG-1 through CBBKG-3) for two (2) subunits (1) CSSLP Subunit (Upland Area), 25 sampling locations (CSSLP-1 through CSSLP-19, CSSLP-27 through CSSLP-32) for the 0 to 0.3 m (0 to1 ft), 0.3 to 1.2 m (1 to 4 ft) intervals for soil, and (2) CSSLP Subunit Surface Water Impoundment, four locations (CSSLP-20 through CSSLP-23) for sediment (0 to 0.3 m [0 to 1 ft] and 0.3 to 1.2 m [1 to 4 ft] intervals), and four (4) locations (CSSLP-20 through CSSLP-23) for surface water (unfiltered and filtered). The CSSLP also has unit specific background data for soil from three (3) sampling locations (CSSLP-24 through CSSLP-26) from the 0 to 0.3 m (0 to1 ft), 0.3 to 1.2 m (1 to 4 ft) intervals. Unit specific background sediment (0 to 0.3 m [0 to1 ft] and 0.3 to 1.2 m [1 to 4 ft] intervals) and background surface water samples (unfiltered and filtered) were collected from three (3) locations from Carolina Bay #125 (CBBKG-1 through CBBKG-3) to support the CSSLP Surface Water Impoundment Area evaluation.

3.8.3 CSSLP Subunit Nature and Extent of Contamination

Constituents identified as USCs for the CSSLP subunit are shown in Table A.2.7. USCs were identified in soil, sediment and surface water media at the CSSLP subunit. The maximum soil and sediment values were compared against two-times (2X) SRS mean background concentrations, if applicable, to determine if the constituent is a USC. Constituents (e.g., VOCs) above detection

limits and without an SRS mean, are considered USCs. Surface water samples were compared against MCLs or Tap Water RSLs to determine if they were USCs. Soil samples were collected from the CSSLP Subunit Upland Area. The sediment and surface water samples were collected from the CSSLP Subunit Surface Water Impoundment Area. The contaminants identified at the CSSLP include inorganics (e.g., metals), VOCs, SVOCs and radionuclides.

3.8.3.1 Soil Media

In the surface (0 to 0.3 m [0 to 1 ft]) soil interval the following constituents are identified as USCs in one or more sample: 2-methylnaphthalene, acetone, aldrin, alpha-chlordane, anthracene, Aroclor-1254, Aroclor-1260, arsenic, barium, benzo(g,h,i)perylene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, beryllium, bis(2-ethylhexyl) phthalate, calcium, carbazole, chromium, chrysene, cobalt, copper, cumene, cyanide, DDE, DDT, dibenz[ah]anthracene, di-n-butyl phthalate, fluoranthene, gamma-chlordane, hexavalent chromium (EPA 7196A), indeno[1,2,3-cd]pyrene, lead, magnesium, manganese, methyl ethyl ketone, naphthalene, nickel phenanthrene, potassium, pyrene, sodium and zinc.

In the shallow (0.3m to 1.2 m [1 to 4 ft]) subsurface soil interval the following constituents are identified as USCs in one (1) or more sample: 2-methylnaphthalene, acetone, aldrin, alpha-chlordane, anthracene, Aroclor-1254, Aroclor-1260, arsenic, barium, benzene, benzo(g,h,i)perylene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]-fluoranthene, beryllium, bis(2-ethylhexyl)phthalate, cadmium, calcium, chromium, chrysene, cobalt, copper, cumene, cyanide, DDD, DDE, DDT, dibenz[ah]anthracene, dieldrin, di-n-butyl phthalate, fluoranthene, gamma-chlordane, gross alpha, hexavalent chromium (EPA 7196A), indeno[1,2,3-cd]pyrene, lead, lindane, magnesium, manganese, mercury, methyl ethyl ketone, methylcyclohexane, nickel phenanthrene, potassium, pyrene, selenium, sodium and zinc.

In the deep (2.4 to 3.0 m [8 to 10 ft], 3.0 to 3.6 m [10 to 12 ft]) and 5.5 to 6.1 m [18 to 20 ft]) subsurface intervals the following constituents are identified as USCs in one (1) or more sample: 1,2,3-trichlorobenzene, 2-methylnaphthalene, acenaphthene, acetone, alpha-chlordane, aluminum, anthracene, Aroclor 1248, Aroclor 1254, Aroclor 1260, arsenic, barium, benzo(g,h,i)perylene,

benzo[a]anthrocene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, bis(2-ethyl-hexyl) phthalate, cadmium, calcium, carbazole, chloroethane, chloroethene, chloromethane, chromium, chrysene, cobalt, copper, cumene, cyclohexane, dibenz[ah]anthracene, dibenzofuran, dichloromethane, di-n-butyl phthalate, ethylbenzene, fluoranthene, fluorene, gamma-chlordane, indeno[1,2,3-cd]pyrene, iron, lead, m,p-xylene, magnesium, manganese, mercury, methyl acetate, methyl ethyl ketone, methyl teriary butyl ether, methylcyclohexane, naphthalene, nickel, o-xylene, pentachlorophenol, phenanthrene, potassium, pyrene, sodium, vanadium and zinc.

3.8.3.2 Sediment Media

In the surface (0 to 0.3 m [0 to 1 ft]) soil interval the following constituents are identified as USCs in one (1) or more sample: acetone, arsenic, barium, benzo[a]anthracene, benzo[b]fluoranthene, bis(2-ethylhexyl)phthalate, calcium, dimethyl phthalate, hexavalent chromium (EPA 7196A), manganese, methyl ethyl ketone, thorium-228, thorium-230, thorium-232, toluene, uranium-238 and zinc.

In the shallow (0.3m to 1.2 m [1 to 4 ft]) subsurface soil interval the following constituents are identified as USCs in one (1) or more sample: acetone, anthracene, arsenic, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, bis(2-ethylhexyl)phthalate, calcium, chrysene, copper, fluoranthene, gross alpha, hexavalent chromium (EPA7196A and EPA7199), magnesium, manganese, methyl ethyl ketone, phenanthrene, potassium, pyrene, sodium, toluene, uranium-238 and zinc.

3.8.4 CSSLP Subunit Contaminant Fate and Transport Evaluation Results

3.8.4.1 Upland Area

The following is a summary of the results from the CSSLP subunit (Upland upland Area) CM analysis using VZCOMML© (Appendix B):

- Tier I COPCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl) phthalate, naphthalene, pentachlorophenol, aldrin, dieldrin, lindane, p,p'-DDD, Aroclor 1248,

Aroclor 1254, Aroclor 1260, aresenic, barium, cadmium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, and vanadium.

- Tier II COCs: arsenic, cadmium, cobalt, iron, and manganese. Arsenic further evaluated using GoldSim®.
- Tier II RCOCs: None.

3.8.4.2 Surface Water Impoundment Area

The following is a summary of the results from the CSSLP subunit (Surface Water Impoundment Area) CM analysis using VZCOMML© (Appendix B):

- Tier I COPCs: benzo(a)anthracene, arsenic, manganese, thorium-232, and uranium-238.
- Tier II COCs: arsenic, manganese, and uranium-238. Though not specifically required, arsenic in the Surface Water Impoundment Area was evaluated using GoldSim® for combinative effects with the Upland Area.
- Tier II RCOCs: None

3.8.5 CSSLP Subunit Human Health Risk Assessment Results

3.8.5.1 Upland Area – Soils

The HHRA includes risk calculations for the resident and industrial worker scenarios for the CSSLP Upland Area soil media (Appendix C).

Results of each step of the HHRA for soil media for CSSLP Upland Area are summarized below.

- COPCs: arsenic, chromium VI, cobalt, iron, lead, manganese, vanadium, and benzo[a]pyrene. These constituents had maximum detected concentrations that exceeded human health (residential) risk-based screening levels and exceeded two times (2X) SRS mean background concentrations.
- COCs include the following:
  - Resident scenario: - arsenic, chromium VI – 7196A, and benzo[a]pyrene

- Industrial worker scenario: arsenic

HH RCOCs were identified for the soil media for the CSSLP Upland Area as shown below:

- Resident scenario: arsenic (risk = 2.41E-05).
- Industrial Worker scenario: arsenic (risk = 5.46E-06).

3.8.5.2 Surface Water Impoundment Area – Sediment

The HHRA includes risk calculations for the resident and industrial worker scenarios for the CSSLP Surface Water Impoundment Area sediment media (Appendix C).

Results of each step of the HHRA for sediment media for CSSLP Surface Water Impoundment Area sediment are summarized below.

- COPCs: arsenic, chromium VI, iron, lead, vanadium, thorium-232, and uranium-238. These constituents had maximum detected concentrations or activity concentrations that exceeded human health (residential) risk-based screening levels and exceeded two times (2X) mean SRS background concentrations.
- COCs include the following
  - Resident scenario: arsenic, chromium VI, thorium-232, and uranium-238
  - Industrial worker scenario: arsenic, thorium-232, and uranium-238

HH RCOCs were identified for the soil media for the CSSLP subunit (Surface Water Impoundment Area) sediment as shown below:

- Resident scenario: arsenic (risk = 1.22E-05).
- Industrial Worker scenario: arsenic (risk = 2.76E-06).

3.8.5.3 Surface Water Impoundment Area – Surface Water

The HHRA includes a comparison to conservative TLs for the CSSLP Surface Water Impoundment Area surface water media (Appendix C).

Results of each step of the HHRA for surface water media for CSSLP Surface Water Impoundment Area sediment are summarized below.

- COCs: arsenic (unfiltered and filtered) and chromium VI (filtered) as human health surface water COCs because the maximum-detected concentration exceeded surface water comparison values.

No HH RCOCs were identified for the surface water media for the CSSLP Surface Water Impoundment Area.

3.8.6 CSSLP Subunit Ecological Risk Assessment (ERA)

The ERA includes risk calculations for the ecological receptors for the CSSLP subunit (Appendix D). Results of each step of the ERA for the CSSLP subunit are summarized below.

- COPECs:
  - Upland Area - surface soil (0 to 0.3 m [0 to 1 ft]): acetone, arsenic, bis(2-ethylhexyl)phthalate, di-N-butylphthalate, chromium, hexavalent chromium (Method 7169A), copper, cyanide, lead, manganese, nickel, selenium, vanadium, and zinc
  - Upland Area - subsurface soil (0.3 to 1.2 m [1 to 4 ft]): alpha-chlordane, antimony, arsenic, Aroclor 1254, Aroclor 1260, bis(2-ethylhexyl)phthalate, cadmium, chromium, hexavalent chromium (Method 7196A), copper, Dieldrin, di-N-butylphthalate, lead, Lindane, mercury, nickel, selenium, vanadium, and zinc.
  - Surface Water Impoundment Area – surface water: aluminum, barium, copper, iron, lead, manganese, and zinc
- COPCs:
  - Upland Area - surface soil (0 to 0.3 m [0 to 1 ft]): vanadium
  - Upland Area - subsurface soil (0.3 to 1.2 m [1 to 4 ft]): bis(2-ethylhexyl)phthalate, mercury, selenium, and vanadium
  - Upland Area - sediment (0 to 0.3 m [0 to 1 ft]): vanadium

- Surface Water Impoundment Area – surface water: aluminum, copper, iron, lead, manganese, and zinc

- RCOCS
  - Upland Area - surface soil – none
  - Upland Area - subsurface soil: none
  - Surface Water Impoundment Area – sediment: none
  - Surface Water Impoundment Area - surface water: none

3.8.7 Central Shops Scrap Lumber Pile Subunit Principal Threat Source Material

3.8.7.1 Upland Area

The PTSM evaluation is presented in Appendix E. The following is a summary of the problems warranting action:

- Soil media (all depths): No PTSM RCOCs

3.8.7.2 Surface Water Impoundment Area

The PTSM evaluation is presented in Appendix E. The following is a summary of the problems warranting action:

- Sediment media (all depths): No PTSM RCOCs

3.9 Ford Building Subunit

3.9.1 Ford Building Subunit Description

The Ford Building is located within the N Area facility boundary. It was a one-story metal frame structure on a concrete pad, covering ~900 m^2 (9,700 ft^2) (Figure 1-5). The primary area of the building consisted of a machine shop with offices, storage rooms, restrooms and a service area. Ancillary equipment and other areas that are included with the Ford Building subunit are the

remnants of 1) a 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 Ford Building (Figure 1-3) was built in the 1950s and used exclusively for testing of Ford Company-manufactured motor control packages for control rod drive mechanisms prior to their installation in the SRS reactors. During the early 1960s, the SRS reactors were operating at higher power levels and failure of heat exchangers prompted conversion of this facility for repair/rework. This mission continued until the early 1970s when the procurement of new heat exchangers for the SRS reactors terminated the mission of the facility. In the 1980s, it housed construction crews that performed minor repairs and the building was mostly used to store equipment and miscellaneous supplies. During the early 1990s, the K-Reactor had a minor leak in a heat exchanger that resulted in reactivating the Ford Building. The facility operated for about six (6) months and was closed. It was then utilized to store excess equipment (in waste containers [e.g., Sealands] and/or bagged/wrapped in plastic) that was chemically and/or radiologically contaminated. Services and utilities to the facility included domestic water, fire water, electrical power, sanitary sewer and process sewer.

3.9.2 Ford Building Subunit Characterization and Data Summary

In 2014, concrete samples were collected inside the Ford Building subunit at twenty-one (21) locations, and soil samples were collected at the same locations beneath the concrete cover. The Characterization Report 690-N (Ford Building) and Ancillary Equipment and Facilities (SRNS 2014b) concluded that minimal radiological and PCB contamination was present in the Ford Building concrete remnant slab and soils below the concrete remnant slab. In 2019, a HH screening evaluation for the Ford Building (690-N) concrete and underlying soils in support of the D&D strategy identified concrete with PCBs (Aroclor 1254, maximum detection in concrete = 15 mg/kg, residential risk = 6.3E-06, industrial worker risk = 1.5E-06; Aroclor 1260 maximum detection in concrete = 5.5 mg/kg, residential risk = 2.3E-06, industrial worker risk < 1E-06) and cesium-137 (maximum detection in concrete = 1.75 pCi/g, residential risk = 2.8E-05 , industrial worker risk = 1.7E-05) at levels that warrant concern with respect to human health (SRNS 2019). No HH COCs were identified for underlying soils. No CM COCs were identified as part of the

evaluation for the Ford Building (690-N) concrete cover and underlying soils in support of the D&D strategy.

In 2019, agreement was reached for the Ford Building, excluding the building remnant slab, to undergo D&D and the USEPA and SCDHEC concurred with the Facility Decommissioning Evaluation Building 690-N, Process Heat Exchanger Repair Facility (SRNS 2019). Following removal of the Ford Building under the D&D program, an engineered concrete cover was installed over the entire Ford Building remnant slab area to prevent exposure to PCBs and cesium-137 (+D).

As part of the 2019 pre-Work Plan characterization effort, soils samples were taken in surface and subsurface soils around the Ford Building and ancillary remnants at thirty-eight locations. Preliminary screening of the 2019 pre-Work Plan characterization data identified metals and radionuclides in soils that may constitute a problem warranting action for human and ecological receptors. Data supporting the Ford Building evaluation include 2019 Pre-WP characterization data collected from 38 locations (FBFA-1 through FBFA-38) for the 0 to 0.3 m (0 to 1 ft) and 0.3 to 1.2 m (1 to 4 ft) soil intervals , which received TAL, TCL-SVOC, TCL-VOC, TCL-PCB, and radiological indicator parameters (gross alpha and nonvolatile beta). At five locations (FBFA-7, FBFA-17, FBFA36, FBFA-37 and FBFA-38) deeper subsurface (2.4 to 3.0 m [8 to 10 ft], 5.5 to 6.1 m [18 to 20 ft] and 8.5 to 9.1 m [28 to 30 ft]) soil samples were collected and received TAL, TCL-SVOC, TCL-VOC, TCL-PCB, and radiological indicator parameters (gross alpha and nonvolatile beta). Site-specific background data is not required for the Ford Building subunit because the SRS background soils report provides sufficient data (WSRC 2006).

3.9.3 Ford Building Subunit Nature and Extent of Contamination

Constituents identified as USCs for the Ford Building are shown in Table A.3.7. The primary contaminants at the Ford Building are inorganics (e.g., metals) and SVOCs. The maximum soil concentrations above detection were compared against two-times (2X) SRS mean background concentrations, if applicable, to determine if the constituent is a USC. Constituents (e.g., VOCs) above detection limits and without an SRS mean, are considered USCs.

In the surface (0 to 0.3 m [0 to 1ft]) soil interval the following constituents are identified as USCs in one (1) or more sample: Aroclor 1254, Aroclor 1260, arsenic, benzo[g,h,i]perylene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, beryllium, bis(2-ethylhexyl)phthalate, cadmium, calcium, carbazole, cesium-137, chromium, chrysene, cobalt-60, cumene, di-n-butyl phthalate, fluoranthene, indeno[1,2,3-cd]pyrene, iron, lead, magnesium, manganese, mercury, methyl ethyl ketone, pentachlorophenol, phenanthrene, potassium-40, pyrene, silver, thorium-230, toluene, vanadium and zinc.

In the shallow (0.3 to 1.2 m [1 to 4 ft]) subsurface soil interval, the following constituents are identified as USCs in one or more sample: acetone, anthracene, barium, butyl benzyl phthalate, copper, cyclohexane, tetrachloroethylene and thorium-228.

In the deep (2.4 to 3.0 m [8 to 10 ft], 5.5 to 6.1 m [18 to 20 ft]) and 8.5 to 9.1 m [28 to 30 ft]) subsurface intervals the following constituents are identified as USCs in one (1) or more sample: actinium-228, aluminum, bismuth-212, bismuth-214, cobalt, dichloromethane, gross alpha, lead-212, lead-214, methyl tertiary butyl ether, n-dioctyl phthalate, nickel, nonvolatile beta, potassium, selenium, styrene, thallium, thallium-208, TPH diesel range organics, trichloroethylene, uranium-233/234 and uranium-238.

Soil sampling at the Ford Building subunit is sufficient to determine the nature and extent of contamination, and the presence or absence of problems warranting response action. The contaminants with the highest soil concentrations are relatively immobile. A contaminant migration analysis has been performed as described in Section 3.7.4. Results of the contaminant of the contaminant migration evaluation indicate the contaminants at the Ford Building subunit are not a potential source for groundwater contamination. Cobalt-60 in surface soil (0.545 pCi/g) was only detected above background at one location (FBFA-21), which is currently under the gravel supporting the concrete cover for the Ford Building subunit. Cobalt-60 is discussed in more detail in the Fate and Transport (section 3.9.4) and HHRA (section 3.9.5) sections that follow.

3.9.4 Ford Building Subunit Contaminant Fate and Transport Evaluation Results

The following is a summary of the results from the Ford Building subunit CM analysis using VZCOMML© (Appendix B):

- Tier I COPCs: dichloromethane (methylene chloride), benzo(a)anthracene, pentachlorophenol, Aroclor 1254, Aroclor 1260, aluminum, arsenic, beryllium, cadmium, cobalt, copper, iron, lead, manganese, mercury, selenium, thallium, vanadium, zinc, potassium-40, thorium-230, thorium-232, uranium-233/234, and uranium-238.
- Tier II COCs: None.
- Tier II RCOCs: None.

3.9.5 Ford Building Subunit Human Health Risk Assessment (HHRA) - soil

The HHRA includes risk calculations for the resident and industrial worker scenarios for the Ford Building subunit soil media (Appendix C).

Results of each step of the HHRA for soil media for Ford Building subunit are summarized below.

- COPCs: aluminum, arsenic, chromium, cobalt, iron, manganese, thallium, vanadium, cobalt-60, potassium-40, thorium-232, and uranium-238. These constituents had maximum detected concentrations or activity concentrations that exceeded human health (residential) risk-based screening levels and exceeded two times (2X) SRS mean background concentrations.
- COCs include the following
    - Resident scenario: arsenic, chromium, thallium, cobalt-60, potassium-40, thorium-232, and uranium-238
    - Industrial worker scenario: arsenic, chromium, cobalt-60, potassium-40, thorium-232, and uranium-238
- RCOCs were identified for the soil media for the ECODS N-1:
    - Resident scenario: cobalt-60 (risk = 1.65E-05).

- Industrial Worker scenario: cobalt-60 (risk = 1.13E-05).

3.9.6 Ford Building Subunit Ecological Risk Assessment (ERA) - soil

The ERA includes risk calculations for the ecological receptors for the Ford Building subunit soil media (Appendix C).

Results of each step of the ERA for the soil media are summarized below .

- COPECs:
  - Surface soil (0 to 0.3 m [0 to 1 ft]): actinium-228, aluminum, arsenic, Aroclor 1254, Aroclor 1260, beryllium, bis(2-ethylhexyl)phthalate, bismuth-212, cadmium, chromium, copper, cumene, di-N-butylphthalate, iron, lead, lead-214, manganese, mercury, potassium-40, selenium, tetrachloroethylene, thallium, thallium-208, vanadium, and zinc
  - Subsurface soil (0.3 to 1.2 m [1 to 4 ft]): actinium-228, aluminum, arsenic, Aroclor 1254, bismuth-212, bis(2-ethylhexyl)phthalate, chromium, copper, di-N-butylphthalate, iron, lead, lead-214, mercury, potassium-40, selenium, thallium, and thallium-208
- COPCs:
  - Surface soil (0 to 0.3 m [0 to 1 ft]): actinium-228, aluminum, bismuth-212, cumene, iron, lead-214, potassium-40, selenium, thallium, thallium-208, and vanadium
  - Subsurface soil (0.3 to 1.2 m [1 to 4 ft]): actinium-228, aluminum, bismuth-212, copper, iron, lead-214, potassium-40, selenium, thallium, and thallium-208.
- RCOCS
  - Surface soil: none
  - Subsurface soil: none

3.9.7 Ford Building Subunit Principal Threat Source Material

The PTSM evaluation is presented in Appendix E. The following is a summary of the problems warranting action:

- Soil media (all depths): No PTSM RCOCs

3.10 Summary of Refined Constituents of Concern and Refined Conceptual Site Models

The ECODS N-1, CSSLP, and Ford Building were investigated to determine the nature and extent of contamination, the risk to the resident, industrial worker, and the environment, the presence of PTSM, and if there are constituents that are a CM concern. Soil, sediment, and surface water samples were collected, evaluated, and screened against the appropriate regulatory thresholds and protocols to identify COCs that may warrant further consideration for remedial action. Results of the evaluations indicate that RCOCs were identified at the CSSLP subunit in soil and sediment, and the Ford Building subunit in the soil. Arsenic was identified as a human health RCOC in CSSLP surface soil for the resident (risk = 2.4E-05) and industrial worker (risk = 5.5E-06) and CSSLP surface sediment for the resident (risk = 1.2E-05) and industrial worker risk = 2.8E-06). Cobalt-60 was identified as a RCOC in Ford Building surface soil for the resident (risk = 5.5E-05) and industrial worker (risk = 1.1E-05). No ecological RCOCs were identified in soil, sediment or surface water for the ECODS N-1, CSSLP, and Ford Building OU (Appendix D). No PTSM RCOCs were identified in soil or sediment for the ECODS N-1, CSSLP, and Ford Building (Appendix E). The CM analyses (Appendix B) also concluded that there is no CM occurring from the ECODS N-1, CSSLP, and Ford Building subunits into the underlying groundwater.

With the results of the HHRA, ERA, PTSM, and CM evaluations, the preliminary CSMs (Figures 2-5 through 2-7) are upgraded to refined CSMs (Figures 3-4 through 3-6) to provide a visual summary of potential risks/hazards for each receptor by exposure route. Filled circles within boxes beneath applicable receptors indicate a potential unacceptable exposure as a result of a quantitative evaluation. Below is a summary of the elements of the refined CSMs by unit by exposure medium in which potential impacts are noted.

3.10.1 ECODS N-1

The refined CSM for the ECODS N-1 (Figure 3-4) indicates that no further evaluation of surface, subsurface, or deep soils within this subunit is required in the CMS/FS from the results of the

HHRA. However, ACM is present in subsurface soils that may pose a risk to human receptors if exposed and will require further evaluation in the CMS/FS.

3.10.2 Central Shops Scrap Lumber Pile (631-2G)

Figure 3-5 presents the refined CSM for the CSSLP subunit. Three media (soil, sediment, and surface water) and their potential for migration to groundwater, were evaluated.

3.10.2.1 Upland Area - Soil

Contact with surface soil (via inhalation, ingestion, and dermal contact) by a resident or industrial worker may result in in unacceptable risk associated with arsenic. Therefore, soil represents an exposure medium that requires further evaluation in the CMS/FS for potential remedial action (Chapter 5).

3.10.2.2 Surface Water Impoundment Area - Sediment

Contact with surface sediment (via inhalation, ingestion, and dermal contact) by a resident or industrial worker may result in in unacceptable risk associated with arsenic. Therefore, sediment represents an exposure medium that requires further evaluation in the CMS/FS for potential remedial action (Chapter 5).

3.10.3 Ford Building

Figure 3-6 presents the refined CSM for the Ford Building. Soil media potential for migration to groundwater was evaluated.

Contact with surface soil (via inhalation, ingestion, dermal contact and external radiation) by a resident or industrial worker may result in in unacceptable risk associated with cobalt-60. Therefore, soil represents an exposure medium that requires further evaluation in the CMS/FS for potential remedial action (Chapter 5).

3.11 Applicable or Relevant and Appropriate Requirements Evaluation

Analytical data are compared to the chemical-specific ARARs. Chemical-specific ARARs or to-be-considered (TBC) requirements exist under federal and state regulations for lead and PCBs.

For lead in soil, the CERCLA value of 400 mg/kg was set by the USEPA Office of Solid Waste Emergency Response and adopted as a TBC for the screening process. At the ECODS N-1 subunit, two (2) of the 153 total soil samples from all soil depth intervals are above this concentration. The maximum detected concentration of lead is 1,470 mg/kg from location ECN1-08 (0 to 0.3 m [0 to 1 ft] interval. The other exceedance had a concentration of 889 mg/kg at location ECN1-044 (0.3 to 1.2 m [1 to 4 ft] interval). The ARAR TBC screening threshold corresponds to the residential RSL of 400 mg/kg. The 95% UCL in surface soil is 202.1 mg/kg and the residential HQ is 0.51 (RSL 400 mg/kg). The all-depths soils mean concentration is 25.3 mg/kg. The two (2) isolated lead hotspots are not deemed significant enough to warrant a remedial response, and lead is not identified as an ARAR RCOC.

PCBs are governed by the Toxic Substances Control Act (TSCA) (40 CFR Part 761). The final rule for PCB disposal was established on August 20, 1998; it addresses residual levels of PCB remediation waste that can be left in place. Action levels are based on site-specific conditions.

For high-occupancy areas (both residential and industrial scenarios), 40 CFR 176.125 (4)(v) states that spills be decontaminated to 10 mg/kg PCBs, provided that soil is excavated to a minimum depth of 25 cm (10 in) and that the excavated soil is replaced with clean soil (i.e., soil containing less than one (1) mg/kg PCBs). For low-occupancy areas (e.g., the most likely onsite worker scenario), the regulation requires that action levels be established in the range of 25 to 50 mg/kg and recognizes that PCB concentrations near the high end of this range may be protective of human health and the environment at sites where exposure is limited through institutional controls. No soil/sediment results are above the most conservative PCB concentration of 1 mg/kg established for free-release.

However, maximum detected concentrations of Aroclor 1254 (max = 15 mg/kg) and Aroclor 1260 (max = 5.5 mg/kg)) originating from the machine oils in the concrete remnant slab as well as

expansion joint caulk containing PCBs at the Ford Building do not meet the free release criteria. A 15-cm (6-in.) concrete cover was designed to be compliant with PCB capping requirements found in TSCA (40 CFR 761.61[1][7]). The concrete cover was installed in 2021. The concrete cover breaks the direct exposure pathway to PCBs. As a result of this barrier, PCBs are not identified as an ARAR RCOC at the Ford Building. This cover also achieves the substantive requirements under 40 CFR 761.62(c) for risk-based disposal of Bulk Product Waste and the unit does not pose an unreasonable risk of injury to health or the environment.

This page is intentionally left blank.

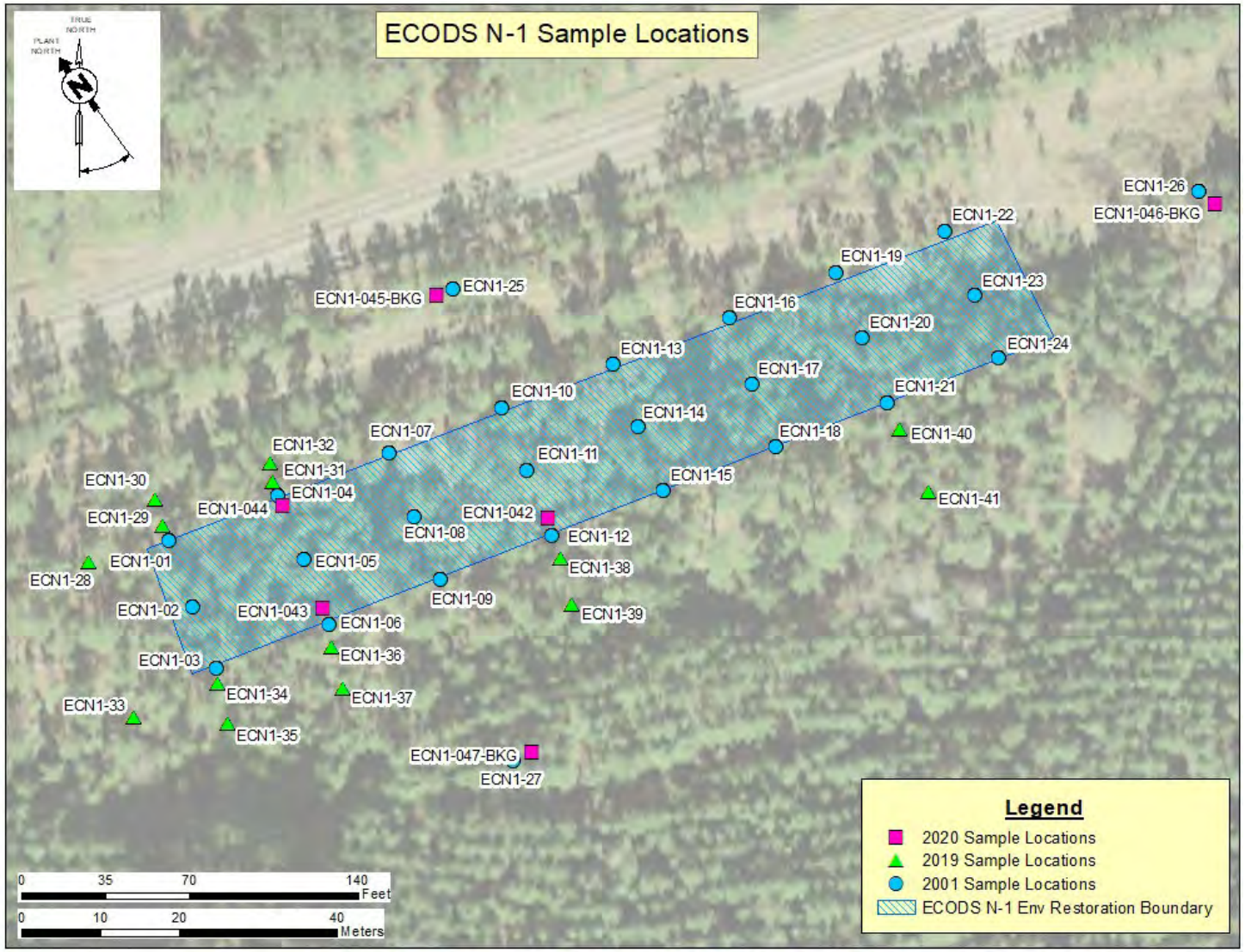


Figure 3-1. ECODS N-1 Sample Locations

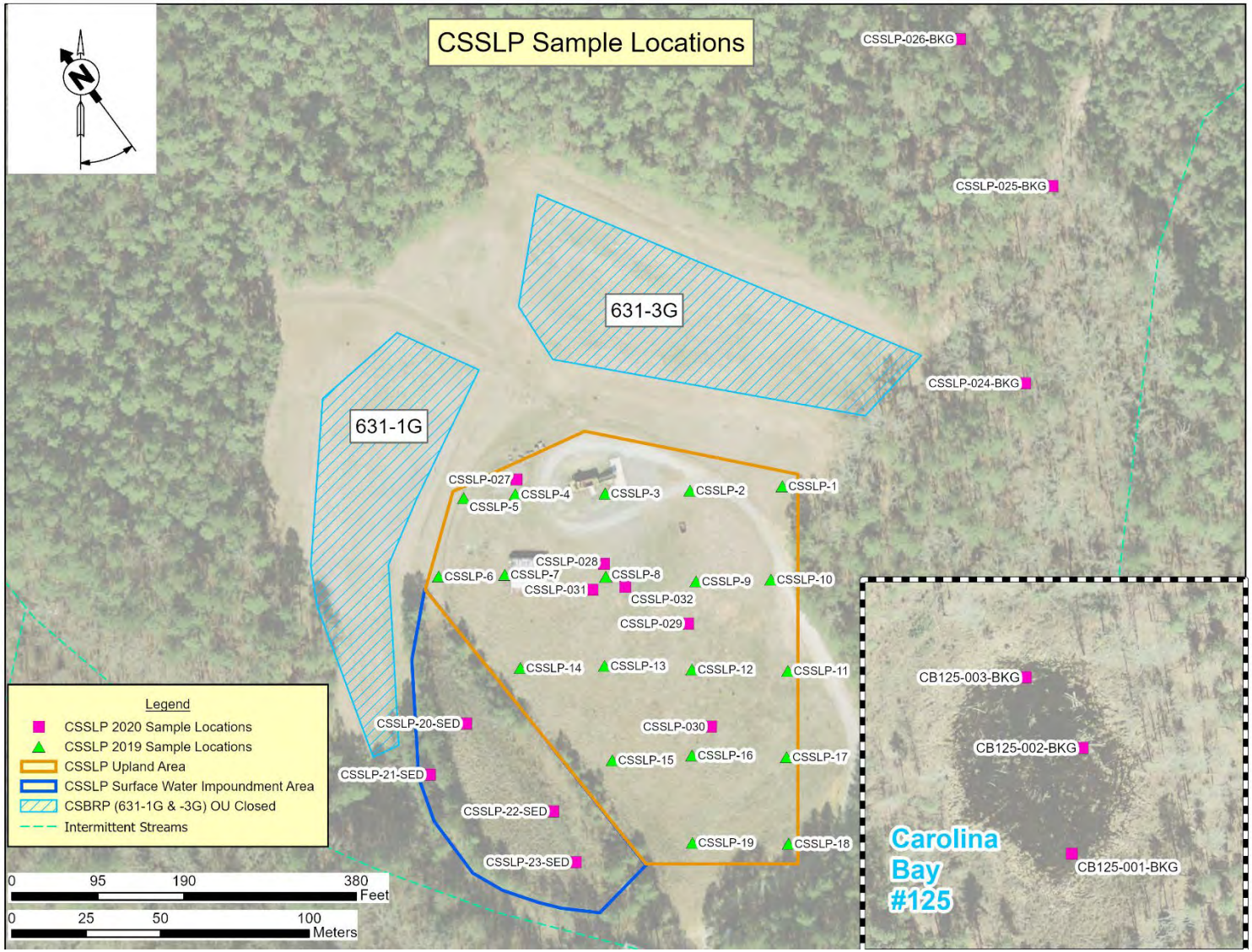


Figure 3-2. Central Shops Scrap Lumber Pile (631-2G) Sample Locations

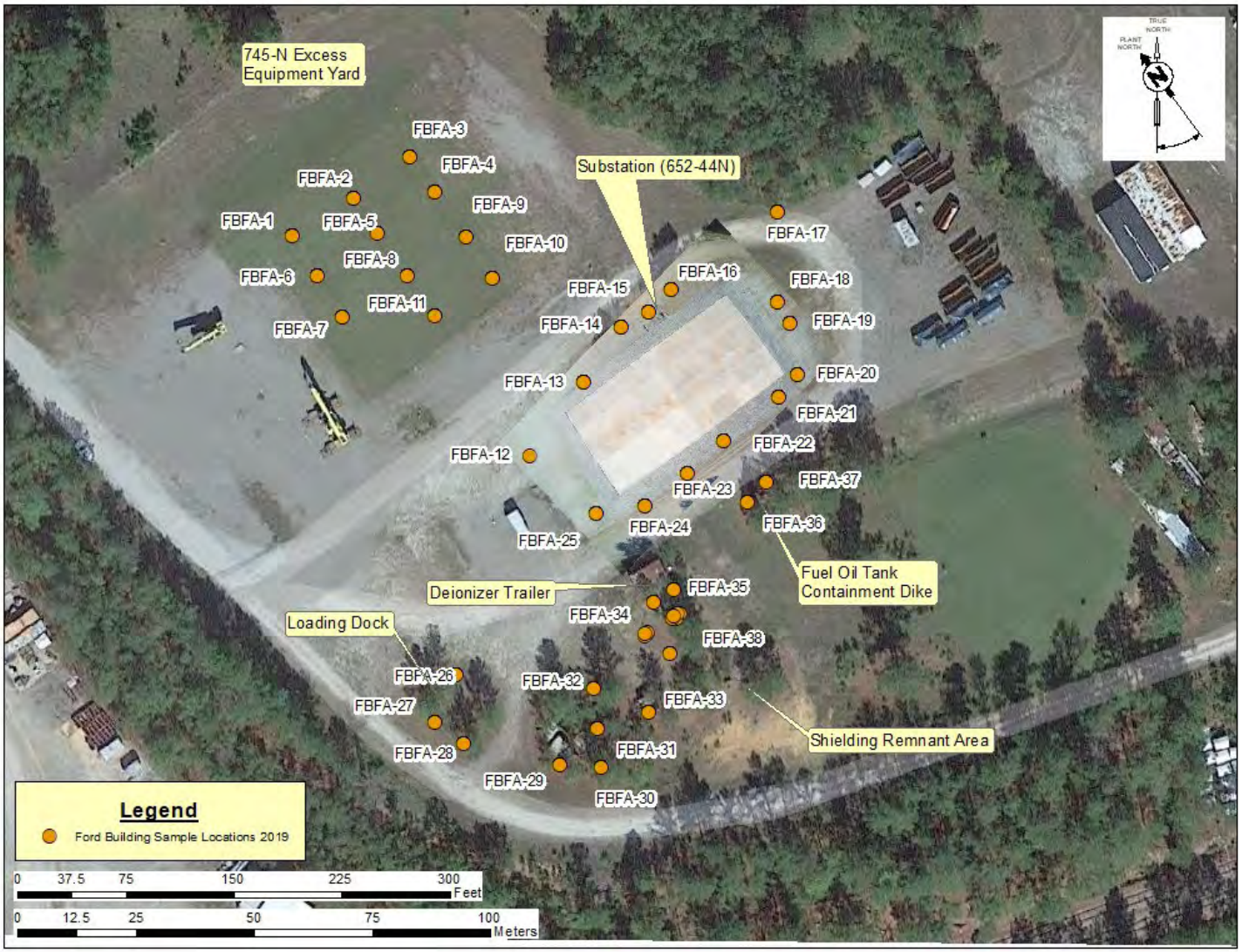
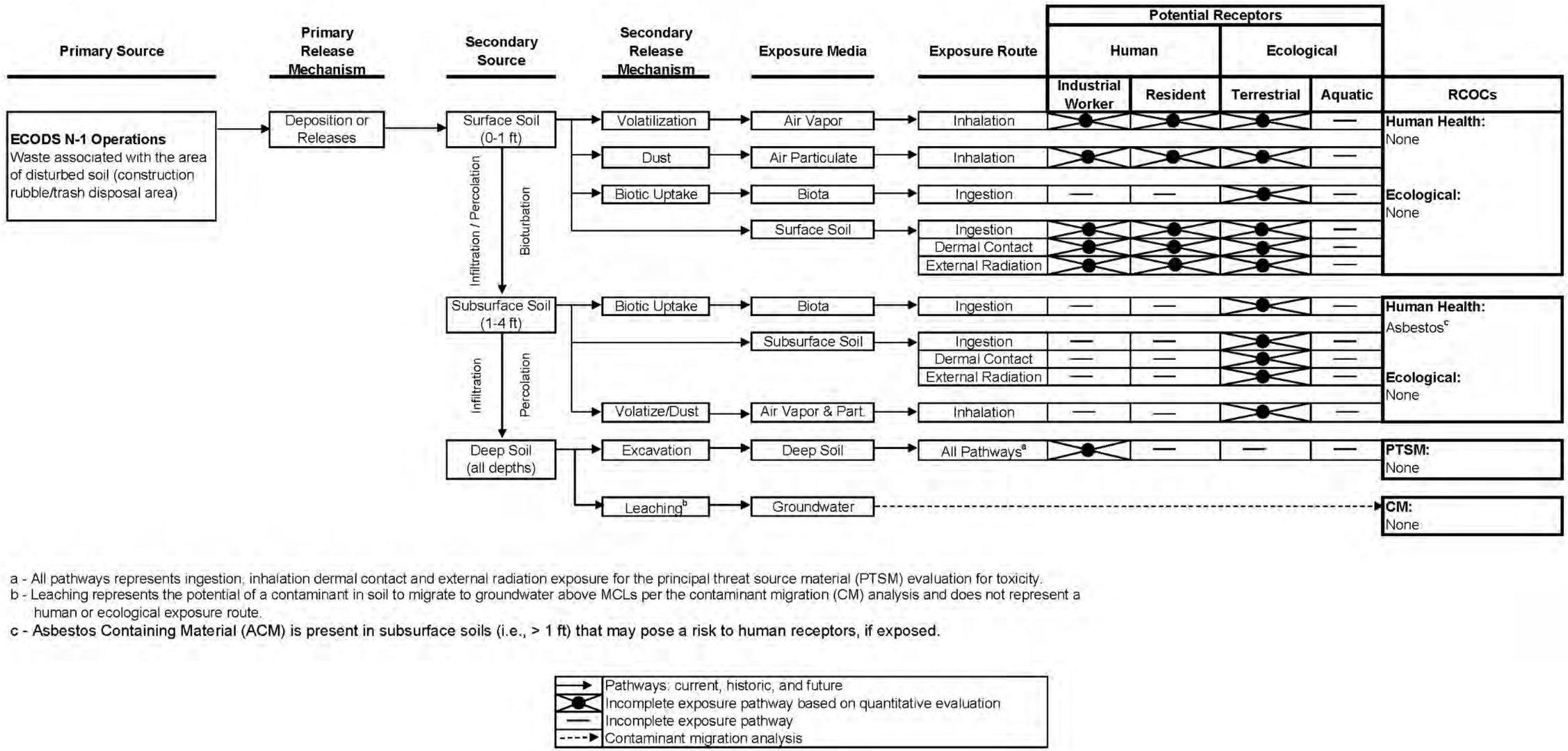


Figure 3-3. Ford Building Sample Locations

This page is intentionally left blank.



a - All pathways represents ingestion, inhalation dermal contact and external radiation exposure for the principal threat source material (PTSM) evaluation for toxicity.
b - Leaching represents the potential of a contaminant in soil to migrate to groundwater above MCLs per the contaminant migration (CM) analysis and does not represent a human or ecological exposure route.
c - Asbestos Containing Material (ACM) is present in subsurface soils (i.e., > 1 ft) that may pose a risk to human receptors, if exposed.

Figure 3-4. Revised Conceptual Site Model for the ECODS N-1 Subunit

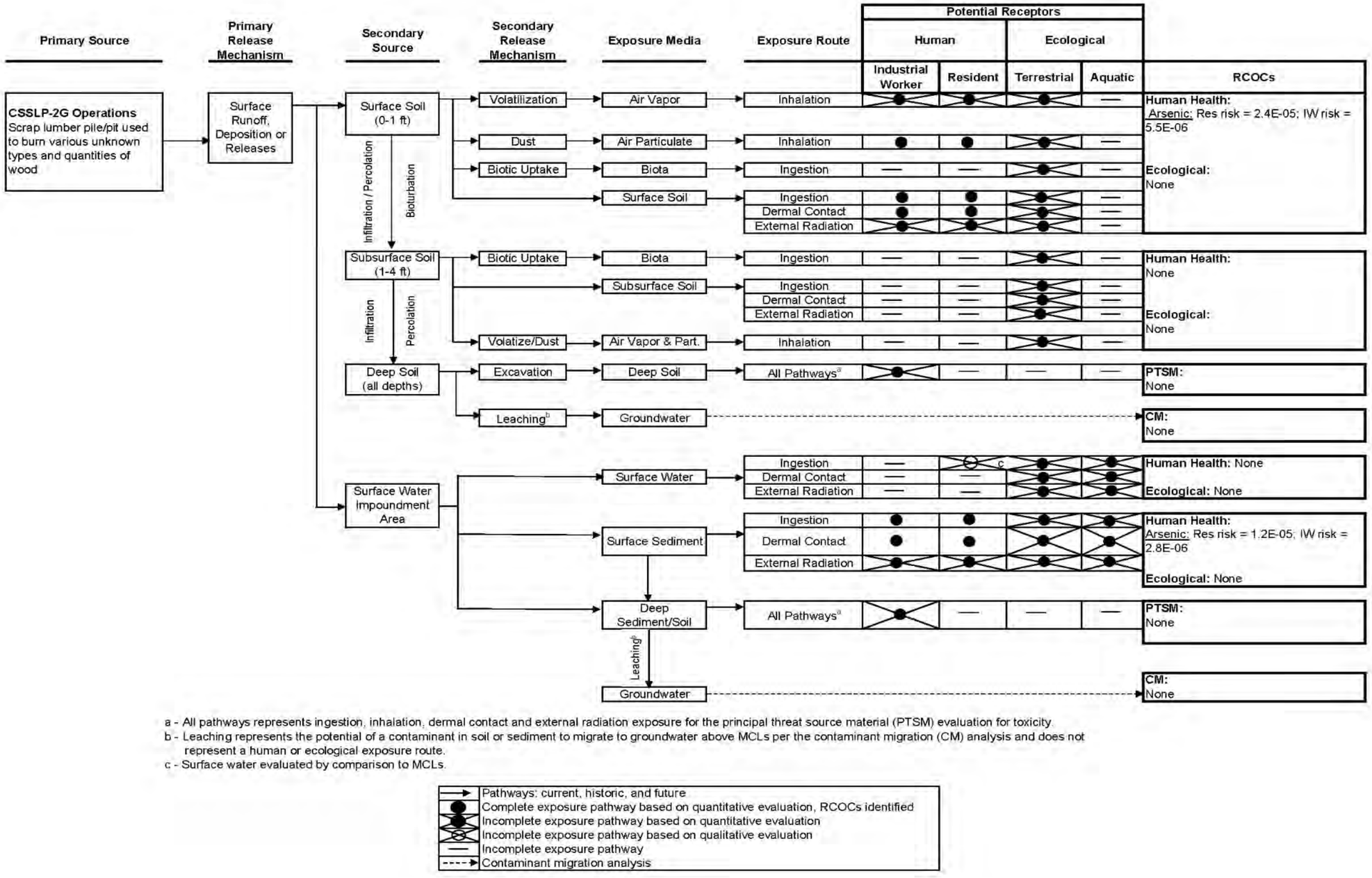
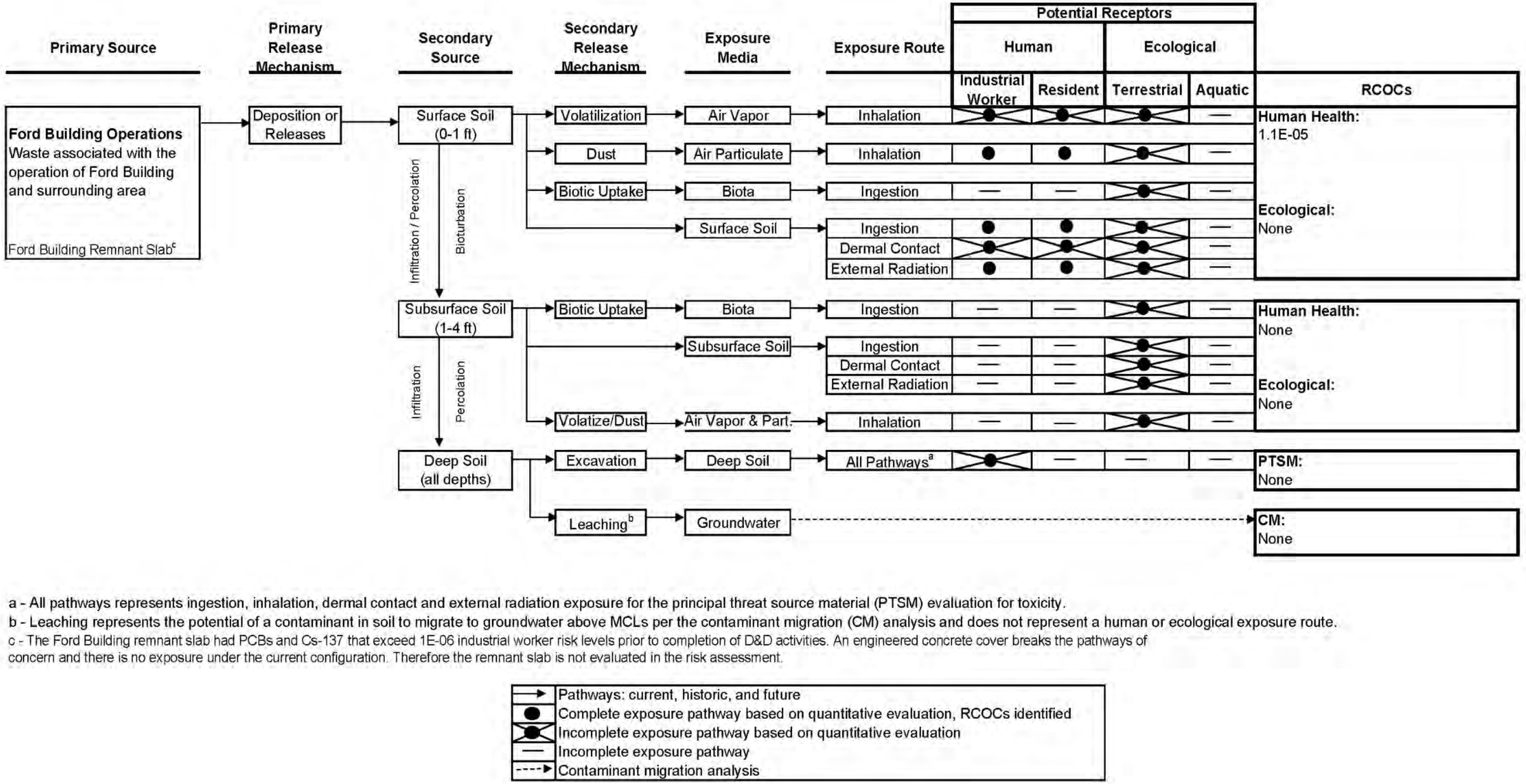


Figure 3-5. Revised Conceptual Site Model for the Central Shops Scrap Lumber Pile (631-2G) Subunit



a - All pathways represents ingestion, inhalation, dermal contact and external radiation exposure for the principal threat source material (PTSM) evaluation for toxicity.
b - Leaching represents the potential of a contaminant in soil to migrate to groundwater above MCLs per the contaminant migration (CM) analysis and does not represent a human or ecological exposure route.
c - The Ford Building remnant slab had PCBs and Cs-137 that exceed 1E-06 industrial worker risk levels prior to completion of D&D activities. An engineered concrete cover breaks the pathways of concern and there is no exposure under the current configuration. Therefore the remnant slab is not evaluated in the risk assessment.

Figure 3-6. Revised Conceptual Site Model for the Ford Building Subunit

This page is intentionally left blank.

4.0 REMEDIAL ACTION OBJECTIVES AND PRELIMINARY REMEDIATION GOALS

4.1 Remedial Action Objectives

RAOs are site-specific or media-specific objectives for protection of human health and the environment. RAOs usually specify RCOCs for the potential receptors, media of concern, and exposure pathways. RAOs describe what the remediation must accomplish and are used as a framework for developing remedial alternatives for the CMS/FS.

Section 121(d) of the CERCLA (1980), as amended by the Superfund Amendments and Reauthorization Act (1986), requires that any remedial action comply with requirements or standards set forth under Federal and State environmental laws (i.e., ARARs), as well as non-promulgated advisories, guidance, or proposed standards that are not legally binding but provide useful approaches or recommendations (called "To-be-considered" [TBC] requirements).

ARARs and TBCs include action-specific, location-specific, and chemical-specific requirements that are to be achieved unless a waiver is invoked. In addition, the NCP requires the development of health-based, site-specific levels for constituents (i.e., risk-based levels) where such promulgated limits do not exist and where there is a concern with their potential health or environmental effects. RAOs are developed, as applicable, from ARARs, TBCs, or risk-based levels that address the constituent, receptor, and media of concern. RAOs are presented by subunit within the ECODS N-1, CSSLP, Ford Building OU in which RCOCs have been identified from the assessments performed in Appendices B (Contaminant Fate and Transport), C (HHRA), D (ERA), and E (PTSM). RAOs are presented below by subunit.

4.1.1 ECODS N-1 Subunit

According to the analysis performed in Appendices B (Contaminant Fate and Transport), C (HHRA), D (ERA), and E (PTSM), and the results summarized in Chapter 3, there are no CM,

HH, ECO, or PTSM RCOCs identified for the ECODS N-1 subunit. However, ACM is present in subsurface soils.

The following problem warranting action is identified for the ECODS N-1 subunit:

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

Based on the problem warranting action, the following RAO applies for the ECODS N-1 subunit:

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

4.1.2 CSSLP Subunit

Results of the analyses performed for the CSSLP Subunit are discussed for the Upland Area and Surface Water Impoundment Area in the following subsections.

4.1.2.1 CSSLP Subunit (Upland Area)

4.1.2.1.1 Soil

According to the analyses performed in Appendices B (Contaminant Fate and Transport), C (HHRA), D (ERA), and E (PTSM), and the results summarized in Chapter 3, there are no CM, ECO, or PTSM RCOCs identified for the CSSLP - Upland Unit.

The following problem warranting action is identified for the CSSLP – Upland Area:

- Arsenic is present in surface soil (0 to 0.3 [0 to 1 ft]) (EPC =16.4 mg/kg) exceeding the 1E-06 risk level for the resident (risk = 2.4E-05) and industrial worker (risk =5.5E-06) scenarios.

Based on the problem warranting action, the following RAO applies for the CSSLP – Upland Area:

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

4.1.2.2 CSSLP Subunit (Surface Water Impoundment Area)

4.1.2.2.1 Sediment

According to the analyses performed in Appendices B (Contaminant Fate and Transport), C (HHRA), D (ERA), and E (PTSM), and the results summarized in Chapter 3, there are no CM, ECO, or PTSM RCOCs identified for the CSSLP – Surface Water Impoundment Area.

The following problem warranting action is identified for the CSSLP – Surface Water Impoundment Area:

- Arsenic is present in surface sediment (0 to 0.3 [0 to 1 ft]) (EPC = 8.27 mg/kg) exceeding the 1E-06 risk level for the resident (risk = 1.2E-05) and industrial worker (risk =2.8E-06) scenarios.

Based on the problem warranting action, the following RAO applies for the CSSLP – Surface Water Impoundment Area:

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

4.1.2.2.2 Surface Water

According to the analysis performed in Appendices C (HHRA), D (ERA), and the results summarized in Chapter 3, there are no HH or ECO RCOCs identified for the CSSLP subunit (Surface Water Impoundment Area) surface water.

4.1.3 Ford Building Subunit

4.1.3.1 Ford Building Remnant

The following problem warranting action is identified for the Ford Building remnant slab:

- Prior to placement of a concrete cover with minimum gravel underlay (0.46m [18 in.]) in 2021, PCBs (Aroclors 1254 and 1260) and cesium-137(+D) were present at the Ford Building remnant slab that exceeds the 1E-06 risk level for the resident and industrial worker scenario.

Based on the problem warranting action, the following RAO applies for the Ford Building remnant slab:

- Prevent residential and industrial exposure to PCBs and cesium-137 at the Ford Building remnant slab that exceed 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).

4.1.3.2 Soil

According to the analysis performed in Appendices B (Contaminant Fate and Transport), C (HHRA), D (ERA), and E (PTSM), and the results summarized in Chapter 3, there are no CM, ECO, or PTSM RCOCs identified for the Ford Building perimeter soils.

The following problem warranting action is identified for the Ford Building soils:

- Cobalt-60 is present in surface soil (0 to 1 ft) (EPC = 0.545 pCi/g) exceeding the 1E-06 level of concern for the resident (risk = 5.5E-05) and industrial worker (risk = 1.1E-05) scenarios.

Based on the problem warranting action, the following RAO applies for the Ford Building remnant:

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

4.2 Preliminary Remediation Goal Development

PRGs represent the preliminary media-specific goals and serve as a standard by which to measure whether a selected remedial action has met its RAO. PRGs can be qualitative statements (e.g., indirect actions that prevent receptor contact), numerical values often expressed as concentrations in media (e.g., risk-based soil or sediment concentrations) or specific actions to eliminate contact with contaminated media (e.g., installation of engineered barriers, placement of caps and covers,

etc.) that achieve the RAO. PRGs become finalized as remedial goals (RGs) following public comment and approval of the SB/PP. The PRGs for the selected remedy are documented as final RGs or cleanup levels in the ROD. Numerical PRGs consist of a range of risk-based concentrations for RCOCs that provide a basis for selecting the final remedial action to achieve such values. Risk-based PRG calculations for the ECODS N-1, CSSLP, and Ford Building OU are provided in Appendix F.

The selection of final RGs is made by the risk managers for the SRS. The risk managers are the key decision makers and include representatives of the USDOE, SCDHEC, and USEPA.

The development of PRGs for the ECODS N-1, CSSLP, and Ford Building OU is described below.

4.2.1 Fate and Transport Preliminary Remediation Goals

The CM analysis is presented in Appendix B of this document. No CM RCOCs were identified for any subunits within the ECODS N-1, CSSLP, and Ford Building OU. Therefore, no CM PRGs are developed.

4.2.2 Human Health Preliminary Remediation Goals

The HHRA is presented in Appendix C of this document. Arsenic was identified as a HH RCOC in surface soil and surface sediment media at the CSSLP subunit for the resident and industrial worker scenarios. Cobalt-60 was identified as a HH RCOC in surface soil at the Ford Building for the resident and industrial worker scenarios. The range of HH PRGs (risk = 1E-04 to 1E-06) for the RCOCs at the CSSLP and the Ford Building are provided in Appendix F.

No HH RCOCs were identified for ECODS N-1 soil or CSSLP surface water media.

4.2.3 Ecological Preliminary Remediation Goals

The ERA is presented in Appendix D of this document. No ECO RCOCs were identified for any subunits within the ECODS N-1, CSSLP, and Ford Building OU. Therefore, no ECO PRGs are developed.

4.2.4 Principal Threat Source Material Preliminary Remediation Goals

The PTSM analysis is presented in Appendix E of this document. No PTSM RCOCs were identified for any subunits within the ECODS N-1, CSSLP, and Ford Building OU. Therefore, no PTSM PRGs are developed.

4.2.5 Applicable or Relevant and Appropriate Requirements Preliminary Remediation Goal

As presented in the Remedial Investigation (Chapter 3), there are no chemical-specific ARAR RCOCs identified for any media (i.e., soil, sediment or surface water) within the ECODS, CSSLP, Ford Building OU. Therefore, no ARAR PRGs are presented.

At the Ford Building remnant slab, PCBs (Aroclor 1254 and 1260) were present at levels that presented a problem warranting action prior to placement of a TSCA-compliant concrete cover. There is no human exposure risk under the current configuration (i.e., no exposure pathway). The concrete cover must be maintained to prevent exposure to PCB concentrations that exceed the PCB ARAR of 1 mg/kg for free release.

4.3 Most Restrictive and Most Likely Preliminary Remediation Goals

The most restrictive of the range of HH PRGs (i.e., risk = 1E-06) is presented in Appendix F and is shown in Table 4-1 for both the resident and industrial worker scenarios. Additionally, a range of background values is also presented in order to assist in the selection of the most restrictive, applicable PRG. The Most Likely PRG is the most restrictive (i.e., residential) risk-based concentration. If the risk-based PRG is less than the SRS background, then the SRS 95th percentile is identified as the Most Likely PRG.

Table 4-1. 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[2]	Most Likely PRG[3]
Central Shops Scrap Lumber Pile (631-2G)								
Soil and Sediment	Arsenic	mg/kg	0.68	3.0	4.5	*8.2*	22.9	**8.2**
Ford Building								
Soil	Cobalt-60	pCi/g	*0.033*	0.048	NA[4]	NA[4]	NA[4]	**0.033**

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

This page is intentionally left blank.

5.0 CORRECTIVE MEASURES STUDY / FEASIBILITY STUDY

This chapter describes the general response actions for the ECODS N-1, CSSLP, and Ford Building OU, identifies potential remedial technologies for each general response action, and screens remedial technologies with respect to effectiveness, implementability, and cost. According to the analyses performed in Appendix B (Contaminant Fate and Transport), Appendix C (HHRA), Appendix D (ERA), and Appendix E (PTSM), all three subunits require a response action to restrict/eliminate exposure to unacceptable risks.

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

The CSSLP subunit presents an unacceptable risk to human health. Arsenic is present in surface soils and surface sediments at levels that have been determined to pose an unacceptable risk for the residential and industrial worker scenarios.

The Ford Building subunit presents unacceptable risks to human health. The Ford Building remnant slab contains cesium-137 and PCBs at levels that have been determined to pose an unacceptable risk to the residential and industrial worker scenarios. The surface soils associated with the Ford Building subunit contain cobalt-60 at levels that have been determined to pose an unacceptable risk for the residential and industrial worker scenarios.

This initial list of action technologies applicable to the ECODS N-1, CSSLP, and Ford Building OU is based upon the approved likely response actions from the August 11, 2021, scoping meeting with the USDOE, USEPA, and SCDHEC, as well as experience with similar remedial actions and several sources of remedial listings, including the following:

- Superfund Innovative Technology Evaluation Program (SITE) Technology Profiles Tenth Edition (NRMRL 1999)
- U. S. Environmental Protection Agency (USEPA) Technology Innovation and Field Services Division (CLU-IN) (USEPA 1996)

- Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (USEPA 1988)

5.1 Identification and Screening of Technologies

The purpose of this section is to describe the applicability of the specific technology types identified for the ECODS N-1, CSSLP, and Ford Building OU. Identified technologies are screened using the NCP criteria: effectiveness, implementability, and cost. Technologies that pass this screening are retained and carried forward into the development of remedial action alternatives.

5.1.1 General Response Actions

General response actions are unit-specific actions that achieve RAOs and satisfy the requirements of the NCP. General response actions have been identified for the ECODS N-1, CSSLP, and Ford Building OU:

- No action
- LUCs
- Containment
- Excavation and Disposal

These response actions may be implemented singly or in combination.

5.1.1.1 No Action

The No Action response is not a technology but is required by the NCP as a baseline for comparison with other remedial actions. In this scenario, no efforts would be taken to monitor, remove, treat, or otherwise mitigate the potential spread of contaminants from the ECODS N-1, CSSLP, and Ford Building OU. Contaminant reduction would be achieved only through any natural attenuation that may occur.

5.1.1.2 Land Use Controls

LUCs include engineering controls (i.e., access controls) and institutional controls (i.e., administrative measures) that minimize the potential for human exposure to contaminants. Generally, LUCs are retained for use if necessary, in conjunction with other remedial alternative(s)

ultimately selected at the area or as a stand-alone alternative. LUCs already exist at SRS and can be implemented at the ECODS N-1, CSSLP, and Ford Building OU.

Access controls involve temporary or permanent physical restrictions to prevent or reduce human exposure to contaminants. Controls also can be used to prevent vandalism of on-site remedial equipment or disturbance of contaminated media. Regular monitoring and maintenance of access controls are required for this technology to effectively deter site entry. Access controls may include, but are not limited to, signs, fencing, barricades, or exclusion devices.

Administrative controls can be used to prevent or reduce future human exposure to contaminants remaining on the site. For example, excavation permit restrictions can be used to permanently prohibit excavation or subsurface construction. Administrative controls can also be temporary measures used while other remedial actions are taking place.

In the long-term, if the property is ever transferred to nonfederal ownership, the U.S. Government would, in compliance with Section 120(h) of CERCLA, create a deed for the new property owner. The deed would include notification disclosing the former waste management and disposal activities as well as remedial actions taken onsite and any continuing groundwater monitoring commitments.

5.1.1.3 Containment

Containment technologies minimize or eliminate human and ecological exposure to contaminants and minimize leaching, erosion, and bio-uptake of contaminated media through the use of engineered barriers including covers and caps.

5.1.1.4 Removal and Disposal

Removal (excavation) and disposal response actions eliminate human and ecological exposure to contaminants by permanently removing the contaminated media from the unit. This type of response action is achieved by scraping, cutting, digging, and/or vacuuming with heavy moving equipment through the use of conventional construction methods.

5.1.2 Screening of Technologies

Various technologies and approaches exist for implementing the general response actions for the ECODS N-1, CSSLP and Ford Building OU. The NCP requires that these potential technologies be screened against criteria of effectiveness, implementability, and cost.

- Effectiveness. An effective technology must achieve specified RAOs, be compatible with contaminant characteristics and waste unit conditions, and be protective of human health and the environment in both short-term and long-term scenarios. Technologies that do not meet RAOs, are significantly less effective than comparable approaches, or that have not been demonstrated successfully at similarly contaminated site are eliminated from further consideration.
- Implementability. Technologies are evaluated based on the technical feasibility, availability of resources and equipment, and the administrative or institutional feasibility of implementation. Implementable technologies are those that can be readily installed in a cost-effective and timely fashion and that will not elicit substantial public concern from the surrounding community. Mobilization and permitting requirements must be workable and must have been previously demonstrated at similar projects. Consideration is also given to regulatory constraints such as waste handling, disposal, and treatment requirements that would affect the implementation of a technology.
- Cost. A qualitative cost evaluation is provided so that comparisons can be made among the alternatives. Qualitative evaluations take into consideration capital costs and operation and maintenance costs. For screening purposes, the costs of technologies are typically described as high, medium, or low relative to others in the same general category.

Technologies were identified and screened initially during the scoping meeting conducted on August 11, 2021. Technologies that pass this screening are retained and carried forward for consideration as remedial alternatives. Tables 5-1 through 5-3 summarize the results of this screening.

5.1.2.1 No Action

This response would take no action to monitor, remove, treat, or otherwise mitigate the potential spread of contaminants from the ECODS N-1, CSSLP, and Ford Building OU. The No Action response could be readily implemented and would be the least expensive response.

Although the No Action response is ineffective at achieving RAOs or preventing access to the ECODS N-1, CSSLP, and Ford Building OU contaminants, it is required by the NCP and is retained as a baseline for comparison with other remedial actions. Therefore, No Action is retained for further consideration in the development of alternatives.

5.1.2.2 Land Use Controls

This response action leaves hazardous substances in place that present a potential risk for residential and industrial worker scenarios. Both administrative and engineering controls would prevent exposure of potential human receptors to contaminants by limiting access to the land or resource use. LUCs are relatively simple and inexpensive to implement and may be retained as an independent alternative or in conjunction with another remedial alternative(s).

LUCs are relatively low in cost, provide a high degree of protection of human health, and are relatively simple to implement. Therefore, LUCs are retained for further consideration in the development of alternatives.

5.1.2.3 Containment

Containment technologies involve the construction of engineered caps and soil covers to isolate contaminated media. Technologies include soil covers, horizontal barriers, and synthetic membrane covers/liners. Properly constructed and maintained containments are effective and reliable at preventing direct exposure to contaminants and at minimizing leaching, erosion, mobility, and bio-uptake.

For the ECODS N-1, CSSLP, and Ford Building OU, there are no CM concerns. Therefore, a low permeability cover system to reduce infiltration will not be necessary. Containment needs simply

to break the pathway for human receptors to be exposed to contaminants in surface soils and sediments.

The effectiveness of containment technologies depends upon the materials used and the design and effectiveness of the soil cover. Cover integrity must be maintained for as long as contaminants will persist or until degradation or decay of the contaminants renders them harmless. Maintenance activities include inspections, and monitoring for settlement and erosion. Land use controls would be required in conjunction with a containment remedy.

Containment alternatives are relatively high in cost, provide a high degree of protection of human health, and are considered a standard practice at SRS that has been performed at several waste units at SRS. Containment is retained for further consideration in the development of alternatives.

5.1.2.4 Removal and Disposal

Removal (excavation) and disposal of contaminated media in an appropriate facility is one of the most aggressive approaches to remediation. Contaminated media could be excavated and hauled to an approved disposal facility. Removing contaminated media from the ECODS N-1, CSSLP, and Ford Building OU would lower risk levels for human and ecological receptors by permanently removing the contaminated media.

The earthwork required for excavating the contaminated media is a standard construction practice and is readily accomplished. The action is highly effective in eliminating risk to human and ecological receptors due to the permanence of the removal. The cost of this action could be substantial based upon the volume of contaminated media present and the distance the media must be hauled to an approved waste disposal facility. Removal and disposal will be retained for further consideration in the development of alternatives.

5.2 Development and Screening of Alternatives

Potential alternatives have been developed to address the contaminated media at each of the ECODS N-1, CSSLP, and Ford Building OU subunits. In accordance with the NCP, it is desirable to offer a range of diverse alternatives to compare during the detailed analysis. The range of

alternatives includes options that 1) restrict exposure to contaminated media; 2) reduce exposure to contaminated media and require the need for long-term management; 3) remove a portion of the contaminant volume exceeding identified risk thresholds; and 4) removes all contaminant volume eliminating all exposure to contaminated media. As required by the NCP, the No Action alternative is provided as a baseline for comparison.

The only RAO identified for the ECODS N-1 subunit soil media is:

- Prevent residential and industrial exposure to friable asbestos that is present in the subsurface.

The RAOs identified for the CSSLP subunit soil and sediment media are:

- Prevent residential and industrial exposure to arsenic in surface soils at levels exceeding 1E-06 risk and/or SRS background concentration.
- Prevent residential and industrial exposure to arsenic in sediment at levels exceeding 1E-06 risk and/or SRS background concentration.

The RAOs identified for the Ford Building subunit are:

- Prevent residential and industrial exposure to PCBs and cesium-137 at the Ford Building remnant slab that exceed 1E-06 risk and PCB ARAR of 1 mg/kg for free release.
- Prevent residential and industrial exposure to cobalt-60 in surface soils at levels that exceed 1E-06 risk.

5.2.1 Development of Alternatives

Based on the technology screening and the RAOs for the ECODS N-1, CSSLP, and Ford Building OU, three (3) remedial alternatives have been developed for the ECODS N-1 subunit, four (4) remedial alternatives have been developed for the CSSLP subunit, and three (3) remedial alternatives have been developed for the Ford Building subunit. Due to the similar exposure risks to the human receptor at the CSSLP from soil in the Upland upland Area and sediment in the Surface Water Impoundment Area, the alternatives that have been developed for the subunit will apply to both the Upland Area and the Surface Water Impoundment Area as a whole. Separate

alternatives for the two areas within the CSSLP subunit will not be evaluated. After completion of D&D at the Ford Building subunit, an engineered 15.2 cm (6 in.) concrete cover was installed over the facility remnant slab area extending out 0.3 m (1 ft) from the remnant slab edge (SRNS 2019). The concrete cover is the current baseline condition of the Ford Building subunit and the alternatives have been developed with this condition in place.

5.2.1.1 ECODS N-1 Subunit

5.2.1.1.1 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 COCs at the ECODS N-1 subunit. This alternative would leave the ECODS N-1 subunit in its current condition with no additional controls. This alternative does not include five-year remedy reviews.

5.2.1.1.2 Alternative A-2: Land Use Controls

This alternative involves the use of 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 the use of warning signs indicating the presence of asbestos containing material and no trespassing, excavation permit restrictions, a Land Use Control Implementation Plan (LUCIP), and deed restrictions in the event the property is ever sold. Five-year remedy reviews would be required under this alternative.

5.2.1.1.3 Alternative A-3: Excavation and Disposal

Alternative A-3 consists of excavating all contaminated media within the ECODS N-1 subunit and disposing off-site. Specifically, this remedial alternative includes clearing ~0.18 ha (0.45 ac), the removal and offsite disposal of ~4,440 cubic meters (m^3) (5,807 cubic yards [yd^3]) of contaminated media to a depth of 2.4 m (8 ft) below the ground surface (the bottom depth of the disposal pits)

and backfilling with clean fill to grade. Alternative A-3 would not require LUCs or five-year remedy reviews.

5.2.1.2 CSSLP Subunit

5.2.1.2.1 Alternative B-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 constituents of concern 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.

5.2.1.2.2 Alternative B-2: Land Use Controls

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

5.2.1.2.3 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 will be placed over the entire area of the CSSLP subunit (Upland Area and Surface Water Impoundment Area). Specifically, this remedial alternative includes releasing ~1,324,894 liters (L [350,000 gallons {gal}]) of stormwater from the Surface Water Impoundment Area, clearing and grubbing ~2.35 ha (5.8 ac), hauling and placing ~10,756 m^3 (14,068 yd^3) of clean soil to cover grade and contour the soil cover, hauling and placing ~2,151 m^3 (2,814 yd^3) of top soil to construct a vegetated cover over the footprint, and constructing a stormwater management system. To facilitate a soil cover installation over the existing Surface Water Impoundment Area, the contained stormwater will 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.

5.2.1.2.4 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 5-1). Specifically, this remedial alternative includes releasing ~1,324,894 L (350,000 gal) of stormwater from the Surface Water Impoundment Area, clearing and grubbing ~0.77 ha (1.9 ac), the removal and offsite disposal of ~1,788 m^3 (2,339 yd^3) of contaminated media to a depth of 0.3 m (1 ft) bgs, backfilling with ~1,430 m^3 (1,871 yd^3) of clean fill and 716 m^3 (936 yd^3) of topsoil to grade and the constructing a stormwater management system. To complete the excavation of the sediment hot spot within the Surface Water Impoundment Area, contained stormwater will be managed by releasing water through a stormwater BMP sediment control feature (i.e. check dams, silt fences, etc.) to eliminate sediment migration. Pre-excavation sampling would be conducted to confirm the lateral extent of the area to be excavated. A Sampling and Analysis Plan would include a sampling design as well as sample collection and analytical methods that would be developed and presented in the Corrective Measures Implementation/Removal Action Implementation Plan (CMI/RAIP). Alternative B-4 would not require LUCs or five-year remedy reviews since removal of the contaminated media would result in concentrations not exceeding the cleanup level.

5.2.1.3 Ford Building Subunit

5.2.1.3.1 Alternative C-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 constituents of concern 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.

5.2.1.3.2 Alternative C-2: Land Use Controls

This alternative involves the use of 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 by posting 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, the need for Operations and Maintenance (O&M) of the concrete cover would also be a part of this alternative. O&M will include inspections and repairs as needed to ensure the integrity of the concrete cover. Five-year remedy reviews would be required under this alternative.

5.2.1.3.3 Alternative C-3: Excavation (Hot Spot Removal) and Disposal with Land Use Controls

Alternative C-3 consists of excavating contaminated media exceeding the cleanup level and disposing of it off-site. Specifically, this remedial alternative includes removing ~23 cm (9 in.) of gravel from a 1 meter (m) by 1 m area that currently exists adjacent to the Ford Building concrete cover, the removal and offsite disposal of ~0.3 m^3 (0.4 yd^3) of contaminated media to a depth of 0.3 m (1 ft) bgs, backfilling with ~0.21 m^3 (0.27 yd^3) of clean fill and 0.10 m^3 (0.13 yd^3) of topsoil to grade and replacing the removed gravel to grade. Pre-excavation sampling would be conducted to confirm the lateral extent of the area to be excavated. A Sampling and Analysis Plan to include a sampling design as well as sample collection and analytical methods would be developed and presented in the CMI/RAIP. Alternative C-3 would require LUCs to maintain the integrity of the concrete cover that exists over the Ford Building remnant slab. This remedy would require five-year remedy reviews.

5.2.2 Screening of Alternatives

In this section, the alternatives for the ECODS N-1, CSSLP and Ford Building OU are evaluated against the CERCLA criteria of effectiveness, implementability, and cost. The retained alternatives will be analyzed in detail in Section 5.3.

For an alternative to be effective, it must achieve specified objectives, must be compatible with the contaminant characteristics and unit conditions, and must be protective of human health and the environment in the long term. The alternative must also be effective in reducing the risk to human health and the environment in the short term (during construction and construction execution). In addition, each alternative should be effective in decreasing the inherent threats or risks associated with hazardous substances or media by reducing their toxicity, mobility, or volume through treatment. Permanence of the action is also considered. Alternatives that do not provide adequate protection of human health and the welfare of the environment or that do so to a much lesser extent than a comparable alternative are screened out and not considered during the detailed analysis.

Implementability addresses both the technical and institutional feasibility of applying a technology. Under this criterion, technologies are evaluated based on the technical feasibility to construct, reliably operate, and meet technology-specific regulations for the particular treatment operation, maintenance, and monitoring of technical components of the alternative, if required, after the remedial action is complete. Institutional feasibility of an alternative refers to the ability to obtain necessary approvals and the availability of treatment, storage, and disposal services and capacity, as needed, as well as availability of specific equipment, technical specialists, and other related components.

The nature of the alternative should be such that it can be implemented in a cost effective and timely manner. In addition, the implementation of the technology should not elicit substantial public concerns in the community. Site accessibility, available area, and potential future use of the property may affect the implementation of a specific technology. Mobilization and permitting or approval requirements must be workable and previously demonstrated at similar projects. Preliminary consideration is also given to regulatory constraints such as waste handling, disposal, and treatment requirements that would affect the implementation of a technology. These considerations will be evaluated further during the detailed analysis for retained alternatives when action-specific ARARs are developed. Screened out alternatives will not be considered during the detailed analysis.

A qualitative cost evaluation is provided so that cost comparisons can be made among the alternatives. Remedial alternative costs are described as high, medium, or low relative to other technologies in the same general response action category. Qualitative evaluations take into consideration capital costs and O&M costs. These estimates are based on prior estimates, previous experience, and engineering judgment. Alternatives demonstrating comparable levels of applicability, effectiveness, and implementability but at a significantly greater cost will be rejected. Otherwise, cost will not be used as a criterion to screen technologies at this point in the CMS/FS process.

The proposed remedial alternatives for the ECODS N-1, CSSLP and Ford Building OU were evaluated against the initial screening criteria. The results of the evaluation are described in the following sections.

5.2.2.1 ECODS N-1 Subunit

5.2.2.1.1 Alternative A-1: No Action

The No Action Alternative is not appropriate for the ECODS N-1 subunit as it does not meet the RAO goal defined in Chapter 4. However, in accordance with the NCP, this alternative is carried forward to serve as a baseline for comparison with other remedial alternatives.

5.2.2.1.2 Alternative A-2: Land Use Controls

Alternative A-2 proposes placing engineering and administrative controls on the contaminated media within the ECODS N-1 subunit to prevent exposure to human receptors. Human health and the environment would be protected in the long term through O&M of the controls, as well as in the short term due to no worker exposure to contaminated media during implementation. There is no reduction in toxicity, mobility or volume through treatment with this alternative. Alternative A-2 is readily implementable due to the previously successful implementation of LUCs at other locations on the SRS. This alternative is considered to be on the low end of the cost scale by requiring only warning signage for the presence of asbestos containing material and no trespassing,

excavation permit restrictions, a LUCIP, and any necessary deed restrictions. This alternative is determined to be effective and is retained for detailed analysis.

5.2.2.1.3 Alternative A-3: Excavation and Disposal

Excavation and Disposal consists of excavating all contaminated media from the ECODS N-1 subunit and disposing of it offsite. Human health and the environment would be protected in the long term due to the permanence of removing contaminated media and in the short term through the use of best management construction practices and strict adherence to the project-specific health and safety plan. There is no reduction in toxicity, mobility or volume through treatment with this alternative. Alternative A-3 is determined to be moderately implementable due to SRS's previous experience with the common construction methods and equipment used to implement this type of alternative but special worker requirements, work controls (e.g., dust suppression) and permits would be required to excavate the ACM and/or friable asbestos. This alternative is considered to have a significantly higher cost due to special permits, worker requirements, and work controls that must be put in place for contact with asbestos, the excavation of contaminated media from the entire subunit (to the bottom of the disposal pits), loaded and hauled to an approved off-site disposal facility, and the area filled to grade with clean fill. Due to these reasons this alternative was not retained for detailed analysis.

5.2.2.2 CSSLP Subunit

5.2.2.2.1 Alternative B-1: No Action

The No Action Alternative is not appropriate for the CSSLP subunit as it does not meet the RAO goals defined in Chapter 4. However, in accordance with the NCP, this alternative is carried forward to serve as a baseline for comparison with other remedial alternatives.

5.2.2.2.2 Alternative B-2: Land Use Controls

Alternative B-2 proposes placing engineering and administrative controls on the contaminated media within the CSSLP subunit to prevent exposure to human receptors. Human health and the environment would be protected in the long term through O&M of the controls, as well as in the

short term due to no worker exposure to contaminated media during implementation. There is no reduction in toxicity, mobility or volume through treatment with this alternative. Alternative B-2 is readily implementable due to the previously successful implementation of LUCs at other locations on the SRS. This alternative is considered to be on the low end of the cost scale by only requiring signage, excavation permit restrictions, a LUCIP, and any necessary deed restrictions. This alternative is determined to be effective and is retained for detailed analysis.

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

Alternative B-3 proposes placing a 0.6 m (2 ft) layer of clean fill over the CSSLP Upland Area and Surface Water Impoundment Area, with LUCs to maintain the integrity of the cap. Since arsenic is highly unlikely to degrade over time, the cover is expected to require maintenance beyond the 30 years used in the cost estimate. Human health and the environment would be protected in the long term as long as O&M of the soil cover and signage persists, as well as in the short term through the use of best management construction practices and strict adherence to the project-specific health and safety plan. There is no reduction in toxicity, mobility or volume through treatment with this alternative. Alternative B-3 is readily implementable due to SRS's previously successful implementation of LUCs across the site and experience with the common construction methods and equipment used to implement this type of alternative. This alternative is considered to have a comparatively higher cost due to the stormwater management, transportation and placement of the fill material, the grading and contouring of the soil cover, placement of a vegetative cover, and the implementation of LUCs. This alternative is determined to be effective and is retained for detailed analysis.

5.2.2.2.4 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 5-1). Human health and the environment would be protected in the long term due to the permanence of removing the contaminated media and in the short term through the use of best management construction practices and strict adherence to the project-specific health and safety plan. There is no reduction in toxicity, mobility or volume through treatment

with this alternative. This alternative is readily implementable due to SRS's previous experience with the common construction methods and equipment used to implement this type of alternative. This alternative is considered to have a comparatively moderate cost due to the stormwater management, the excavation of contaminated sediment media from areas identified above the cleanup level, the loading and hauling of the excavated media to an approved off-site disposal facility, and adding clean fill to grade. This alternative is determined to be effective and is retained for detailed analysis.

5.2.2.3 Ford Building Subunit

5.2.2.3.1 Alternative C-1: No Action

The No Action Alternative is not appropriate for the Ford Building subunit as it does not meet the RAO goals defined in Chapter 4. However, in accordance with the NCP, this alternative is carried forward to serve as a baseline for comparison with other remedial alternatives.

5.2.2.3.2 Alternative C-2: Land Use Controls

Alternative C-2 proposes placing engineering and administrative controls on the contaminated media at the Ford Building subunit to prevent exposure to human receptors. This alternative would also include O&M of the concrete cover that exists atop the Ford Building remnant slab. Human health and the environment would be protected in the long term through O&M of the controls, as well as in the short term due to no worker exposure to contaminated media during implementation. There is no reduction in toxicity, mobility or volume through treatment with this alternative. Alternative C-2 is readily implementable due to the previously successful implementation of LUCs across the SRS. This alternative is considered to have a moderate cost due to requiring signage, O&M of the signage and concrete cover, a LUCIP, and any necessary deed restrictions. Therefore, this alternative is determined to be effective and is retained for detailed analysis.

5.2.2.3.3 Alternative C-3: Excavation (Hot Spot Removal) and Disposal with Land Use Controls

Alternative C-3 consists of excavating contaminated media exceeding the cleanup level and disposing of it off-site, and LUCs to ensure the integrity over time of the concrete cover that exists atop the Ford Building remnant slab. Human health and the environment would be protected in the long term due to the permanence of removing the contaminated media and LUCs to maintain the concrete cover. Short term protectiveness would be achieved through the use of best management construction practices and strict adherence to the project-specific health and safety plan. There is no reduction in toxicity, mobility or volume through treatment with this alternative. This alternative is readily implementable due to SRS's previously successful implementation of LUCs at other locations on the site and experience with the common construction methods and equipment used to implement this type of alternative. This alternative is considered to have a moderate cost due to the confined spot removal of the contaminated media, the loading and hauling of the contaminated media to an approved off-site disposal facility, the post-excavation site restoration, and the implementation of LUCs. Therefore, this alternative is determined to be effective and is retained for detailed analysis.

5.3 Detailed Analysis of Alternatives

The NCP [40 CFR 300.430(e) (91)] requires that potential remedial alternatives undergo detailed analysis using relevant criteria that will be used by decision makers to select a final remedy. The results of the detailed analysis are then examined to compare alternatives and identify key tradeoffs among alternatives.

Remedial alternatives under consideration may or may not address injuries to the natural resources. Although a comparative analysis of alternatives is provided in this CMS/FS report, this document does not propose a preferred alternative. The preferred alternative will be presented in the SB/PP. The preferred alternative will be based on information contained in this report and comments received from the USEPA, SCDHEC, and the public prior to formal selection in the ROD.

Based upon the technology screening and the RAOs for the ECODS N-1, CSSLP and Ford Building OU, two remedial alternatives are being carried forward for the ECODS N-1 subunit, four remedial alternatives are being carried forward for the CSSLP subunit, and three remedial alternatives are being carried forward for the Ford Building subunit for detailed alternatives analysis against the CERCLA criteria listed in the NCP. The statutory requirements that guide the evaluation of remedial alternatives under CERCLA state that a remedial action must:

- Be protective of human health and the environment
- Attain ARARs or define criteria for invoking a waiver
- Be cost effective
- Use permanent solutions to the maximum extent

USEPA has established nine evaluation criteria to address these statutory requirements under CERCLA. These criteria fall into the categories of threshold criteria, primary balancing criteria, and modifying criteria. Modifying criteria (i.e., State or support agency acceptance and community acceptance) will be evaluated after the public comment period on the SB/PP and are not considered in the detailed analysis.

5.3.1 Threshold Criteria

Each alternative must meet the following threshold criteria to be selected as a permanent remedy under CERCLA:

- **Overall protection of human health and the environment** – The overall protection of human health and the environment is evaluated for each alternative on the basis of the extent to which the alternative reduces the risk of exposure to contaminants from potential exposure pathways through engineered barriers or LUCs. Each alternative is examined as to whether it creates any unacceptable short-term risks to human health.
- **Compliance with ARARs** – Remedial actions under CERCLA must attain all ARARs. ARARs are cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal, State, or local environmental law that

specifically addresses a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

5.3.2 Primary Balancing Criteria

Primary balancing criteria are factors that identify key tradeoffs among alternatives.

- **Long-term Effectiveness and Permanence** – Long-term effectiveness and permanence are evaluated for each alternative on the basis of the magnitude of residual risk and the adequacy and reliability of controls used to manage contaminated media that remain after response objectives have been achieved. Alternatives that offer long-term effectiveness and permanence halt or otherwise mitigate any potential for offsite contaminant transport and minimize the need for future engineered controls.
- **Reduction of Mobility, Toxicity, or Volume through Treatment** – The statutory preference is to select a remedial action that employs treatment to reduce the toxicity, mobility, or volume of hazardous substances. The degree to which alternatives employ recycling or treatment is assessed, including how treatment is used to address the principal threats posed by the waste unit.
- **Short-term Effectiveness** – Evaluation of alternatives for short-term effectiveness takes into account protection of remedial workers, members of the community, and the environment during implementation of the remedial action and the time required to achieve RAOs/PRGs. Schedule estimates are based on projected availability of materials and labor and may have to be updated at the time of remediation.
- **Implementability** – Each alternative is evaluated with respect to the technical and administrative feasibility of implementing the alternatives as well as the availability of necessary equipment and services. This criterion includes the ability to obtain services, capacities, equipment, and specialists necessary to construct components of the alternative; the ability to operate the technologies and monitor their performance and effectiveness; and the ability to obtain necessary approvals from other agencies.

- **Cost** – Accuracy of present-worth costs is +50/-30% according to USEPA guidance. Detailed cost estimates are derived from current information including vendor quotes, conventional cost estimating guides, and costs associated with serial costs, site conditions, competitive market conditions, final project scope, and implementation schedule at the time that the remedial activities are initiated. Real interest rates on U.S. Treasury notes and bonds of specific maturity were used to estimate present-worth costs. Present worth costs for review of the site remedy every five (5) years are given for each alternative for which residuals remain at the site. Present-worth costs for these items are based on an estimated time frame of operation.

5.3.3 Modifying Criteria

Modifying criteria (i.e., State or support agency acceptance, community acceptance) will be considered during remedy selection.

- **State or Support Agency Acceptance** – The preferred alternative should be acceptable to State and support agencies. The State acceptance criterion is evaluated based on scoping meetings held between the USDOE, USEPA, and SCDHEC, and based on comments received on this CMS/FS, which are addressed in the final SB/PP document.
- **Community Acceptance** – The concerns of the community should also be considered in presenting alternatives that would be acceptable to the community. Community acceptance is evaluated based on comments on the SB/PP received during the public comment period. These comments are considered in the final remedy selection for the ROD and the issuance of a RCRA permit modification.

  The largest population concentrations around SRS are located in Augusta, Georgia, and Aiken and North Augusta, South Carolina.

The retained alternatives will be evaluated against the seven CERCLA Threshold and Balancing Criteria that provide the basis for evaluating the alternatives and selecting a remedy. The purpose of this section is to identify key advantages and disadvantages of each alternative. The results of the evaluation are discussed below. The remaining two modifying criteria will be evaluated in the SB/PP. The detailed analysis of each alternative is presented in the following sections.

5.3.4 ECODS N-1 Subunit

5.3.4.1 Alternative A-1: No Action

Alternative A-1 was carried forward as required by the NCP to serve as a baseline for comparison with other remedial alternatives. Alternative A-1 consists of performing no action to address the RAOs at the ECODS N-1 subunit. Contaminated media would remain in place and no LUCs or active remediation would be conducted to control current and/or future potential risk; to treat or remove contaminated media; or to reduce toxicity, mobility, or volume of the contaminated media.

5.3.4.1.1 Protection of Human Health and the Environment

The No Action alternative would not address the risk to resident or industrial workers from exposure to the contaminated media. The No Action alternative would not achieve the RAOs and therefore would not be protective of human health and the environment.

5.3.4.1.2 Compliance with ARARs

No chemical-specific, location-specific, or action-specific ARARs are associated with the Alternative A-1.

5.3.4.1.3 Long-Term Effectiveness

Potential future exposure to human health from contaminated media at the ECODS N-1 subunit would remain unchanged under the No Action alternative. This alternative does not provide long-term effectiveness or permanence.

5.3.4.1.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Treatment of contaminated media to reduce toxicity, mobility, or volume is not associated with the No Action alternative; therefore, there is no reduction in the toxicity, mobility or volume of contaminated media through treatment.

5.3.4.1.5 Short-Term Effectiveness

The No Action alternative would not endanger either the remedial workers or the surrounding communities nor adversely affect the environment during implementation; however, the RAO would not be achieved.

5.3.4.1.6 Implementability

Since this alternative requires no action, implementability is not a consideration.

5.3.4.1.7 Cost

There is no present-worth cost estimated for the No Action alternative since there is no action implemented and no five-year remedy review required. Detailed cost estimates are included in Appendix I. A summary of the estimates cost is below.

Total Present-Worth Cost $0

5.3.4.2 Alternative A-2: Land Use Controls

Alternative A-2 was retained for detailed analysis. This alternative 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 containing material 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 would be required under this alternative.

5.3.4.2.1 Protection of Human Health and the Environment

The exposure pathway to human receptors is broken by controlling access and prohibiting unrestricted use of the contaminated media and thereby protective of human health. Deed restrictions would also be put in place for the potential future resident to prevent possible exposure

in the event the property was ever sold. Because there are no ecological RCOCs, CM RCOCs, or PTSM identified for the ECODS N-1 subunit, no additional physical controls are needed for protection of the environment to prevent ecological exposure to contamination or to control migration of contaminants through environmental media. Alternative A-2 would achieve the RAOs and is therefore determined to be protective of human health and the environment.

5.3.4.2.2 Compliance with ARARs

No chemical-specific, location-specific, or action-specific ARARs are associated with the Alternative A-2.

5.3.4.2.3 Long-Term Effectiveness

The long-term effectiveness for protecting human health can be achieved under this alternative as long as LUCs are maintained. 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 a cost estimate. The actual time requirement will likely be longer, as asbestos does not degrade over time. Remedy reviews will be performed every five (5) years for a total of six (6) reviews. 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.

5.3.4.2.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

No active treatment systems are associated with the LUCs alternative that would reduce the toxicity, mobility, or volume of hazardous substances associated with the ECODS N-1 subunit.

This alternative prevents receptor exposure to the contaminants through controlling access and limiting use.

5.3.4.2.5 Short-Term Effectiveness

This alternative poses no risk to industrial workers or the community because in implementing LUCs no construction work will be performed which disturbs the contaminated media within the ECODS N-1. All of the contaminated media is also within an area with restricted access (site boundary); therefore, it is not accessible to members of the public or community. Since N Area is located in the center of the SRS, there are no hazards to nearby communities since there are none in proximity. The nearest SRS boundary is approximately 12.9 km (8 mi) from N Area.

5.3.4.2.6 Implementability

LUCs have been easily implemented at many waste units at SRS. The implementation of LUCs presents no technical or administrative impediments.

5.3.4.2.7 Cost

Costs associated with this alternative include posting approximately eight (8) warning signs around the perimeter of the subunit and periodic inspections to confirm the signs remain in place. SRS will also control access to and prohibit excavation of the subunit through the Site Use/Site Clearance permit system. For the long term, deed restrictions will be put into place to preclude activities that could cause exposure to contaminated media exceeding acceptable risk levels in the event the property were to be transferred out of federal ownership. A review of the remedy will be performed every five (5) years over an assumed 30-year duration. The detailed cost estimate is provided in Appendix I. A summary of the estimated present-worth cost is presented below:

Total Present-Worth Cost *$271,396*

5.3.5 CSSLP Subunit

5.3.5.1 Alternative B-1: No Action

Alternative B-1 was carried forward as required by the NCP to serve as a baseline for comparison with other remedial alternatives. Alternative B-1 consists of performing no action to address the RAOs at the CSSLP subunit. Contaminated media would remain in place and no LUCs or active remediation would be conducted to control current and/or future potential risk; to treat or remove contaminated media; or to reduce toxicity, mobility, or volume of the contaminated media.

5.3.5.1.1 Protection of Human Health and the Environment

The No Action alternative would not address the risk to resident or industrial workers from exposure to the contaminated media. The No Action alternative would not achieve the RAOs and therefore would not be protective of human health and the environment.

5.3.5.1.2 Compliance with ARARs

No chemical-specific, location-specific, or action-specific ARARs are associated with the No Action alternative.

5.3.5.1.3 Long-Term Effectiveness

Residual risk to human health from contaminated media at the CSSLP subunit would remain unchanged under the No Action alternative. This alternative does not provide long-term effectiveness or permanence.

5.3.5.1.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Treatment of contaminated media to reduce toxicity, mobility, or volume is not associated with the No Action alternative; therefore, there is no reduction in the toxicity, mobility or volume of contaminated media through treatment.

5.3.5.1.5 Short-Term Effectiveness

The No Action alternative would not endanger either the remedial workers or the surrounding communities nor adversely affect the environment during implementation; however, the RAO would not be achieved.

5.3.5.1.6 Implementability

Since this alternative requires no action, implementability is not a consideration.

5.3.5.1.7 Cost

There is no present-worth cost estimated for the No Action alternative since there is no action implemented and no five-year remedy review required. Detailed cost estimates are included in appendix I. A summary of the estimates cost is below.

Total Present-Worth Cost $0

5.3.5.2 Alternative B-2: Land Use Controls

Alternative B-2 was retained for detailed analysis. This alternative 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 CSSLP subunit. LUCs would be implemented at the CSSLP subunit 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 required and periodic maintenance (e.g., sign repair) will be performed to ensure that the LUCs remain protective. Five-year remedy reviews would be required under this alternative.

5.3.5.2.1 Protection of Human Health and the Environment

The exposure pathway to human receptors is broken by controlling access and prohibiting unrestricted use of the contaminated media and thereby protective of human health. Deed restrictions would also be put in place for the potential future resident to prevent possible exposure

in the event the property was ever sold. Because there are no ecological RCOCs, CM RCOCs, or PTSM identified for the ECODS N-1 subunit, no additional physical controls are needed for protection of the environment to prevent ecological exposure to contamination or to control migration of contaminants through environmental media. Alternative B-2 would achieve the RAOs and is therefore determined to be protective of human health and the environment.

5.3.5.2.2 Compliance with ARARs

No chemical-specific, location-specific, or action-specific ARARs are associated with Alternative B-2.

5.3.5.2.3 Long-Term Effectiveness

Long-term effectiveness can be achieved under this alternative as long as LUCs are maintained. 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 a cost estimate. The actual time requirement will likely be longer, as arsenic does not degrade over time. Remedy reviews will be performed every five (5) years for a total of six (6) reviews. 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.

5.3.5.2.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

No active treatment systems are associated with the LUCs alternative that would reduce the toxicity, mobility, or volume of hazardous substances associated with the CSSLP subunit. This

alternative prevents receptor exposure to the contaminants through controlled access and limiting use.

5.3.5.2.5 Short-Term Effectiveness

This alternative poses no risk to industrial workers or the community because in implementing LUCs no construction work will be performed which disturbs the contaminated media within the CSSLP subunit. All of the contaminated media is also within an area with restricted access (site boundary); therefore, it is not accessible to members of the public or community. Since N Area is located in the center of the SRS, there are no hazards to nearby communities since there are none in proximity. The nearest SRS boundary is approximately 12.9 km (8 mi) from N Area.

5.3.5.2.6 Implementability

LUCs have been easily implemented at many waste units at SRS. The implementation of LUCs presents no technical or administrative impediments.

5.3.5.2.7 Cost

Costs associated with this alternative include posting approximately eight (8) warning signs around the perimeter of the subunit and periodic inspections to confirm the signs remain in place. SRS will also control access to and prohibit excavation of the subunit through the Site Use/Site Clearance permit system. For the long term, deed restrictions will be put into place to preclude activities that could cause exposure to contaminated media exceeding acceptable risk levels in the event the property were to be transferred out of federal ownership. A review of the remedy will be performed every five (5) years over an assumed 30-year duration. The detailed cost estimate is provided in Appendix I. A summary of the estimated present-worth cost is presented below:

Total Present-Worth Cost *$345,561*

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

Alternative B-3 was carried forward for a detailed analysis. This alternative consists of placing a 0.6 m (2 ft) soil cover over the CSSLP Upland Area and Surface Water Impoundment Area area

to prevent exposure to human receptors. A soil cover will be constructed using standard earth-moving equipment. This alternative will also require LUCs (e.g., signage and maintenance) to maintain the integrity of the soil cover.

Access for Alternative B-3 as shown on Figure 5-2, will be via the 1 km (0.62 mi) gravel road off of SRS 3 Road. Initially the Surface Water Impoundment Area will be emptied of stormwater. For the purpose of developing a cost estimate, management of the ~1,324,894 L (350,000 gal) of rainwater in the Surface Water Impoundment Area is assumed to be accomplished by releasing through a BMP stormwater sediment feature.

After the Surface Water Impoundment Area is emptied of stormwater, the limit of disturbance will be ~2.35 ha (5.8 ac) to be cleared and grubbed. Placement of ~10,756 m^3 (14,068 yd^3) of clean fill will be hauled in from an onsite borrow pit . Approximately 10,756 m^3 (14,068 yd^3) of clean fill will be placed and compacted with the earth-moving equipment followed by ~2,151 m^3 (2,814 yd^3) of topsoil for the placement of a vegetative cover. The construction of a stormwater management system will also be necessary to divert any runoff from the soil cover to an appropriate location. LUCs as described in section 5.3.5.2 would also be implemented under this alternative with additional O&M to ensure the integrity of the soil cover.

5.3.5.3.1 Protection of Human Health and the Environment

Alternative B-3 breaks the exposure pathway to human receptors by covering the contaminated media and applying LUCs to ensure the permanence of the soil cover. Because there are no ecological RCOCs, CM RCOCs, or PTSM identified for the CSSLP subunit, no additional physical controls are needed for protection of the environment to prevent ecological exposure to contamination or to control migration of contaminants through environmental media. Alternative B-3 would achieve the RAOs and is therefore determined to be protective of human health and the environment.

5.3.5.3.2 Compliance with ARARs

Table 5-4 lists the potential ARARs applicable to the ECODS N-1, CSSLP and Ford Building OU. The specific ARARs applicable to each alternative are listed below.

Chemical-Specific ARARs: No location-specific ARARs are associated with Alternative B-3.

Location-Specific ARARs: No location-specific ARARs are associated with Alternative B-3.

Action-Specific ARARs: The storm water management of the Surface Water Impoundment Area would trigger SCDHEC R. 61-9.122.41 and SCDHEC R. 72-307 I, and must comply with the substantive requirements for stormwater management and sediment control. To minimize erosion of sediment and manage storm water runoff that may occur during the remedial actions, BMPs will be employed.

5.3.5.3.3 Long-Term Effectiveness

Long-term effectiveness can be achieved under this alternative as long as the integrity of the soil cover is maintained and LUCs are in place. LUCs will include the O&M necessary to maintain the soil cover. Alternative B-3 will remain in place until the concentration of hazardous substances in the media is at such levels to allow for unrestricted use and exposure. The timeframe for alternative B-3 is assumed for 30 years of duration as a basis for a cost estimate. The actual time requirement will likely be longer, as arsenic does not degrade over time. Remedy reviews will be performed every five (5) years for a total of six (6) reviews. A LUCIP will be prepared by the USDOE that describes the implementation and anticipated maintenance actions for the remedial action, including periodic inspections. Periodic inspections will be performed to ensure warning signs are in place, no unauthorized encroachment onto the controlled area is occurring, and the integrity of the cover is not compromised. Signs will be replaced and/or repaired as needed, any issues that arise with the soil cover will be repaired 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 alternative. 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.

5.3.5.3.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

No treatment that reduces the toxicity, mobility, or volume of hazardous substances associated with the CSSLP subunit is associated with this alternative. This alternative prevents receptor exposure to the contaminants through a barrier, controlling access, and limiting use.

5.3.5.3.5 Short-Term Effectiveness

This alternative can be completed in a short timeframe while posing no significant risk to the community or workers. Remedial workers will have the greatest risk of exposure during construction activities. Use of BMPs during construction and strict adherence to the project-specific health and safety plan will prevent worker exposure to hazardous material and will minimize any risk to surrounding communities while activities are performed.

5.3.5.3.6 Implementability

Storm water management can be achieved with standard equipment using designed sediment control BMPs. A soil cover is readily implemented with standard earth-moving equipment, materials, and conventional construction methods. There are already many waste units around SRS where this practice has been implemented safely and effectively. LUCs have been easily implemented at many waste units at SRS. The implementation of LUCs presents no technical or administrative impediments.

5.3.5.3.7 Cost

Costs associated with this alternative include management of the stormwater within the Surface Water Impoundment Area, clearing and grubbing, hauling and placing clean soil, grading of soil, construction of a vegetated cover, construction of a stormwater management system and the implementation of LUCs. A detailed cost estimate is provided in Appendix I. A summary of the estimated present-worth cost is presented below:

Total Present-Worth Cost *$3,037,051*

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

Alternative B-4 was retained for detailed analysis. This alternative proposes to excavate and dispose of the contaminated media exceeding the cleanup level, and backfilling to grade, to permanently remove the potential risk to human receptors. Excavation will be completed using standard earth-moving equipment.

Access to the CSSLP subunit, as shown on Figure 5-2, will be via the 1 km (0.62 mi) un-named gravel road off of SRS 3 Road. Initially the Surface Water Impoundment Area will be emptied of storm water. For the purpose of developing a cost estimate, storm water management of the ~1,324,894 L (350,000 gal) of rainwater in the Surface Water Impoundment area is assumed to be accomplished by releasing through a BMP storm water sediment feature.

After the Surface Water Impoundment Area is emptied of stormwater, 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) bgs, the excavated material will be directly loaded into roll-off containers and staged at the site. This alternative assumes that the wastes will ultimately be hauled to the Three Rivers Landfill for disposal following the route shown on Figure 5-1.

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.

5.3.5.4.1 Protection of Human Health and the Environment

By removing the contaminated media exceeding the cleanup level down to 0.3 m (1 ft), and backfilling to grade, exposure to the industrial worker and/or future resident is eliminated. Because there are no ecological RCOCs, CM RCOCs, or PTSM identified for the CSSLP subunit,

no additional physical controls are needed for protection of the environment to prevent ecological exposure to contamination or to control migration of contaminants through environmental media. Alternative B-4 provides protection of human health and the environment and would achieve the identified RAOs.

5.3.5.4.2 Compliance with ARARs

Table 5-4 lists the potential ARARs applicable to the ECODS N-1, CSSLP and Ford Building OU. The specific ARARs applicable to each alternative are listed below.

Chemical-Specific ARARs: No chemical-specific ARARs are associated with Alternative B-4.

Location-Specific ARARs: No location-specific ARARs are associated with Alternative B-4.

Action-Specific ARARs: Disposal and transportation of solid waste generated from Alternative B-4 would be handled in accordance with federal and state regulations (40 CFR 262.11(b) and SCDHEC 61-107.5(D)(3)). Disposal of the solid waste will also trigger South Carolina SC R-61-107 requirements, which requires disposal in a properly constructed and permitted disposal facility. This requirement can be achieved through use of an existing and approved on-site SRS facility or transporting the contaminated media to an approved facility such as Three Rivers Landfill which has an EPA determination of off-site acceptability for disposal of CERCLA waste. The storm water management of the Surface Water Impoundment Area would trigger SCDHEC R. 61-9.122.41 and SCDHEC R. 72-307 I, which must comply with the substantive requirements for stormwater management and sediment control. To minimize erosion of sediment and manage storm water runoff that may occur during the remedial actions, BMPs will be employed.

5.3.5.4.3 Long-Term Effectiveness

Long-term effectiveness can be achieved under this alternative by removing any 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 alternative permanently removes and disposes of the contaminated soil and therefore offers long-term protection.

5.3.5.4.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

This alternative does not employ any treatment to reduce the toxicity, mobility or volume of the contaminated media, although excavation will remove contaminated media from the unit.

5.3.5.4.5 Short-Term Effectiveness

This alternative 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.

5.3.5.4.6 Implementability

Stormwater management can be achieved with standard equipment. Excavation and disposal are readily implemented with standard earth-moving equipment, materials, and conventional construction methods. There are several waste units around SRS where this practice has been implemented safely and effectively.

5.3.5.4.7 Cost

Costs for Alternative B-4 would include stormwater management, clearing and grubbing, excavation, transportation and disposal of contaminated media, sampling and analysis, and hauling and placing of clean fill. A detailed cost estimate is presented in Appendix I. A summary of the estimated present-worth cost is presented below:

Total Present-Worth Cost *$900,928*

5.3.6 Ford Building Subunit

5.3.6.1 Alternative C-1: No Action

Alternative C-1 was carried forward as required by the NCP to serve as a baseline for comparison with other remedial alternatives. Alternative C-1 consists of performing no action to address the RAOs at the Ford Building subunit. Contaminated media would remain in place and no LUCs or active remediation would be conducted to control current and/or future potential risk; to treat or remove contaminated media; or to reduce toxicity, mobility, or volume of the contaminated media.

5.3.6.1.1 Protection of Human Health and the Environment

The No Action alternative would not address the risk to resident or industrial workers from exposure to the contaminated media. The No Action alternative would not achieve the RAOs and therefore would not be protective of human health and the environment.

5.3.6.1.2 Compliance with ARARs

Table 5-4 lists the potential ARARs applicable to the ECODS N-1, CSSLP and Ford Building OU. The specific ARARs applicable to each alternative are listed below.

Chemical-Specific ARARs: Per 40 CFR Part 761, Section 62, Paragraph (c) disposal of PCB bulk product waste would be handled in accordance with the capping requirements provided in 40 CFR Part 761, Section 61, Paragraph (a)(7).

Location-Specific ARARs: No location-specific ARARs are associated with Alternative C-1.

Action-Specific ARARs: No action-specific ARARs are associated with Alternative C-1

5.3.6.1.3 Long-Term Effectiveness

Residual risk to human health from contaminated media at the Ford Building subunit would remain unchanged under the No Action alternative. This alternative does not provide long-term effectiveness or permanence.

5.3.6.1.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Treatment of contaminated media to reduce toxicity, mobility, or volume is not associated with the No Action alternative; therefore, there is no reduction in the toxicity, mobility or volume of contaminated media through treatment

5.3.6.1.5 Short-Term Effectiveness

The No Action alternative would not endanger either the remedial workers or the surrounding communities nor adversely affect the environment during implementation; however, the RAO would not be achieved.

5.3.6.1.6 Implementability

Since this alternative requires no action, implementability is not a consideration.

5.3.6.1.7 Cost

There is no present-worth cost estimated for the No Action alternative since there is no action implemented and no five-year remedy review required. Detailed cost estimates are included in appendix I. A summary of the estimates cost is below.

Total Present-Worth Cost $0

5.3.6.2 Alternative C-2: Land Use Controls

Alternative C-2 was retained for detailed analysis. This alternative 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 required and periodic maintenance (e.g., sign repair) will be performed to ensure that the LUCs remain protective. LUCs would also include O&M costs for the concrete cover 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.

5.3.6.2.1 Protection of Human Health and the Environment

The exposure pathway is broken by controlling access to and prohibiting unrestricted use of the contaminated media as well as by the existing concrete cover atop the Ford Building remnant slab. LUCs are thereby protective of human health and the environment. Deed restrictions would also be put in place for the potential future resident to prevent possible exposure in the event the property was ever sold. Because there are no ecological RCOCs, CM RCOCs, or PTSM identified for the CSSLP subunit, no additional physical controls are needed for protection of the environment to prevent ecological exposure to contamination or to control migration of contaminants through environmental media. Alternative C-2 would achieve the RAOs and is therefore determined to be protective of human health and the environment.

5.3.6.2.2 Compliance with ARARs

Table 5-4 lists the potential ARARs applicable to the ECODS N-1, CSSLP and Ford Building OU. The specific ARARs applicable to each alternative are listed below.

Chemical-Specific ARARs: Per 40 CFR Part 761, Section 62, Paragraph (c) disposal of PCB bulk product waste would be handled in accordance with the capping requirements provided in 40 CFR Part 761, Section 61, Paragraph (a)(7).

5.3.6.2.3 Long-Term Effectiveness

Long-term effectiveness can be achieved under this alternative as long as LUCs are maintained. 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 a cost estimate. The actual time requirement will likely be longer, as PCBs do not degrade significantly over time. Remedy reviews will be performed every five (5)

years for a total of six (6) reviews. 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, 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. 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. LUCIP modifications will only occur through another CERCLA document.

5.3.6.2.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

No treatment is associated with Alternative C-2 that would reduce the toxicity, mobility, or volume of hazardous substances associated with the Ford Building subunit. This alternative prevents receptor exposure to the contaminants through maintenance of a concrete barrier, controlled access and limiting use.

5.3.6.2.5 Short-Term Effectiveness

This alternative poses no risk to industrial workers or the community because in implementing LUCs no construction work will be performed which disturbs the contaminated media within the Ford Building subunit. All of the contaminated media is also within an area with restricted access (site boundary); therefore, it is not accessible to members of the public or community. Since N Area is located in the center of the SRS, there are no hazards to nearby communities since there are none in proximity.. The nearest SRS boundary is approximately 12.9 km (8 mi) from N Area.

5.3.6.2.6 Implementability

LUCs have been easily implemented at many waste units at SRS. The implementation of LUCs presents no technical or administrative impediments.

5.3.6.2.7 Cost

Costs associated with this alternative include posting approximately four (4) warning signs around the perimeter of the contaminated area and the O&M of the signage and the concrete cover system. SRS will also control access to and prohibit excavation within the LUC boundary through the Site Use/Site Clearance permit system. For the long term, deed restrictions will be put into place to preclude activities that could cause exposure to contaminated media exceeding acceptable risk levels in the event the property were to be transferred out of federal ownership. A review of the remedy will be performed every five (5) years over an assumed 30-year duration. Detail for the cost estimate is provided in Appendix I. A summary of the estimated present-worth cost is presented below:

Total Present-Worth Cost *$677,613*

5.3.6.3 Alternative C-3: Excavation (Hot Spot Removal) and Disposal with Land Use Controls

Alternative C-3 was retained for detailed analysis. This alternative proposes to excavate and dispose of the contaminated media exceeding the cleanup level and backfill to grade, to permanently remove the potential risk to human receptors. Excavation will be completed using standard earth-moving equipment. This alternative would also require placing LUCs on the concrete cover that exists atop the Ford Building remnant slab to ensure the exposure pathway to the contaminants beneath the concrete cover remains incomplete.

Access to the Ford Building subunit, as shown on Figure 5-3, will be via the 0.4 km (0.25 mi) unnamed gravel road off of SRS 3 Road. The limit of disturbance will be ~1 m^2 (1.2 yd^2) to be cleared, ~23 cm (9 in.) of gravel that exists atop the area to be excavated will be removed. Pre-excavation sampling to determine the lateral extent of the area to be excavated will be conducted. The excavation of ~0.3 m^3 (0.4 yd^3) of contaminated media to a depth of 0.3 m (1 ft) bgs will be removed and directly loaded into roll-off containers and staged at the site. Representative soil samples around the boundary of the excavated areas will be collected and analyzed to ensure the selected PRG concentration has been achieved. This alternative assumes that the wastes will

ultimately be hauled to the Three Rivers Landfill for disposal following the route shown on Figure 5-3.

After excavation of the soils, the areas will be backfilled using 0.21 m^3 (0.27 yd^3) of clean fill and 0.10 m^3 (0.13 yd^3) of topsoil to grade. The clean fill will be hauled to the site from an on-site borrow pit . The gravel that was removed from the area will be replaced to maintain the grade of the concrete apron that exists around the current concrete cover system. LUCs as described in Section 5.3.6.2 to maintain the existing concrete cover system will also be implemented under this alternative.

5.3.6.3.1 Protection of Human Health and the Environment

By removing the contaminated media exceeding the cleanup level down to 0.3 m (1 ft), and backfilling to grade, exposure to the industrial worker and/or future resident is eliminated. The concrete cover system atop the Ford Building remnant slab must also remain in place to be protective of the industrial worker and/or future resident due to the contaminants that exist below the concrete cover. Because there are no ecological RCOCs, CM RCOCs, or PTSM identified for the Ford Building subunit, no additional physical controls are needed for protection of the environment to prevent ecological exposure to contamination or to control migration of contaminants through environmental media. Alternative C-3 provides protection of human health and the environment and would achieve the identified RAOs.

5.3.6.3.2 Compliance with ARARs

Table 5-4 lists the potential ARARs applicable to the ECODS N-1, CSSLP and Ford Building OU. The specific ARARs applicable to each alternative are listed below.

Chemical-Specific ARARs: Per 40 CFR Part 761, Section 62, Paragraph (c) disposal of PCB bulk product waste would be handled in accordance with the capping requirements provided in 40 CFR Part 761, Section 61, Paragraph (a)(7).

Location-Specific ARARs: No location-specific ARARs are associated with Alternative C-3.

Action-Specific ARARs: Per DOE M 435.1-1(IV)(I) the characterization of low-level waste would be handled in accordance with the requirements identified in DOE M 435.1-1(IV)(I)(2)(a)-(g). Disposal and transportation of solid waste generated from Alternative B-4 would be handled in accordance with Federal and State regulations (40 CFR 262.11(b) and SCDHEC 61-107.5(D)(3)). Disposal of the solid waste will also trigger South Carolina SC R-61-107 requirements, which requires disposal in a properly constructed and permitted disposal facility. This requirement can be achieved through use of an existing and approved on-site SRS facility or transporting the contaminated media to an approved off-site facility such as Three Rivers Landfill, which has an EPA determination of off-site acceptability for disposal of CERCLA waste.

5.3.6.3.3 Long-Term Effectiveness

Long-term effectiveness can be achieved under this alternative as long as the integrity of the concrete cover system atop the Ford Building remnant slab is maintained, and LUCs are in place. Removing any contaminated media identified above the cleanup level also permanently reduces potential exposure to the industrial worker and/or future resident. Alternative C-3 will remain in place until the concentration of hazardous substances in the media is at such levels to allow for unrestricted use and exposure. The timeframe for alternative C-3 is assumed for 30 years of duration as a basis for a cost estimate. The actual time requirement will likely be longer, as PCBs do not degrade significantly over time. Remedy reviews will be performed every five (5) years for a total of six (6) reviews. A LUCIP will be prepared by the USDOE that describes the implementation and anticipated maintenance actions for the remedial action, including periodic inspections. Periodic inspections will be performed to ensure warning signs are in place, no unauthorized encroachment onto the controlled area is occurring and the integrity of the concrete cover system is not compromised. Signs will be replaced and/or repaired as needed, any issues that arise with the concrete cover system will be repaired, 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 alternative. 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.

5.3.6.3.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

This alternative does not employ any treatment to reduce the toxicity, mobility or volume of the contaminated media. This alternative prevents receptor exposure to the contaminants through a barrier, controlling access, limiting use, and the removal of contaminant mass from the unit.

5.3.6.3.5 Short-Term Effectiveness

This alternative can be completed in a short timeframe while posing no significant risk to the community or workers. Remedial workers will have the greatest risk of exposure during construction activities. Use of best management practices during construction and strict adherence to the project-specific health and safety plan will prevent worker exposure to hazardous substances and will minimize any risk to surrounding communities while activities are performed.

5.3.6.3.6 Implementability

Excavation and disposal is readily implemented with standard earth-moving equipment, materials, and conventional construction methods. There are several waste units around SRS where this practice has been implemented safely and effectively. LUCs have been easily implemented at many waste units at SRS. The implementation of LUCs presents no technical or administrative impediments.

5.3.6.3.7 Cost

Costs for Alternative C-3 would include removing gravel, excavation, transportation and disposal of contaminated media, hauling and placing of clean fill, sampling and analysis, and placement of gravel and the implementation of LUCs. A detailed cost estimate is presented in Appendix I. A summary of the estimated present-worth cost is presented below:

Total Present-Worth Cost *$713,746*

5.4 Comparative Analysis of Alternatives

This section identifies key advantages and disadvantages of each alternative in relation to the evaluation criteria. Tables 5-5 through 5-7 summarize the results of the comparative analysis. Tables 5-8 through 5-10 provides a summary of the comparative ranking analysis. Each alternative is ranked with respect to the other alternatives for the evaluation criteria.

5.4.1 ECODS N-1 Subunit

5.4.1.1 Overall Protection of Human Health and the Environment

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

5.4.1.2 Compliance with ARARs

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

5.4.1.3 Long-term Effectiveness

Alternative A-1 is not effective in the long-term since exposure is not prevented and therefore, ranked the lowest. Alternative A-2 was ranked above Alternative A-1 due to remaining effective as long as LUCs are in place.

5.4.1.4 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.

5.4.1.5 Short Term Effectiveness

Alternative A-1 has no controls to prevent exposure in the short term and was ranked the lowest. Alternative A-2 was ranked high due to posing no risk to the industrial worker or surrounding community during implementation, which can be done quickly.

5.4.1.6 Implementability

There is no implementation of A-1; therefore, this alternative was ranked highest. Alternative A-2 was ranked slightly lower than Alternative A-1 due to only requiring administrative and engineering controls to implement.

5.4.1.7 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 *$271,396*

5.4.2 CSSLP Subunit

5.4.2.1 Overall Protection of Human Health and the Environment

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

5.4.2.2 Compliance with ARARs

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

5.4.2.3 Long-term Effectiveness

Alternative B-1 is not effective in the long-term since exposure is not prevented and therefore, ranked the lowest of all the alternatives. Alternative B-4 was considered to rank best on long-term effectiveness, as this alternative includes excavation of contaminated media and leaves no

contamination in place. Alternative B-3 was ranked slightly above Alternative B-2 due to the addition of a soil cover to limit direct exposure to the contaminated media, whereas Alternative B-2 relies primarily on administrative controls.

5.4.2.4 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.

5.4.2.5 Short Term Effectiveness

Alternative B-1 is not effective in the short-term since exposure is not prevented and therefore, ranked lowest of all the alternatives. Alternative B-2 was ranked high due to posing no risk to the industrial worker or surrounding community during implementation, which could also be completed quickly. Alternative B-3 and B-4 were ranked equally and both slightly lower than Alternative B-2 due to the injury risk to the industrial worker during implementation of the alternatives, although this is typically mitigated by health and safety measures. Both Alternatives B-3 and B-4 also take longer to implement than Alternative B-2.

5.4.2.6 Implementability

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

5.4.2.7 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*

5.4.3 Ford Building Subunit

5.4.3.1 Overall Protection of Human Health and the Environment

With the exception of Alternative C-1, all alternatives are protective of human health and the environment. Alternative C-2 limits exposure to the contaminated media through the implementation of engineering and administrative controls. Alternative C-3 physically removes the contamination via excavation and offsite disposal and limits exposure through the use of engineering and engineering controls to maintain the existing concrete cover.

5.4.3.2 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 be compliant 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 the characterization of low level waste and the disposal and transportation of solid waste, which are achievable by using direct or indirect methods to characterize the waste and through the use of an existing approved disposal facility such as Three Rivers Landfill.

5.4.3.3 Long-term Effectiveness

Alternative C-1 is not effective in the long-term since exposure is not prevented and therefore, ranked lowest of all the alternatives. Alternatives C-2 and C-3 were equally ranked when comparing the long-term effectiveness of each alternative. Due to the short half-life (~5.3 years) of cobalt-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 to be effective in the long term; these would be implemented under both alternatives.

5.4.3.4 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.

5.4.3.5 Short Term Effectiveness

Alternative C-1 is not effective in the short-term since exposure is not prevented and therefore, ranked lowest of all the alternatives. Alternative C-2 was ranked high due to posing no risk to the industrial worker or surrounding community during implementation, which could also be completed quickly. Alternative C-3 was ranked slightly lower than Alternative C-2 due to the potential for injury to the industrial worker during implementation, although this is typically mitigated by health and safety measures.

5.4.3.6 Implementability

Alternative C-3 was ranked the lowest regarding implementability due to the fact that it would require the excavation, transportation, and disposal of soil from a small area along with engineering and administrative controls to maintain the existing concrete cover. Alternative C-2 was judged slightly better than Alternative C-3 due to only requiring administrative and engineering controls to implement. There is no implementation of Alternative C-1; therefore, this alternative was ranked highest.

5.4.3.7 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*

This page is intentionally left blank.

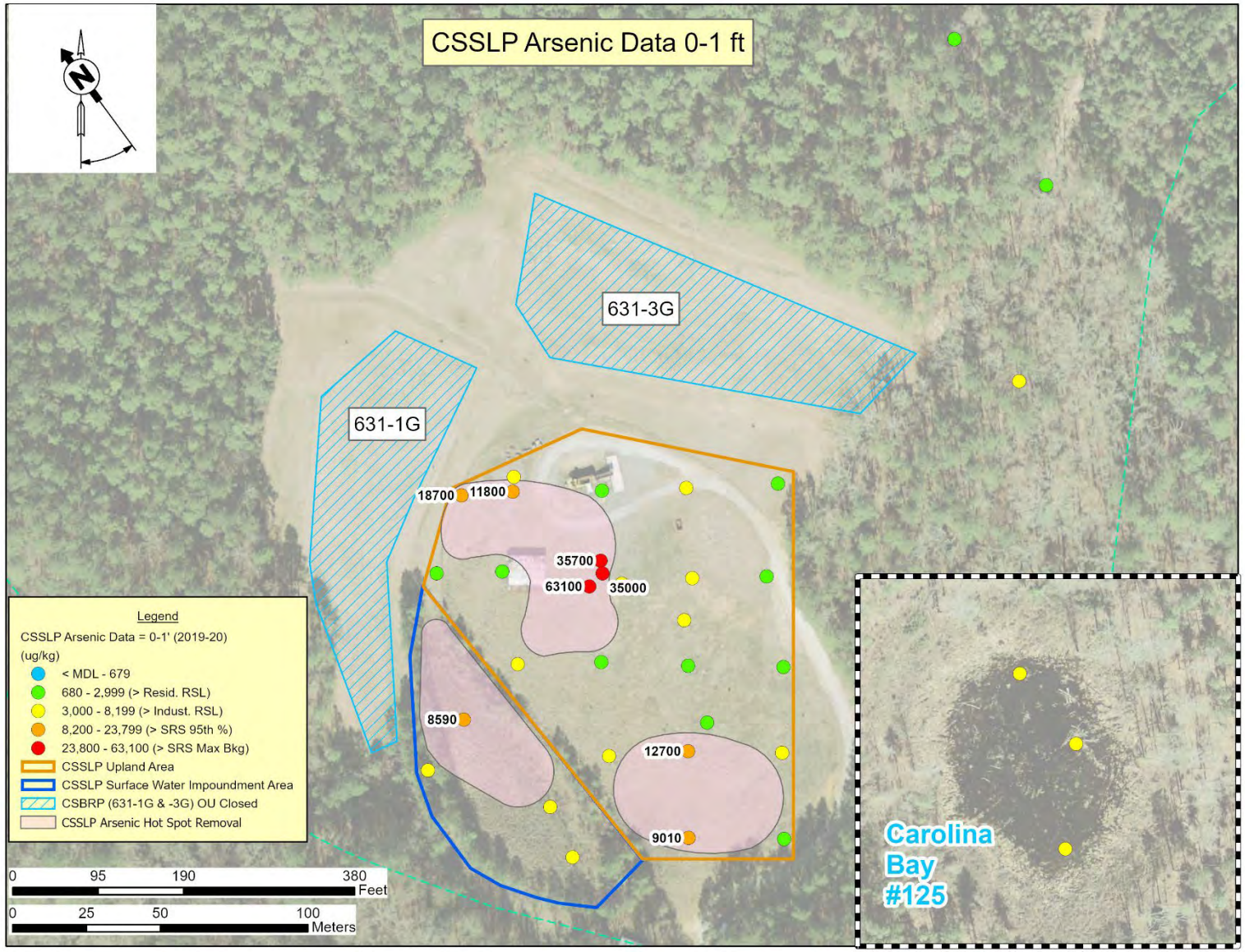


Figure 5-1. Alternative B-4 Excavation and (Hot Spot Removal) and Disposal

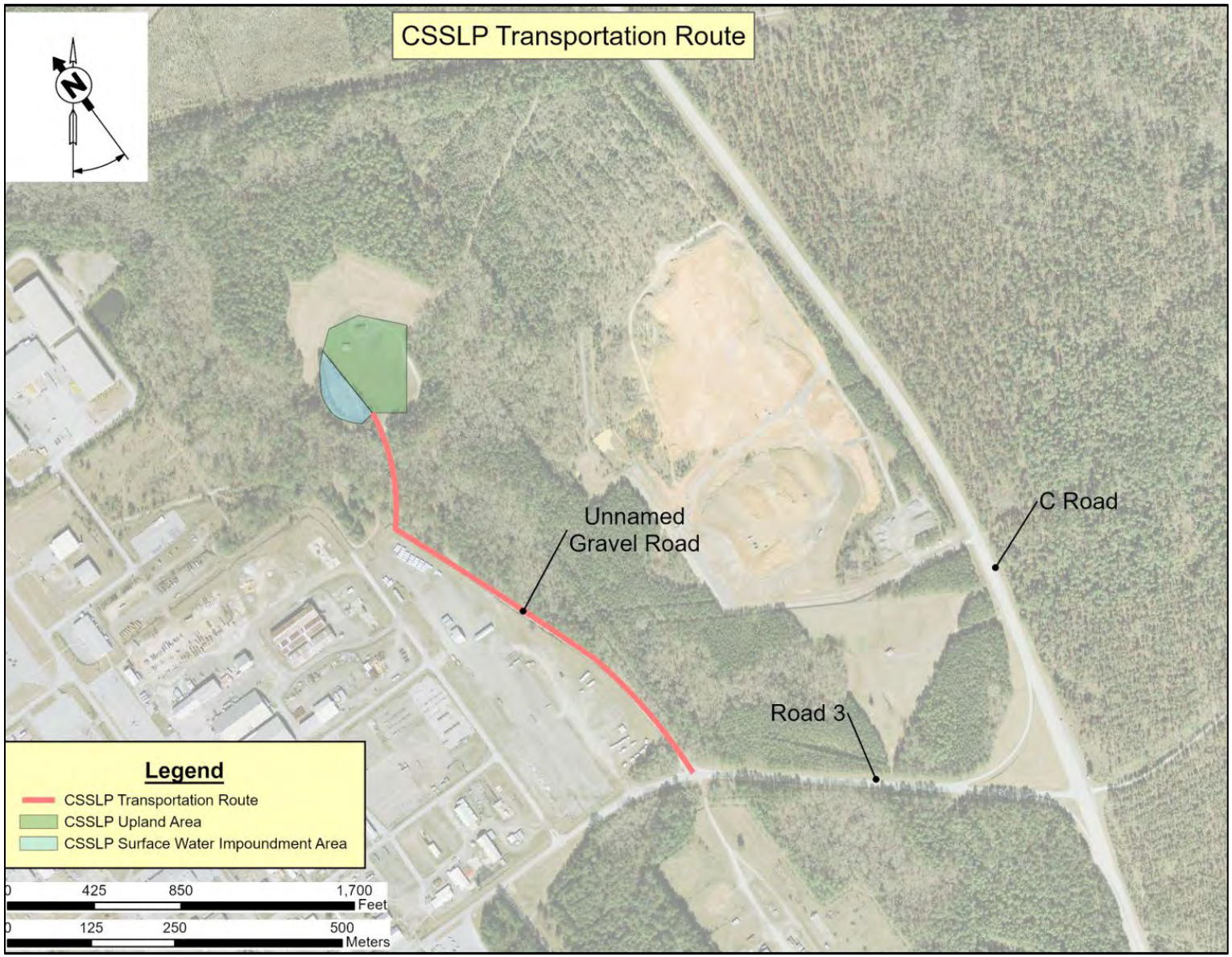


Figure 5-2. Transportation Routes to Clean Soil and Solid Waste Disposal Facilities at CSSLP Subunit

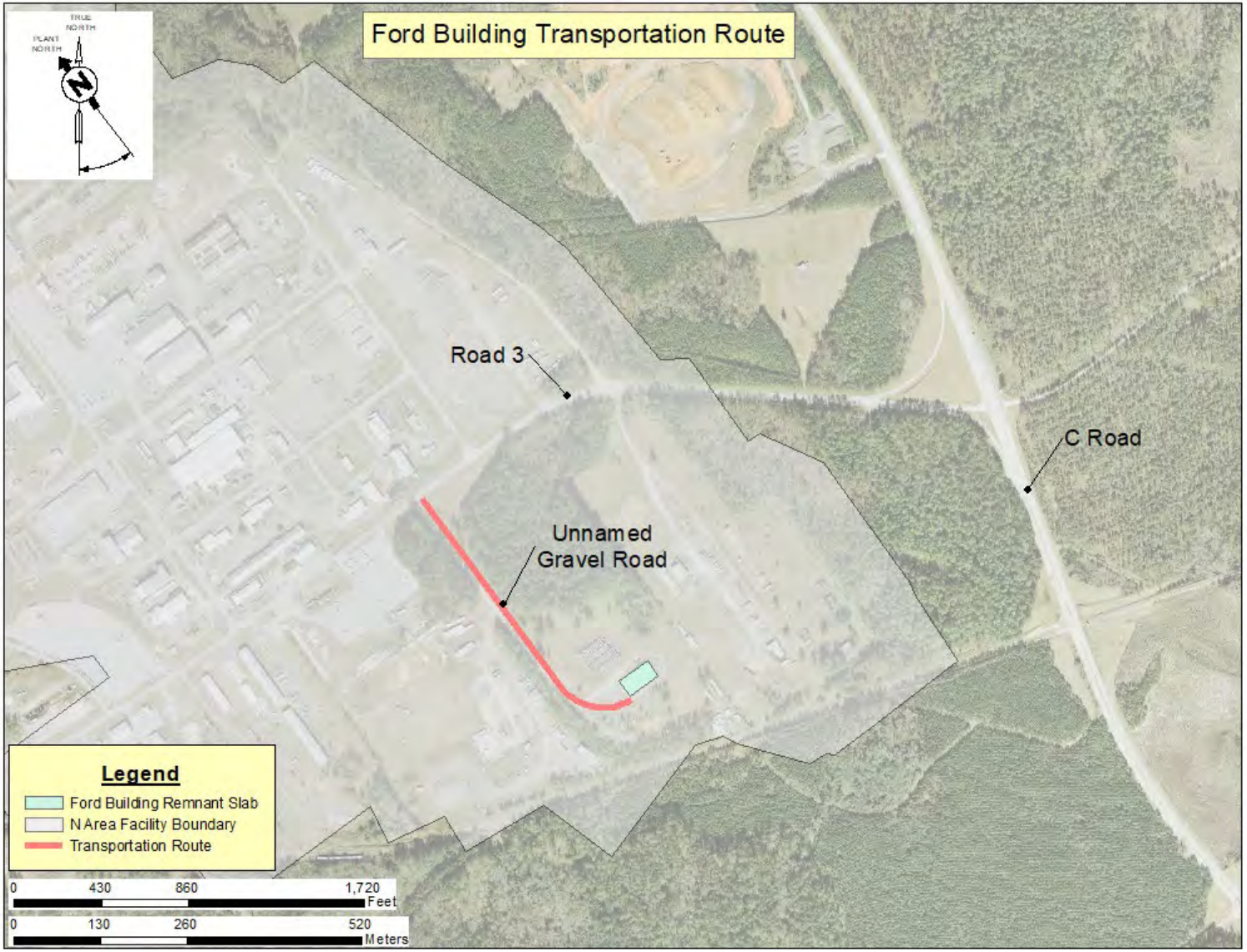


Figure 5-3. Transportation Routes to Clean Soil and Solid Waste Disposal Facilities at Ford Building Subunit

This page is intentionally left blank.

Table 5-1. Alternative Screening for ECODS N-1 Subunit

Alternative	Effectiveness	Implementability	Cost	Status	Comments
A-1) No Action	Not effective in reducing exposure of asbestos to human receptors. Alternative does not treat or remove waste.	Not Applicable	None	Required	Alternative is required by NCP. Influenced by risk management decision to consider impact of removal/backfill alternatives on ecosystem.
A-2) Land Use Controls	Effective in reducing exposure from asbestos to human receptors. Land disturbance of the soils would not be allowed. Alternative leaves asbestos in place.	Installation of warning signs and site inspections.	Low	Retained	Action would allow for asbestos to remain in place. Requires five-year remedy reviews.
A-3) Excavation and Disposal	Effective in permanently eliminating exposure from asbestos to human receptors after completion of implementation.	Involves excavation of asbestos and disposal at offsite facility. Creates potential for an exposure to asbestos to human receptors during implementation.	High	Not retained	Does not require five-year remedy reviews.

Table 5-2. Alternative Screening for CSSLP Subunit

Alternative	Effectiveness	Implementability	Cost	Status	Comments
B-1) No Action	Not effective in reducing exposure of contaminated media to human receptors. Alternative does not treat or remove waste.	Not Applicable	None	Required	Alternative is required by NCP. Influenced by risk management decision to consider impact of removal/backfill alternatives on ecosystem.
B-2) Land Use Controls	Effective in reducing exposure from contaminated media to human receptors. Alternative leaves contaminated media in place.	Installation of warning signs and site inspections.	Low	Retained	Requires five-year remedy reviews.
B-3) Soil Cover with Land Use Controls	Effective in reducing exposure from contaminated media to human receptors. Alternative leaves contaminated media in place.	Involves clearing and grubbing of vegetation, management of surface water, and placing 2-foot soil cover to break exposure pathway from contaminated media using standard earth-moving equipment. Installation of warning signs and site inspections.	High	Retained	Requires five-year remedy reviews. Requires LUCs to ensure the integrity of a soil cover.
B-4) Excavation (Hot Spot Removal) and Disposal	Effective in eliminating exposure from contaminated media to human receptors after implementation.	Involves clearing and grubbing of vegetation, management of surface water, excavation and disposal of contaminated media at an offsite disposal facility, and backfilling for site restoration using standard earth-moving equipment.	Med	Retained	Does not require five-year remedy reviews. Does not require LUCs.

Table 5-3. Alternative Screening for Ford Building Subunit

Alternative	Effectiveness	Implementability	Cost	Status	Comments
C-1) No Action	Not effective in reducing exposure of contaminated media to human receptors. Alternative does not treat or remove waste.	Not Applicable	None	Required	Alternative is required by NCP. Influenced by risk management decision to consider impact of removal/backfill alternatives on ecosystem.
C-2) Land Use Controls	Effective in reducing exposure from contaminated media to human receptors. Alternative leaves contaminated media in place.	Installation of warning signs and site inspections.	Med	Retained	Requires five-year remedy reviews. Includes O&M for Ford Building subunit concrete cover system.
C-3) Excavation (Hot Spot Removal) and Disposal with Land Use Controls	Effective in eliminating exposure from contaminated media to human receptors.	Involves disposal of contaminated media at an offsite disposal facility, and backfilling to restore site using standard earth-moving equipment. Installation of warning signs and site inspections.	Med	Retained	Requires five-year remedy reviews. Residual contamination beneath Ford Building subunit concrete cover system would require LUCs.

This page is intentionally left blank.

Table 5-4. Summary of Potential ARARs for the ECODS N-1, CSSLP and Ford Building OU

Action	Requirements	Prerequisite	Citation
All Land-disturbing Activities (i.e., excavation, clearing, grading, etc.)			
Managing storm water runoff from land-disturbing activities	Must comply with the substantive requirements for stormwater management and sediment control of *NPDES General Permit No. SCR100000*.	Large and small construction activities (as defined in R. 61-9) of more than 1 acre of land – **applicable**	SCDHEC R. 61-9.122.41 NPDES General Permit No. SCR100000
	The stormwater management and sediment control plan shall contain at a minimum the information provided in the following subsections:	Activities involving more than two (2) ac and less than five (5) ac of actual land disturbance which are not part of a larger common plan of development or sale – **applicable**	SCDHEC R. 72-307 I. – *South Carolina Storm Water Management and Sediment Reduction Regulations*
	A plan for temporary and permanent vegetative and structural erosion and sediment control measures which specify the erosion and sediment control measures to be used during all phases of the land disturbing activity and a description of their proposed operation;		SCDHEC R. 72-307 I.(3)(d)
	Provisions for stormwater runoff control during the land disturbing activity and during the life of the facility meeting the following requirements of subsections (e)1 and 2.		SCDHEC R. 72-307 I.(3)(e)
Managing fugitive dust emissions from land disturbing activities	Emissions of fugitive particulate matter shall be controlled in such a manner and to the degree that it does not create an undesirable level of air pollution.	Activities that will generate fugitive particulate matter (Statewide) – **applicable**	SCDHEC R. 61-62.6 Section III(a)- *Control of Fugitive Particulate Matter Statewide*

Table 5-4. Summary of Potential ARARs for the ECODS N-1, CSSLP and Ford Building OU *(continued)*

Action	Requirements	Prerequisite	Citation
Waste Characterization and Storage — (e.g., excavated contaminated soils/sediments)			
Characterization of solid waste	Must determine if the solid waste is excluded from regulation under 40 *CFR* 261.4.	Generation of solid waste as defined in 40 *CFR* 261.2 – **applicable**	40 *CFR* 262.11(a) SCDHEC R. 61-79 262.11*(a)*
	Must determine if waste is listed as hazardous waste in subpart D of 40 *CFR* Part 261.	Generation of solid waste which is not excluded under 40 *CFR* 261.4(a) – **applicable**	40 *CFR* 262.11(b) SCDHEC R. 61-79 262.11*(b)*
	Must determine whether the waste is identified in subpart C of 40 *CFR* Part 261 by using prescribed testing methods or applying generator knowledge based on information regarding material or processes used.	Generation of solid waste that is not listed in subpart D of 40 *CFR* Part 261 and not excluded under 40 *CFR* 261.4 – **applicable**	40 *CFR* 262.11(c) SCDHEC R. 61-79 262.11*(c)*
Characterization of LLW (690-N Co-60 hotspot removal Only)	Shall be characterized using direct or indirect methods and the characterization documented in sufficient detail to ensure safe management and compliance with the WAC of the receiving facility.	Generation of DOE LLW – **TBC**.	DOE M 435.1-1(IV)(I)
	Characterization data shall, at a minimum, include the following information relevant to management of the waste: • physical and chemical characteristics; • volume, including the waste and any stabilization or absorbent media; • weight of the container and contents; • identifies, activities, and concentration of major radionuclides; • characterization date; • generating source; and • any other information needed to prepare and maintain the disposal facility performance assessment, or demonstrate compliance with performance objectives.		DOE M 435.1-1(IV)(I)(2)(a)-(g)

Table 5-4. Summary of Potential ARARs for the ECODS N-1, CSSLP and Ford Building OU *(continued/end)*

Action	Requirements	Prerequisite	Citation
Waste treatment and disposal — (e.g., excavated contaminated soils/sediments, debris)			
Disposal of solid waste	Shall ultimately dispose of solid waste at facilities and/or sites permitted or registered by the Department for processing or disposal of that waste stream.	Generation of solid waste intended for off-site disposal – **relevant and appropriate**	SCDHEC R. 61-107.5(D)(3)
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. EE/CA, Action Memo, FS, PP, or ROD) that is approved or issued by EPA.	Sampling, storage and/or disposal of PCB bulk product waste (as defined in 40 CFR 761.3) – **applicable**	40 CFR Part 761, Section 62, Paragraph (c)
	Cap requirements. A cap means, when referring to on-site cleanup and disposal of PCB remediation waste, a uniform placement of concrete, asphalt, or similar material of minimum thickness spread over the area where remediation waste was removed or left in place in order to prevent or minimize human exposure, infiltration of water, and erosion. A concrete or asphalt cap shall have a minimum thickness of 15 cm (6 inches). A cap must be of sufficient strength to maintain its effectiveness and integrity during the use of the cap surface which is exposed to the environment. A cap shall not be contaminated at a level ≥1 ppm PCB per Aroclor TM (or equivalent) or per congener. Repairs shall begin within 72 hours of discovery for any breaches which would impair the integrity of the cap.	Risk based disposal of PCB bulk product waste per 40 CFR Part 761, Section 62, Paragraph (c)(1)– **relevant and appropriate**	40 CFR Part 761, Section 61, Paragraph (a)(7)

ALARA = As Low As Reasonably Achievable
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
TBC = to be considered

This page is intentionally left blank.

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

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

This page is intentionally left blank.

Table 5-6. Comparison of the CSSLP Subunit Alternatives to the CERCLA 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 Human Health and the Environment				
Human Health	Not protective of the future resident or on-site worker because there are no controls or remediation.	Meets the requirement by limiting exposure to the contaminated media through the use of administrative and engineering controls.	Meets the requirement by placement of a soil cover to eliminate the direct exposure pathways	Meets the requirement by excavation of the contaminated media to eliminate the direct exposure pathways.
Environment	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.
Compliance with ARARs				
Chemical-Specific	No ARARs exist	No ARARs exist	No ARARs exist	No ARARs exist
Location-Specific	No ARARs exist	No ARARs exist	No ARARs exist	No ARARs exist
Action-Specific	No ARARs exist	No ARARs exist	ARARs for control of the minimization of sediment erosion and management of storm water can be achieved.	ARARs for control of the minimization of sediment erosion, management of storm water and transportation of solid waste can be achieved.
Long Term Effectiveness				
Adequacy of Controls	None	Controls are adequate as long as they are maintained	Controls are adequate as long as they are maintained	No controls are required because contaminated media removed
Permanence	No	LUCs are permanent as long as controls are maintained	Cover system is permanent as long as it is maintained	Excavation of media will be permanent
Reduction of Mobility, Toxicity, or Volume through Treatment				
Type of Reduction	No reduction	No reduction	No reduction	No reduction

Table 5-6. Comparison of the CSSLP Subunit Alternatives to the CERCLA 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	$2,733,255	$1,009,718
Present Worth O&M Cost	$0	$317,802	$423,908	$11,322
Total Cost	$0	$345,561	$3,037,051	900,928

Table 5-7. Comparison of the Ford Building Subunit Alternatives to the CERCLA Criteria

Criterion	C-1 No Action	C-2 Land Use Controls	C-3 Excavation (Hot Spot Removal) and Disposal with LUCs
Overall Protection of Human Health and the Environment			
Human Health	Not protective of the future resident or on-site worker because there are no controls or remediation.	Meets the requirement by limiting exposure to the contaminated media through the use of administrative and engineering controls and maintaining the integrity of the existing concrete cover.	Meets the requirement by extraction of the contaminated media to eliminate the direct exposure pathways and the use of administrative and engineering controls to maintain the integrity of the existing concrete cover.
Environment	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.	Not applicable as contaminants are not at levels that pose a threat to the environment.
Compliance with ARARs			
Chemical-Specific	ARAR for sampling, storage and/or disposal of PCB waste is not achieved.	ARAR for sampling, storage and/or disposal of PCB waste can be achieved.	ARAR for sampling, storage and/or disposal of PCB waste can be achieved.
Location-Specific	No ARARs exist	No ARARs exist	No ARARs exist
Action-Specific	No ARARs exist	No ARARs exist	ARAR for transportation of solid waste and characterization of low-level waste can be achieved.
Long Term Effectiveness			
Adequacy of Controls	None	Controls are adequate as long as they are maintained	No controls required because contaminated media removed
Permanence	No	LUCs are permanent as long as controls are maintained	Excavation of media will be permanent
Reduction of Mobility, Toxicity, or Volume			
Type of Reduction	No reduction	No reduction	Reduction in volume and mobility but no reduction of toxicity
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 5-7. Comparison of the Ford Building Subunit Alternatives to the CERCLA 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 5-8 Comparative Alternative Analysis for ECODS N-1 Subunit

Response Action	Overall Protection of Human Health	Compliance with RAOs	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost	Overall Ranking (1-20)
A-1) No Action	No	No	N/A	1	1	1	5	$0	8
A-2) Land Use Controls	Yes	Yes	N/A	3	1	5	4	$271,396	13

Note: Numeric range 1 through 5, where 1= worst and 5 = best

Table 5-9 Comparative Alternative Analysis for CSSLP Subunit

Response Action	Overall Protection of Human Health	Compliance with RAOs	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost	Overall Ranking (1-20)
B-1) No Action	No	No	N/A	1	1	1	5	$0	8
B-2) Land Use Controls	Yes	Yes	N/A	3	1	5	4	$345,561	13
B-3) Soil Cover with LUCs	Yes	Yes	Yes	4	1	4	3	$3,037,051	12
B-4) Excavation (Hot Spot Removal) and Disposal	Yes	Yes	Yes	5	1	4	3	$900,928	13

Note: Numeric range 1 through 5, where 1= worst and 5 = best

Table 5-10 Comparative Alternative Analysis for Ford Building Subunit

Response Action	Overall Protection of Human Health	Compliance with RAOs	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost	Overall Ranking (1-20)
C-1) No Action	No	No	No	1	1	1	5	$0	8
C-2) Land Use Controls	Yes	Yes	Yes	3	1	5	4	$677,613	13
C-3) Excavation (Hot Spot Removal) and Disposal with LUCs	Yes	Yes	Yes	4	1	4	3	$713,746	12

Note: Numeric range 1 through 5, where 1= worst and 5 = best

This page is intentionally left blank.

6.0 RFI/RI/BRA/CMS/FS SUMMARY/CONCLUSIONS

The CSSLP and the Ford Building subunits present unacceptable risks to human health and the environment. Although no COCs were identified by the HHRA for the ECODS N-1 subunit, ACM is present in subsurface soils that could pose a problem warranting action.

The problems warranting action for the ECODS N-1, CSSLP, and Ford Building OU include the following:

ECODS N-1 Subunit

- ECODS N-1 subunit, ACM is present in subsurface soil that may pose a risk to human receptors if exposed.

CSSLP Subunit

- Arsenic is present in surface soil (0 to 0.3 m [0 to 1 ft]) (EPC = 16.4 mg/kg) exceeding 1E-06 risk level for the resident (risk = 2.4E-05) and industrial worker (risk = 5.5E-06) scenarios.
- Arsenic is present in surface sediment (0 to 0.3 m [0 to 1 ft]) (EPC = 8.27 mg/kg) exceeding 1E-06 risk level for the resident (risk = 1.2E-05) and industrial worker (risk = 2.8E-06) scenarios.

Ford Building Subunit

- Ford Building (690-N) slab – Prior to placement of a concrete cover with minimum 0.46 m (18 in.) gravel underlay in 2021, PCBs (Aroclor 1254 and 1260) and cesium-137 (+D) were present at the Ford Building) remnant slab that exceeds the 1E-06 risk level of concern for the resident and industrial worker scenarios.
- Cobalt-60 is present in surface soil (0 to 1 ft) (EPC = 0.545 pCi/g) exceeding the 1E-06 level of concern for the resident scenario (risk = 5.5E-05) and industrial worker (risk = 1.1E-05).

The RAOs include the following:

ECODS N-1 Subunit

- Prevent residential and industrial exposure to friable asbestos that is present in the subsurface for the ECODS N-1 subunit.

CSSLP Subunit

- Prevent residential and industrial exposure to arsenic in surface soils at levels exceeding 1E-06 risk and/or SRS background concentrations.
- Prevent residential and industrial exposure to arsenic in sediment at levels exceeding 1E-06 risk and/or SRS background concentrations.

Ford Building Subunit

- Prevent residential and industrial exposure to PCBs and cesium-137 at the Ford Building remnant slab that exceed 1E-06 risk and PCB ARAR of 1 mg/kg for free release.
- Prevent residential and industrial exposure to cobalt-60 in surface soils at levels that exceed 1E-06 risk.

Two (2) remedial alternatives were considered in the CMS/FS for the ECODS N-1 subunit. These are identified as Alternatives A-1 – A-2.

- A-1. No Action
- A-2. LUCs

Four (4) remedial alternatives were considered in the CMS/FS for the CSSLP subunit. These are identified as Alternatives B-1 – B-4.

- B-1. No Action
- B-2. LUCs
- B-3. Soil Cover with LUCs
- B-4. Excavation (Hot Spot Removal) and Disposal

Three (3) remedial alternatives were considered in the CMS/FS for the Ford Building subunit. These are identified as Alternatives C-1 – C-3.

- C-1. No Action
- C-2. LUCs
- C-3. Excavation (Hot Spot Removal) and Disposal with LUCs

6.1 Implementation Schedule

A summary of the key deliverables and submittal dates for the ECODS N-1, CSSLP, and Ford Building OU is shown below. These dates are listed in the USEPA and SCDHEC approved OU implementation schedule and are included in the FFA.

Deliverable	Submittal Date
Submit Rev. 0, RFI/RI/BRA/CMS/FS	October 28, 2021
Submit Rev. 0, SB/PP	August 3, 2022
Submit Rev. 0, ROD	March 20, 2023
Issuance of the ROD	December 12, 2023
Submit Rev. 0, CMI/RAIP	August 15, 2023
Submit Rev. 0, LUCIP	August 15, 2023
Remedial Action Start	December 16, 2024

This page intentionally left blank.

7.0 REFERENCES

Aadland, R.K., J.A. Gellici, and P.A. Thayer, 1995. *Hydrogeologic Framework of West-central South Carolina*; South Carolina Department of Natural Resources – Water Resources Division Report 5

Bumpus, D. and J. Garner, 1994. *Threatened, Endangered & Sensitive Species Listing 1994 Savannah River Forest Station Site 19, Central Shops Burning Rubble Pit (Waste Site # (90),* U.S Department of Agriculture – Forest Service, Savannah River Site, Aiken, SC

Fallaw, W. and V. Price, 1995. "Stratigraphy of the Savannah River Site and Vicinity," *Southeastern Geology*, Nolume 35, No. 1, p. 21-58

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

GTG, 2018. *GoldSim® User's Guide Version 12.1*. GoldSim® Technology Group. Issaquah, WA. June 2018.

Imm, D., 1998a. *Threatened, Endangered & Sensitive Species Listing 1998 Savannah River Forest Station Site 23, Central Shops Burning/Rubble Pits (631-1G, 631-3G, 631-5G),* U.S Department of Agriculture – Forest Service, Savannah River Site, Aiken, SC

Imm, D., 1998b. *Threatened, Endangered & Sensitive Species Listing 1998 Savannah River Forest Station Site 37, Ford Building Seepage Basin (904-91G),* U.S Department of Agriculture – Forest Service, Savannah River Site, Aiken, SC

LANL, 2017. *Ecorisk Database*, Release 3.3, Los Alamos National Laboratory, Los Alamos, NM

NRMRL, 1999. *Superfund Innovative Technology Evaluation Program (SITE) Technology Profiles*, Tenth Edition, EPA/540/R-99/500B (NTIS PB2000-102922), National Risk Management Research Laboratory, Cincinnati, OH

SRNL, 2020. *Meteorological Monitoring Program at the Savannah River Site*, SRNL-TR-2020-00197, Revision 0, Savannah River National Laboratory, Savannah River Site, Aiken, SC

SRNS, 2012. *Environmental Compliance and Area Completion Projects Regulatory Document Handbook*, ERD-AG-003, Revision 17, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2013. *Decommissioning Project Plan for Building 690-N (Ford Building) and Its Ancillary Equipment/Facilities*, V-PMP-N-00013, Revision 0, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2014a. *745-N Pad Demolition Waste Management Plan*, SRNS-RP-2013-00373, Revision 1, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2014b. *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, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2020. *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 0, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

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

Stieve, A. and D. Stephenson, 1995. "Geophysical Evidence for Post Last Cretaceous Reactivation of Basement Structures in the Central Savannah River Area," *Southeastern Geology*, Vol. 35, No. 1

USEPA, 1991. *A Guide to Principal Threat and Low-Level Threat Wastes*, Superfund Publication 9380.3-06FS, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC

USEPA, 1996. *CLU-IN*. U.S. Environmental Protection Agency, Technology Innovation and Field Services Division, https://clu-in.org/default.cfm. Accessed 17 Aug. 2017.

USEPA, 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*, EPA/540/G-89/004 (OSWER Directive 9355.3-01), Interim Final, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.

USEPA, 2018. *Region 4 Ecological Risk Assessment Supplemental Guidance*, March 2018 Update, Scientific Support Section, Superfund Division, U.S. Environmental Protection Agency, Atlanta, GA

USEPA, 2020a. *USEPA Regional Screening Levels,* U.S. Environmental Protection Agency, National Center for Environmental Assessment, Arlington, VA, (November 2020 updated), 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, 1996. *Savannah River Site Federal Facility Agreement Community Involvement Plan*, WSRC-RP-96-120, Revision 7, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

WSRC 1998. *RCRA Facility Investigation/Remedial Investigation with Baseline Risk Assessment for the Central Shops Burning/Rubble Pits (631-1G and 61-3G) (U)*, WSRC-RP-98-4043, Rev. 1.1, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC.

WSRC 1999. *SRS Land Use Control Assurance Plan for the Savannah River Site*, WSRC-RP-98-4125, Revision 1.1, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC (Updated February 2018)

WSRC, 2001a. *RCRA Facility Investigation/Remedial Investigation with Baseline Risk Assessment for Central Shops Burning/Rubble Pits (631-1G and 631-3G)*, WSRC-RP-98-4043, Revision 1.2, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC 29808

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

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

WSRC, 2002. *Record of Decision Remedial Alternative Selection for the Central Shops Burning/Rubble Pits (CSBRP) (631-1G and 631-3G) (U)*, WSRC-RP-2021-4265, Revision 1.1, Westinghouse Savannah River Company, Savannah River Site, 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

This page intentionally left blank.

APPENDIX A

INVESTIGATION DATA

This page was intentionally left blank.

TABLE OF CONTENTS

ECODS

Table A.1.1. Data Summary Table ECODS N-1 Subunit Soil (0 to 1 ft) A-5
Table A.1.2. Data Summary Table ECODS N-1 Subunit Soil (1 to 4 ft) A-7
Table A.1.3. Data Summary Table ECODS N-1 Subunit Soil (All Depths) A-9
Table A.1.4. Data Summary Table Background ECODS N-1 Subunit Soil (0 to 1 ft) A-11
Table A.1.5. Data Summary Table Background ECODS N-1 Subunit Soil (1 to 4 ft) A-12
Table A.1.6. Data Summary Table Background ECODS N-1 Subunit Soil (All Depths) A-13
Table A.1.7. Unit Specific Constituent Screening Table ECODS N-1 Subunit (All Depths) A-15

CSSLP

Table A.2.1. Data Summary Table CSSLP Subunit Upland Area Soil (0 to 1 ft) A-17
Table A.2.2. Data Summary Table CSSLP Subunit Upland Area Soil (1 to 4 ft) A-19
Table A.2.3. Data Summary Table CSSLP Subunit Upland Area Soil (All Depths) A-21
Table A.2.4. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Sediment/Soil (0 to 1 ft) A-25
Table A.2.5. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Sediment/Soil (1 to 4 ft) A-27
Table A.2.6. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Sediment/Soil (All Depths) A-29
Table A.2.7. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Surface Water (Unfiltered) A-31
Table A.2.8. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Surface Water (Filtered) A-32
Table A.2.9. Data Summary Table Background CSSLP Subunit Upland Area Soil (0 to 1 ft) A-33
Table A.2.10. Data Summary Table Background CSSLP Subunit Upland Area Soil (1 to 4 ft) A-34
Table A.2.11. Data Summary Table Background CSSLP Subunit Upland Area Soil (All Depths) A-35
Table A.2.12. Data Summary Table CSSLP Background Sediment – Carolina Bay (0 to 1 ft) A-36
Table A.2.13. Data Summary Table CSSLP Background Sediment – Carolina Bay (1 to 4 ft) A-37
Table A.2.14. Data Summary Table CSSLP Background Sediment – Carolina Bay (All Depths) A-39
Table A.2.15. Data Summary Table CSSLP Background Surface Water – Carolina Bay (Unfiltered) A-41
Table A.2.16. Unit Specific Constituent Screening Table CSSLP Subunit Upland Unit (All Depths) A-43
Table A.2.17. Unit Specific Constituent Screening Table CSSLP Subunit Surface Water Impoundment Area (All Depths) A-47

FORD BLDG

Table A.3.1. Data Summary Table Ford Building Subunit Soil (0 to 1 ft) A-49
Table A.3.2. Data Summary Table Ford Building Subunit Soil (1 to 4 ft) A-53
Table A.3.3. Data Summary Table Ford Building Subunit Soil (All Depths) A-57
Table A.3.4. Unit Specific Constituent Screening Table Ford Building Subunit (All Depths) A-61

This page was intentionally left blank.

Table A.1.1. Data Summary Table ECODS N-1 Subunit Soil (0 to 1 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
2-Methylnaphthalene	mg/kg	24	23	1	1	--	--	0.0064	--	0.0237	ND	0.0237	ECN1-08	J	1/25/2001
Acetone	mg/kg	24	14	10	2	X	7	0.0132	0.02	0.0619	ND	0.02	ECN1-09		1/22/2001
Aluminum	mg/kg	41	0	41	1	N	1	6390.5	6906	11200	2630	6906	ECN1-08		1/25/2001
Antimony	mg/kg	41	39	2	2	X	5	1.267	3.256	12.6	ND	3.256	ECN1-08	J	1/25/2001
Aroclor 1254	mg/kg	24	23	1	1	--	--	0.007	--	0.0469	ND	0.0469	ECN1-08	J	1/25/2001
Aroclor 1260	mg/kg	24	23	1	1	--	--	0.0063	--	0.048	ND	0.048	ECN1-08	J	1/25/2001
Arsenic	mg/kg	41	3	38	29	X	7	3.218	3.552	5.08	ND	3.552	ECN1-29	J	6/20/2019
Barium	mg/kg	41	0	41	6	N	1	9.238	10.92	33	1.81	10.92	ECN1-35		6/20/2019
Benzo(g,h,i)perylene	mg/kg	24	23	1	1	--	--	0.0092	--	0.0272	ND	0.0272	ECN1-08	J	1/25/2001
Benzo[a]anthracene	mg/kg	24	23	1	1	--	--	0.0126	--	0.0322	ND	0.0322	ECN1-08	J	1/25/2001
Benzo[a]pyrene	mg/kg	24	23	1	1	--	--	0.0047	--	0.031	ND	0.031	ECN1-08	J	1/25/2001
Benzo[b]fluoranthene	mg/kg	24	23	1	1	--	--	0.0057	--	0.0597	ND	0.0597	ECN1-08	J	1/25/2001
Beryllium	mg/kg	41	35	6	6	G	2	0.1499	0.132	0.27	ND	0.132	ECN1-35	J	6/20/2019
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	24	9	15	12	L	3	0.1011	0.338	0.857	ND	0.338	ECN1-18		1/19/2001
Calcium	mg/kg	41	0	41	24	N	1	103.8	121	320	9	121	ECN1-22	J	1/24/2001
Carbon Disulfide	mg/kg	24	22	2	2	X	4	0.0005	0.0016	0.0038	ND	0.0016	ECN1-11	J	1/25/2001
Chromium	mg/kg	41	0	41	6	G	2	14.24	16.44	50.2	4.1	16.44	ECN1-08		1/25/2001
Chromium, Hexavalent 7196a	mg/kg	2	1	1	0	--	--	1.492	--	2.9	ND	2.9	ECN1-043		9/23/2020
Chromium, Hexavalent 7199	mg/kg	3	2	1	0	--	--	0.477	--	1.2	ND	1.2	ECN1-042		9/23/2020
Chrysene	mg/kg	24	23	1	1	--	--	0.0104	--	0.0731	ND	0.0731	ECN1-08	J	1/25/2001
Cobalt	mg/kg	41	25	16	10	X	7	0.5048	0.564	0.998	ND	0.564	ECN1-35		6/20/2019
Copper	mg/kg	41	9	32	12	L	3	16.82	21.97	256	1.01	21.97	ECN1-044		9/29/2020
Cyanide	mg/kg	27	18	9	4	X	7	0.9322	1.546	8.43	ND	1.546	ECN1-16		1/23/2001
DDE	mg/kg	24	23	1	1	--	--	0.0003	--	0.0017	ND	0.0017	ECN1-17	J	1/19/2001
DDT	mg/kg	24	23	1	0	--	--	0.0004	--	0.0023	ND	0.0023	ECN1-17		1/19/2001
Fluoranthene	mg/kg	24	23	1	1	--	--	0.0119	--	0.0283	ND	0.0283	ECN1-08	J	1/25/2001
Iron	mg/kg	41	0	41	1	N	1	12020.5	13563	30600	2900	13563	ECN1-17		1/19/2001
Lead	mg/kg	41	0	41	2	X	4	46.69	202.1	1470	2.61	202.1	ECN1-08		1/25/2001

Table A.1.1. Data Summary Table ECODS N-1 Subunit Soil (0 to 1 ft) *(Continued/End)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Magnesium	mg/kg	41	0	41	25	G	2	54.84	64.31	148	14.7	64.31	ECN1-08		1/25/2001
Manganese	mg/kg	41	0	41	9	G	2	19.96	24.47	73.5	2.83	24.47	ECN1-08		1/25/2001
Mercury	mg/kg	41	3	38	17	X	4	0.0162	0.0289	0.123	ND	0.0289	ECN1-08		1/25/2001
Methyl Ethyl Ketone	mg/kg	24	23	1	0	--	--	0.0023	--	0.0069	0.0041	0.0069	ECN1-22		1/24/2001
Nickel	mg/kg	41	23	18	3	X	4	1.427	4.194	25.4	0.392	4.194	ECN1-08		1/25/2001
Phenanthrene	mg/kg	24	23	1	1	--	--	0.0078	--	0.0318	ND	0.0318	ECN1-08	J	1/25/2001
Potassium	mg/kg	41	0	41	21	N	1	61	66.17	97.5	21.7	66.17	ECN1-23		1/25/2001
Pyrene	mg/kg	24	23	1	1	--	--	0.0069	--	0.0329	ND	0.0329	ECN1-08	J	1/25/2001
Selenium	mg/kg	41	38	3	3	X	7	0.5027	0.741	2.42	ND	0.741	ECN1-34	J	6/20/2019
Thallium	mg/kg	41	40	1	1	--	--	0.5342	--	1.18	ND	1.18	ECN1-043	J	9/23/2020
Vanadium	mg/kg	41	0	41	6	N	1	31.61	35.63	78.9	7.91	35.63	ECN1-17		1/19/2001
Zinc	mg/kg	41	0	41	24	X	4	16.4	27.29	67.2	2.39	27.29	ECN1-08	J	1/25/2001

Distribution Code:
N Normal Distribution
L Lognormal Distribution
G Gamma Distribution
X Non-Parametric

UCL Method Code: (as determined by ProUCL)
1 Student's t UCL
2 Approximate Gamma UCL
3 95% H-UCL
4 95% Chebyshev UCL
5 97.5% Chebysev UCL
6 99% Chebyshev UCL
7 Kaplan-Meier (KM) t UCL
8 Hall's Bootstrap UCL

ND = Non-Detect

Table A.1.2. Data Summary Table ECODS N-1 Subunit Soil (1 to 4 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
1,1,2,2-Tetrachloroethane	mg/kg	24	23	1	0	--	--	0.0003	--	0.0016	ND	0.0016	ECN1-07		1/23/2001
Acetone	mg/kg	24	14	10	2	X	7	0.0163	0.0501	0.192	ND	0.0501	ECN1-12		1/19/201
Aluminum	mg/kg	41	0	41	0	N	1	13394.9	14072	23000	2740	14072	ECN1-08		1/25/2001
Antimony	mg/kg	41	39	2	1	X	5	1.092	14.26	58.9	ND	14.26	ECN1-044		9/29/2020
Aroclor 1254	mg/kg	24	22	2	2	X	7	0.006	0.0137	0.0273	ND	0.0137	ECN1-23	J	1/25/2001
Aroclor 1260	mg/kg	24	22	2	2	X	5	0.0058	0.0193	0.0425	ND	0.0193	ECN1-23	J	1/25/2001
Arsenic	mg/kg	41	1	40	18	X	7	4.657	5.14	10.4	ND	5.14	ECN1-20		1/19/2001
Barium	mg/kg	41	0	41	0	G	2	20.97	23.86	57.2	7.04	23.86	ECN1-044		9/29/2020
Benzo(g,h,i)perylene	mg/kg	24	22	2	2	X	7	0.0099	0.0232	0.0565	ND	0.0232	ECN1-08	J	1/25/2001
Benzo[a]anthracene	mg/kg	24	22	2	1	X	7	0.0148	0.0353	0.0985	ND	0.0353	ECN1-08		1/25/2001
Benzo[a]pyrene	mg/kg	24	22	2	1	X	7	0.0093	0.0236	0.103	ND	0.0236	ECN1-08		1/25/2001
Benzo[b]fluoranthene	mg/kg	24	22	2	1	X	7	0.0106	0.0274	0.127	ND	0.0274	ECN1-08		1/25/2001
Benzo[k]fluoranthene	mg/kg	24	22	2	2	X	7	0.0092	0.0217	0.0592	ND	0.0217	ECN1-08	J	1/25/2001
Beryllium	mg/kg	41	27	14	14	N	1	0.191	0.333	0.229	ND	0.229	ECN1-30	J	6/20/2019
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	24	8	16	6	G	2	0.1769	0.416	1.51	ND	0.416	ECN1-20		1/19/2001
Cadmium	mg/kg	41	38	3	2	X	7	1.567	3.261	40.5	ND	3.261	ECN1-11		1/25/2001
Calcium	mg/kg	41	0	41	20	X	4	269	469.8	2010	19.6	469.8	ECN1-044		9/29/2020
Carbon Disulfide	mg/kg	24	20	4	4	X	7	0.0004	9.36E-04	0.0026	ND	9.36E-04	ECN1-05	J	1/25/2001
Chromium	mg/kg	41	0	41	5	N	1	20.56	22.22	45.8	5.06	22.22	ECN1-08		1/25/2001
Chrysene	mg/kg	24	22	2	1	X	4	0.0129	0.0516	0.134	ND	0.0516	ECN1-08		1/25/2001
Cobalt	mg/kg	41	24	17	3	X	4	0.6825	0.892	1.3	0.391	0.892	ECN1-29, ECN1-36		6/20/2019
Copper	mg/kg	41	11	30	11	X	4	32.31	2339	17700	1.38	2339	ECN1-044		9/29/2020
Cyanide	mg/kg	27	16	11	3	X	7	1.019	1.617	5.72	ND	1.617	ECN1-10		1/23/2001
Dibenz[ah]anthracene	mg/kg	24	23	1	1	--	--	0.0101	--	0.0282	ND	0.0282	ECN1-08	J	1/25/2001
Di-n-butyl phthalate	mg/kg	24	23	1	0	--	--	0.0093	--	0.12	ND	0.12	ECN1-17		1/19/2001
Fluoranthene	mg/kg	24	22	2	1	X	7	0.0153	0.0364	0.103	ND	0.0364	ECN1-08		1/25/2001
Hexavalent Chromium 7196a	mg/kg	2	1	1	0	--	--	1.178	--	2.27	ND	2.27	ECN1-042		9/23/2020
Hexavalent Chromium 7199	mg/kg	2	0	2	0	--	--	2.9	--	3.9	1.9	3.9	ECN1-044		9/29/2020

Table A.1.2. Data Summary Table ECODS N-1 Subunit Soil (1 to 4 ft) *(Continued/End)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
1,1,2,2-Tetrachloroethane	mg/kg	24	23	1	0	--	--	0.0003	--	0.0016	ND	0.0016	ECN1-07		1/23/2001
Indeno[1,2,3-cd]pyrene	mg/kg	24	22	2	2	X	7	0.0117	0.0269	0.053	ND	0.0269	ECN1-08	J	1/25/2001
Iron	mg/kg	41	0	41	0	N	1	18923	19975	43900	3700	19975	ECN1-20		1/19/2001
Lead	mg/kg	41	0	41	0	X	4	38.91	130.6	889	3.19	130.6	ECN1-044		9/29/2020
Magnesium	mg/kg	41	0	41	21	N	1	153.6	174.7	511	33.3	174.7	ECN1-044		9/29/2020
Manganese	mg/kg	41	0	41	2	L	3	56.3	52.18	488	8.76	52.18	ECN1-14		1/24/2001
Mercury	mg/kg	41	0	41	2	N	1	0.0407	0.0451	0.105	0.0075	0.0451	ECN1-21		1/24/2001
Nickel	mg/kg	41	14	27	7	X	4	2.773	5.088	14.1	0.715	5.088	ECN1-08		1/25/2001
Phenanthrene	mg/kg	24	23	1	1	--	--	0.0069	--	0.0443	ND	0.0443	ECN1-08	J	1/25/2001
Potassium	mg/kg	41	0	41	6	N	1	99.76	107.3	167	33.3	107.3	ECN1-03		1/22/2001
Pyrene	mg/kg	24	22	2	1	X	7	0.0104	0.0252	0.0847	ND	0.0252	ECN1-08		1/25/2001
Selenium	mg/kg	41	34	7	6	X	4	8.831	41.14	294	ND	41.14	ECN1-11		1/25/2001
Silver	mg/kg	41	37	4	4	X	7	0.305	0.153	0.304	ND	0.153	ECN1-044	J	9/29/2020
Sodium	mg/kg	41	38	3	2	X	7	27.4	18.22	126	ND	18.22	ECN1-14	J	1/24/2001
Thallium	mg/kg	41	40	1	0	--	--	0.5306	--	2.33	ND	2.33	ECN1-042		9/23/2020
Vanadium	mg/kg	41	0	41	5	N	1	44.22	47.15	79	9.47	47.15	ECN1-20		1/19/2001
Zinc	mg/kg	41	0	41	28	X	4	94.18	283.9	1400	3.03	283.9	ECN1-044	J	9/29/2020

Distribution Code:

N Normal Distribution
L Lognormal Distribution
G Gamma Distribution
X Non-Parametric

UCL Method Code: (as determined by ProUCL)

1 Student's t UCL
2 Approximate Gamma UCL
3 95% H-UCL
4 95% Chebyshev UCL
5 97.5% Chebysev UCL
6 99% Chebyshev UCL
7 Kaplan-Meier (KM) t UCL
8 Hall's Bootstrap UCL

ND = Non-Detect

Table A.1.3. Data Summary Table ECODS N-1 Subunit Soil (All Depths)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
1,1,2,2-Tetrachloroethane	mg/kg	72	71	1	0	0.0003	0.00162	ND	ECN1-07		1/23/2001
2-Methylnaphthalene	mg/kg	71	70	1	1	0.0059	0.0237	ND	ECN1-08	J	1/25/2001
Acetone	mg/kg	72	43	29	6	0.0125	0.192	ND	ECN1-12		1/19/2001
Aluminum	mg/kg	153	0	153	2	8853.1	23000	2510	ECN1-08		1/25/2001
Antimony	mg/kg	153	138	15	11	1.401	58.9	ND	ECN1-044		9/29/2020
Aroclor 1254	mg/kg	72	69	3	3	0.0064	0.0469	ND	ECN1-08	J	1/25/2001
Aroclor 1260	mg/kg	72	69	3	3	0.0058	0.048	ND	ECN1-08	J	1/25/2001
Arsenic	mg/kg	153	8	145	78	4.22	19.1	ND	ECN1-24		1/24/2001
Barium	mg/kg	153	1	152	27	10.28	61.6	0.565	ECN1-40		8/8/2019
Benzo(g,h,i)perylene	mg/kg	71	68	3	3	0.0098	0.0565	ND	ECN1-08	J	1/25/2001
Benzo[a]anthracene	mg/kg	71	68	3	2	0.0138	0.0985	ND	ECN1-08		1/25/2001
Benzo[a]pyrene	mg/kg	71	68	3	2	0.0061	0.103	ND	ECN1-08		1/25/2001
Benzo[b]fluoranthene	mg/kg	71	68	3	2	0.0068	0.127	ND	ECN1-08		1/25/2001
Benzo[k]fluoranthene	mg/kg	71	69	2	2	0.0084	0.0592	ND	ECN1-08	J	1/25/2001
Beryllium	mg/kg	153	112	41	41	0.1561	0.501	ND	ECN1-35	J	8/16/2019
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	71	25	46	29	0.1577	1.9	ND	ECN1-13		1/23/2001
Cadmium	mg/kg	153	149	4	3	0.5739	40.5	ND	ECN1-11		1/25/2001
Calcium	mg/kg	153	11	142	72	132.5	2010	8.67	ECN1-044		9/29/2020
Carbon Disulfide	mg/kg	72	62	10	8	0.0008	0.0125	ND	ECN1-14		1/24/2001
Chromium	mg/kg	153	0	153	18	23.41	475	3.51	ECN1-38		8/8/2019
Chrysene	mg/kg	71	68	3	2	0.0109	0.134	ND	ECN1-08		1/25/2001
Cobalt	mg/kg	153	84	69	42	0.5589	3.67	ND	ECN1-40		8/8/2019
Copper	mg/kg	153	35	118	38	127.5	17700	0.758	ECN1-044		9/29/2020
Cyanide	mg/kg	84	59	25	11	0.7234	8.43	ND	ECN1-16		1/23/2001
DDE	mg/kg	72	71	1	1	0.0003	0.00171	ND	ECN1-17	J	1/19/2001
DDT	mg/kg	72	71	1	0	0.0004	0.00225	ND	ECN1-17		1/19/2001
Dibenz[ah]anthracene	mg/kg	71	70	1	1	0.012	0.0282	ND	ECN1-08	J	1/25/2001
Di-n-butyl phthalate	mg/kg	71	70	1	0	0.0072	0.12	ND	ECN1-17		1/19/2001

Table A.1.3. Data Summary Table ECODS N-1 Subunit Soil (All Depths) *(Continued/End)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Fluoranthene	mg/kg	71	68	3	2	0.0134	0.103	ND	ECN1-08		1/25/2001
Hexavalent Chromium 7196a	mg/kg	18	5	13	3	1.419	2.9	ND	ECN1-043		9/23/2020
Hexavalent Chromium 7199	mg/kg	12	8	4	0	0.7222	3.9	ND	ECN1-044		9/29/2020
Indeno[1,2,3-cd]pyrene	mg/kg	71	69	2	2	0.0119	0.053	ND	ECN1-08	J	1/25/2001
Iron	mg/kg	153	0	153	3	19509.4	90100	2520	ECN1-38		8/8/2019
Lead	mg/kg	153	0	153	22	25.28	1470	0.671	ECN1-08		1/25/2001
Magnesium	mg/kg	153	14	139	71	80.23	511	ND	ECN1-044		9/29/2020
Manganese	mg/kg	153	0	153	37	24.16	488	0.848	ECN1-14		1/24/2001
Mercury	mg/kg	153	22	131	63	0.0204	0.123	ND	ECN1-08		1/25/2001
Methyl Ethyl Ketone	mg/kg	72	71	1	0	0.0022	0.00693	ND	ECN1-22		1/24/2001
Nickel	mg/kg	153	61	92	18	1.637	25.4	0.304	ECN1-08		1/25/2001
Phenanthrene	mg/kg	71	69	2	2	0.0076	0.0443	ND	ECN1-08	J	1/25/2001
Potassium	mg/kg	153	4	149	62	75.32	178	17.5	ECN1-39		8/8/2019
Pyrene	mg/kg	71	68	3	2	0.008	0.0847	ND	ECN1-08		1/25/2001
Selenium	mg/kg	153	119	34	19	4.801	294	ND	ECN1-11		1/25/2001
Silver	mg/kg	153	147	6	6	0.4261	0.304	ND	ECN1-044	J	9/29/2020
Sodium	mg/kg	153	141	12	11	39.28	126	ND	ECN1-14	J	1/24/2001
Thallium	mg/kg	153	128	25	8	0.6867	60.5	ND	ECN1-35		8/6/2019
Vanadium	mg/kg	153	0	153	18	50.39	176	7.24	ECN1-04	J	1/23/2001
Zinc	mg/kg	153	18	135	83	44.68	1400	ND	ECN1-044	J	9/29/2020

ND = Nondetect

Table A.1.4. Data Summary Table Background ECODS N-1 Subunit Soil (0 to 1 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Aluminum	mg/kg	6	0	6	0	9616.7	14900	5610	ECN1-25		1/18/2001
Aroclor 1254	mg/kg	3	2	1	1	0.0071	0.0119	ND	ECN1-27	J	1/18/2001
Arsenic	mg/kg	6	0	6	3	3.863	7.01	2.55	ECN1-25		1/18/2001
Barium	mg/kg	6	0	6	0	13.63	26.2	4.99	ECN1-047-BKG		9/23/2020
Beryllium	mg/kg	6	4	2	2	0.1646	0.227	ND	ECN1-047-BKG	J	9/23/2020
Calcium	mg/kg	6	0	6	3	137.1	216	57.3	ECN1-27	J	1/18/2001
Carbon Disulfide	mg/kg	3	1	2	2	0.0011	0.002	ND	ECN1-27	J	1/18/2001
Chromium	mg/kg	6	0	6	0	16.67	31.9	10.8	ECN1-25		1/18/2001
Cobalt	mg/kg	6	3	3	1	0.5243	0.589	0.326	ECN1-047-BKG		9/23/2020
Copper	mg/kg	6	0	6	2	7.77	15.8	2.89	ECN1-046-BKG		9/30/2020
Cyanide	mg/kg	6	5	1	1	0.1147	0.554	ND	ECN1-27	J	1/18/2001
Hexavalent Chromium 7196a	mg/kg	1	0	1	0	2.26	2.26	ND	ECN1-047-BKG		9/23/2020
Hexavalent Chromium 7199	mg/kg	2	1	1	0	1.075	1.6	ND	ECN1-045-BKG		9/30/2020
Iron	mg/kg	6	0	6	0	14625	30100	8250	ECN1-25		1/18/2001
Lead	mg/kg	6	0	6	0	8.077	16.3	4.72	ECN1-27		1/18/2001
Magnesium	mg/kg	6	0	6	3	86.18	142	50.7	ECN1-047-BKG		9/23/2020
Manganese	mg/kg	6	0	6	1	19.17	28.5	6.59	ECN1-27		1/18/2001
Mercury	mg/kg	6	0	6	2	0.0229	0.0501	0.0065	ECN1-047-BKG		9/23/2020
Nickel	mg/kg	6	3	3	0	1.393	2.3	ND	ECN1-047-BKG		9/23/2020
Potassium	mg/kg	6	0	6	2	76.18	120	57.6	ECN1-047-BKG		9/23/2020
Thallium	mg/kg	6	5	1	1	0.5845	0.862	ND	ECN1-047-BKG	J	9/23/2020
Vanadium	mg/kg	6	1	5	0	3266	75.3	ND	ECN1-25		1/18/2001
Zinc	mg/kg	6	0	6	6	12.57	25.8	3.43	ECN1-27	J	1/18/2001

ND = Nondetect

Table A.1.5. Data Summary Table Background ECODS N-1 Subunit Soil (1 to 4 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Aluminum	mg/kg	6	0	6	0	13326.7	28600	2990	ECN1-25		1/18/2001
Antimony	mg/kg	6	4	2	2	1.124	1.16	0.7	ECN1-047-BKG	J	9/23/2020
Arsenic	mg/kg	6	0	6	2	4.971	7.77	0.674	ECN1-045-BKG		9/30/2020
Barium	mg/kg	6	0	6	0	16.04	26.4	8.75	ECN1-25		1/18/2001
Beryllium	mg/kg	6	4	2	2	0.1488	0.145	ND	ECN1-047-BKG	J	9/23/2020
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	3	2	1	0	0.2507	0.746	ND	ECN1-27		1/18/2001
Calcium	mg/kg	6	0	6	3	168.3	258	125	ECN1-25	J	1/18/2001
Chromium	mg/kg	6	0	6	1	20.78	30.9	4.47	ECN1-045-BKG		9/20/2020
Cobalt	mg/kg	6	3	3	2	0.4562	0.52	0.304	ECN1-046-BKG	J	9/30/2020
Copper	mg/kg	6	1	5	3	3.146	5.22	1.44	ECN1-27	J	1/18/2020
Cyanide	mg/kg	6	5	1	1	0.1839	0.706	ND	ECN1-27	J	1/18/2020
Hexavalent Chromium 7196a	mg/kg	3	0	3	0	1.804	2.95	0.393	ECN1-047-BKG		9/23/2020
Hexavalent Chromium 7199	mg/kg	3	1	2	0	1.37	2.6	ND	ECN1-047-BKG		9/23/2020
Iron	mg/kg	6	0	6	1	18293.3	28200	2620	ECN1-045-BKG		9/30/2020
Lead	mg/kg	6	0	6	1	5.395	9.17	3.34	ECN1-045-BKG		9/30/2020
Magnesium	mg/kg	6	0	6	3	108.4	185	58.1	ECN1-25	J	1/18/2001
Manganese	mg/kg	6	0	6	1	26.07	57.8	8.5	ECN1-046-BKG		9/30/2020
Mercury	mg/kg	6	0	6	2	0.0272	0.043	0.00751	ECN1-25		1/18/2001
Nickel	mg/kg	6	3	3	0	1.316	3.18	1.04	ECN1-045-BKG		9/30/2020
Potassium	mg/kg	6	0	6	1	78.87	117	52.3	ECN1-25		1/18/2001
Silver	mg/kg	6	5	1	1	0.262	0.177	ND	ECN1-045-BKG	J	9/30/2020
Thallium	mg/kg	6	5	1	1	0.7013	1.62	ND	ECN1-047-BKG	J	9/23/2020
Vanadium	mg/kg	6	0	6	1	46.22	65.5	9.51	ECN1-25		1/18/2020
Zinc	mg/kg	6	0	6	6	10.68	22.1	2.74	ECN1-25	J	1/18/2001

ND = Nondetect

Table A.1.6. Data Summary Table Background ECODS N-1 Subunit Soil (All Depths)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Aluminum	mg/kg	21	0	21	0	8814.8	28600	2620	ECN1-25		1/18/2001
Antimony	mg/kg	21	18	3	3	0.8728	1.16	ND	ECN1-047-BKG	J	9/23/2020
Aroclor 1254	mg/kg	9	8	1	1	0.006	0.0119	ND	ECN1-27	J	1/18/2001
Arsenic	mg/kg	21	2	19	9	3.493	7.77	0.674	ECN1-045-BKG		9/30/2020
Barium	mg/kg	21	0	21	3	9.605	26.4	0.473	ECN1-25		1/18/2001
Beryllium	mg/kg	21	13	8	8	0.196	0.227	ND	ECN1-047-BKG	J	9/23/2020
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	9	8	1	0	0.0856	0.746	ND	ECN1-27		1/18/2001
Calcium	mg/kg	21	1	20	10	113.2	258	ND	ECN1-25	J	1/18/2001
Carbon Disulfide	mg/kg	9	7	2	2	0.0006	0.002	ND	ECN1-27	J	1/18/2001
Chromium	mg/kg	21	0	21	3	15.1	31.9	3.25	ECN1-25		1/18/2001
Cobalt	mg/kg	21	14	7	4	0.3906	0.611	ND	ECN1-047-BKG		9/23/2020
Copper	mg/kg	21	3	18	9	4.351	15.8	1.32	ECN1-046-BKG		9/30/2020
Cyanide	mg/kg	21	19	2	2	0.1306	0.706	ND	ECN1-27	J	1/18/2001
Hexavalent Chromium 7196a	mg/kg	12	6	6	0	0.9445	2.95	0.393	ECN1-047-BKG		9/23/2020
Hexavalent Chromium 7199	mg/kg	12	8	4	0	0.6996	2.6	ND	ECN1-047-BKG		9/23/2020
Iron	mg/kg	21	0	21	2	13926.2	30100	2620	ECN1-25		1/18/2001
Lead	mg/kg	21	0	21	6	6.408	16.3	2.49	ECN1-27		1/18/2001
Magnesium	mg/kg	21	1	20	10	75.33	185	6.48	ECN1-25	J	1/18/2001
Manganese	mg/kg	21	0	21	4	17.61	57.8	1.5	ECN1-046-BKG		9/30/2020
Mercury	mg/kg	21	5	16	8	0.0175	0.0501	ND	ECN1-047-BKG		9/23/2020
Nickel	mg/kg	21	13	8	0	0.9924	3.18	ND	ECN1-045-BKG		9/30/2020
Potassium	mg/kg	21	1	20	5	76.49	163	ND	ECN1-26		1/18/2001
Selenium	mg/kg	21	20	1	1	0.4214	0.625	ND	ECN1-045-BKG		10/1/2020
Silver	mg/kg	21	20	1	1	0.2229	0.177	ND	ECN1-045-BKG		9/30/2020
Thallium	mg/kg	21	17	4	4	0.6775	1.83	ND	ECN1-047-BKG		9/24/2020
Vanadium	mg/kg	21	1	20	2	37.75	75.3	ND	ECN1-25		1/18/2001
Zinc	mg/kg	21	0	21	21	9.027	25.8	1.5	ECN1-27	J	1/18/2001

ND = Nondetect

This page was intentionally left blank.

Table A.1.7. Unit Specific Constituent Screening Table ECODS N-1 Subunit Soil (All Depths)

Analyte	Units	Max[1] Result	Max Qualifier	Max Location	Top Depth *(ft)*	Bottom Depth *(ft)*	SRS 2X Mean Background[2]	Is Max Detect >2X SRS Mean Bkg?[3]
Inorganics								
Aluminum	mg/kg	23000		ECN1-08	1	4	13395	Yes
Antimony	mg/kg	58.9		ECN1-044	1	4	2.65	Yes
Arsenic	mg/kg	19.1		ECN1-24	8	10	4.45	Yes
Barium	mg/kg	61.6		ECN1-40	8	10	33.1	Yes
Beryllium	mg/kg	0.501	J	ECN1-35	18	20	0.3047	Yes
Cadmium	mg/kg	40.5		ECN1-11	1	4	0.4436	Yes
Calcium	mg/kg	2010		ECN1-044	1	4	334	Yes
Chromium	mg/kg	475		ECN1-38	10	12	22.9	Yes
Chromium, Hexavalent (7196a)	mg/kg	2.90		ECN1-043	0	1	N/A	Yes
Chromium, Hexavalent (7199)	mg/kg	3.90		ECN1-044	1	4	N/A	Yes
Cobalt	mg/kg	3.67		ECN1-40	8	10	1.40	Yes
Copper	mg/kg	17700		ECN1-044	1	4	6.35	Yes
Cyanide	mg/kg	8.43		ECN1-16	0	1	N/A	Yes
Iron	mg/kg	90100		ECN1-38	18	20	22001	Yes
Lead	mg/kg	1470		ECN1-08	0	1	10.8	Yes
Magnesium	mg/kg	511		ECN1-044	1	4	246	Yes
Manganese	mg/kg	488		ECN1-14	1	4	63.3	Yes
Mercury	mg/kg	0.123		ECN1-08	0	1	0.0668	Yes
Nickel	mg/kg	25.4		ECN1-08	0	1	4.15	Yes
Potassium	mg/kg	178	J	ECN1-39	18	20	213	No
Selenium	mg/kg	294		ECN1-11	1	4	3.71	Yes
Silver	mg/kg	0.304	J	ECN1-044	1	4	0.6368	No
Sodium	mg/kg	126	J	ECN1-14	1	4	43.6	Yes
Thallium	mg/kg	60.5		ECN1-35	18	20	2.94	Yes
Vanadium	mg/kg	176	J	ECN1-04	8	10	58.1	Yes
Zinc	mg/kg	1400	J	ECN1-044	1	4	7.44	Yes

Table A.1.7. Unit Specific Constituent Screening Table ECODS N-1 Subunit Soil (All Depths) *(Continued/End)*

Analyte	Units	Max[1] Result	Max Qualifier	Max Location	Top Depth *(ft)*	Bottom Depth *(ft)*	SRS 2X Mean Background[2]	Is Max Detect >2X SRS Mean Bkg?[3]
Herbicides and Pesticides								
DDE	mg/kg	0.00171	J	ECN1-17	0	1	N/A	Yes
DDT	mg/kg	0.00225		ECN1-17	0	1	N/A	Yes
Polychlorinated Biphenyls (PCBS)								
Aroclor 1254	mg/kg	0.0469	J	ECN1-08	0	1	N/A	Yes
Aroclor 1260	mg/kg	0.0480	J	ECN1-08	0	1	N/A	Yes
Volatile Organic Compounds								
1,1,2,2-Tetrachloroethane	mg/kg	0.00162		ECN1-07	1	4	N/A	Yes
Acetone	mg/kg	0.19200		ECN1-12	1	4	N/A	Yes
Carbon Disulfide	mg/kg	0.01250		ECN1-14	8	10	N/A	Yes
Methyl Ethyl Ketone	mg/kg	0.00693		ECN1-22	0	1	N/A	Yes
Semi-Volatile Organic Compounds								
2-Methylnaphthalene	mg/kg	0.0237	J	ECN1-08	0	1	N/A	Yes
Benzo(g,h,i)perylene	mg/kg	0.0565	J	ECN1-08	1	4	N/A	Yes
Benzo[a]anthracene	mg/kg	0.0985		ECN1-08	1	4	N/A	Yes
Benzo[a]pyrene	mg/kg	0.1030		ECN1-08	1	4	N/A	Yes
Benzo[b]fluoranthene	mg/kg	0.1270		ECN1-08	1	4	N/A	Yes
Benzo[k]fluoranthene	mg/kg	0.0592	J	ECN1-08	1	4	N/A	Yes
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	1.9000		ECN1-13	8	10	N/A	Yes
Chrysene	mg/kg	0.1340		ECN1-08	1	4	N/A	Yes
Dibenz[ah]anthracene	mg/kg	0.0282	J	ECN1-08	1	4	N/A	Yes
Di-n-butyl phthalate	mg/kg	0.1200		ECN1-17	1	4	N/A	Yes
Fluoranthene	mg/kg	0.1030		ECN1-08	1	4	N/A	Yes
Indeno[1,2,3-cd]pyrene	mg/kg	0.0530	J	ECN1-08	1	4	N/A	Yes
Phenanthrene	mg/kg	0.0443	J	ECN1-08	1	4	N/A	Yes
Pyrene	mg/kg	0.0847		ECN1-08	1	4	N/A	Yes

Table Notes:

1 = Max = Maximum Detected Concentration from All Depth Intervals.

2 = *Background Soils Statistical Summary Report for the Savannah River Site*, ERD-EN-2005-0223, Appendix B-2 (All Depth Intervals).

3 = Constituents Identified as an USC if Maximum Detected Concentration is Greater Than 2X SRS Mean Concentration.

J = Estimated Value.

NA = Not Available.

Table A.2.1. Data Summary Table CSSLP Subunit Upland Area Soil (0 to 1 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
2-Methylnaphthalene	mg/kg	18	17	1	1	--	--	0.0087	--	0.016	ND	0.016	CSSLP-8	J	6/26/2019
Acetone	mg/kg	19	14	5	5	X	7	0.0761	0.153	0.579	ND	0.153	CSSLP-15	J	7/1/2019
Aldrin	mg/kg	19	18	1	0	--	--	0.0001	--	0.0008	ND	0.0008	CSSLP-7		6/26/2019
Alpha-Chlordane	mg/kg	19	17	2	2	X	7	0.0001	2.56E-04	0.0005	ND	2.56E-04	CSSLP-8	J	6/26/2019
Aluminum	mg/kg	25	0	25	4	N	1	5653.6	6239	9330	2190	6239	CSSLP-9		6/24/2019
Anthracene	mg/kg	18	17	1	0	--	--	0.0325	--	0.444	ND	0.444	CSSLP-5		6/19/2019
Antimony	mg/kg	25	21	4	4	X	7	0.3027	0.546	1.57	ND	0.546	CSSLP-5	J	6/19/2019
Aroclor 1254	mg/kg	19	11	8	6	G	2	0.0012	0.0027	0.0066	ND	0.0027	CSSLP-5		6/19/2019
Aroclor 1260	mg/kg	19	10	9	7	X	4	0.0021	0.0058	0.0153	ND	0.0058	CSSLP-5		6/19/2019
Arsenic	mg/kg	25	0	25	12	L	3	9.769	16.38	63.1	0.975	16.38	CSSLP-031		10/6/2020
Barium	mg/kg	25	0	25	1	X	4	29.38	52.61	108	5.24	52.61	CSSLP-028		10/7/2020
Benzo[G,H,I]Perylene	mg/kg	18	14	4	2	X	7	0.0154	0.0249	0.0763	ND	0.0249	CSSLP-18		6/26/2019
Benzo[a]anthracene	mg/kg	18	9	9	6	X	7	0.0508	0.157	0.389	ND	0.157	CSSLP-5		6/19/2019
Benzo[a]pyrene	mg/kg	18	11	7	4	X	7	0.0386	0.128	0.344	ND	0.128	CSSLP-5		6/19/2019
Benzo[b]fluoranthene	mg/kg	18	9	9	5	X	7	0.0725	0.218	0.563	ND	0.218	CSSLP-5		6/19/2019
Benzo[k]fluoranthene	mg/kg	18	12	6	4	X	7	0.0299	0.0579	0.226	ND	0.0579	CSSLP-5		6/19/2019
Beryllium	mg/kg	25	1	24	23	X	7	0.1741	0.205	0.524	ND	0.205	CSSLP-18		6/26/2019
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	18	11	7	5	X	7	0.041	0.118	0.29	ND	0.118	CSSLP-5		6/19/2019
Cadmium	mg/kg	25	23	2	2	X	7	0.073	0.142	0.331	ND	0.142	CSSLP-028	J	10/7/2020
Calcium	mg/kg	25	0	25	3	X	4	942.7	1989	5320	241	1989	CSSLP-028		10/7/2020
Carbazole	mg/kg	18	17	1	1	--	--	0.01	--	0.0602	ND	0.0602	CSSLP-5	J	6/19/2019
Chromium	mg/kg	25	0	25	3	G	2	15.1	18.15	32.6	4.91	18.15	CSSLP-5		6/19/2019
Hexavalent Chromium 7196a	mg/kg	12	9	3	0	X	7	0.4117	0.793	0.986	ND	0.793	CSSLP-030		10/7/2020
Chrysene	mg/kg	18	10	8	5	X	7	0.0557	0.18	0.467	ND	0.18	CSSLP-5		6/19/2019
Cobalt	mg/kg	25	1	24	1	N	1	1.115	1.242	4.26	ND	1.242	CSSLP-18		6/26/2019
Copper	mg/kg	25	0	25	1	X	4	12.76	28.09	67.8	2.87	28.09	CSSLP-8		6/26/2019
Cumene (Isopropylbenzene)	mg/kg	19	17	2	2	X	7	0.0032	3.81E-04	0.0005	ND	3.81E-04	CSSLP-13	J	6/24/2019
Cyanide	mg/kg	6	4	2	2	X	7	0.0811	0.159	0.203	ND	0.159	CSSLP-031	J	10/6/2020
DDE	mg/kg	19	15	4	4	X	7	0.0004	5.01E-04	0.0011	ND	5.01E-04	CSSLP-7	J	6/26/2019
DDT	mg/kg	19	17	2	2	X	7	0.0004	4.04E-04	0.0006	ND	4.04E-04	CSSLP-6	J	6/26/2019

Table A.2.1. Data Summary Table CSSLP Subunit Upland Area Soil (0 to 1 ft) *(Continued/End)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Dibenz[ah]anthracene	mg/kg	18	17	1	1	--	--	0.0162	--	0.0222	ND	0.0222	CSSLP-18	J	6/26/2019
Di-n-butyl phthalate	mg/kg	20	10	10	9	X	7	0.0156	0.024	0.0424	ND	0.024	CSSLP-9	J	6/24/2019
Fluoranthene	mg/kg	18	8	10	5	X	7	0.0162	0.3	0.798	ND	0.3	CSSLP-5		6/19/2019
Gamma-Chlordane	mg/kg	19	16	3	2	X	7	0.0002	3.06E-04	0.0008	ND	3.06E-04	CSSLP-6		6/26/2019
Gross Alpha	pCi/g	19	0	19	0	N	1	11.88	13.46	19.1	5.45	13.46	CSSLP-4		6/19/2019
Indeno[1,2,3-cd]pyrene	mg/kg	18	14	4	3	X	7	0.0162	0.0243	0.0756	ND	0.0243	CSSLP-18		6/26/2019
Iron	mg/kg	25	0	25	4	N	1	9458.4	10748	21300	3690	10748	CSSLP-029		10/7/2020
Lead	mg/kg	25	0	25	2	X	4	10.15	19.34	50.3	3.69	19.34	CSSLP-028		10/7/2020
Magnesium	mg/kg	25	0	25	5	L	3	359.9	467.2	2480	94.5	467.2	CSSLP-18		6/26/2019
Manganese	mg/kg	25	0	25	5	G	2	75.64	98.93	264	17.4	98.93	CSSLP-18		6/26/2019
Mercury	mg/kg	25	1	24	6	G	2	0.0207	0.0245	0.0515	ND	0.0245	CSSLP-030		10/7/2020
Methyl Ethyl Ketone	mg/kg	19	17	2	2	--	--	0.016	--	0.0038	ND	0.0515	CSSLP-7	J	6/26/2019
Naphthalene	mg/kg	18	17	1	1	--	--	0.008	--	0.0196	ND	0.0038	CSSLP-8	J	6/26/2019
Nickel	mg/kg	25	0	25	1	X	4	2.941	5.347	13.8	0.623	5.347	CSSLP-18		6/26/2019
Nonvolatile Beta	pCi/g	19	0	19	4	G	2	8.494	9.678	16.5	5.63	9.678	CSSLP-4		6/19/2019
Phenanthrene	mg/kg	18	12	6	3	X	4	0.0376	0.164	0.453	ND	0.164	CSSLP-5		6/19/2019
Potassium	mg/kg	25	0	25	4	X	4	212.97	385.6	722	51.4	385.6	CSSLP-3	J	6/19/2019
Pyrene	mg/kg	18	7	11	6	X	4	0.0648	0.234	0.61	ND	0.234	CSSLP-5		6/19/2019
Selenium	mg/kg	25	17	8	8	X	7	0.8058	1.248	3.13	ND	1.248	CSSLP-2	J	6/24/2019
Silver	mg/kg	25	22	3	3	X	7	0.089	0.156	0.479	ND	0.156	CSSLP-3	J	6/19/2019
Sodium	mg/kg	25	8	17	10	G	2	26.6	48.9	162	ND	48.9	CSSLP-028		10/7/2020
Thallium	mg/kg	25	24	1	1	--	--	0.2832	--	0.681	ND	0.681	CSSLP-032	J	10/6/2020
Vanadium	mg/kg	25	0	25	2	G	2	22.66	26.76	47	9.22	26.76	CSSLP-029		10/7/2020
Zinc	mg/kg	25	0	25	12	L	3	34.15	63.07	162	4.32	63.07	CSSLP-18		6/26/2019

Distribution Code:
N Normal Distribution
L Lognormal Distribution
G Gamma Distribution
X Non-Parametric

UCL Method Code: (as determined by ProUCL)
1 Student's t UCL
2 Approximate Gamma UCL
3 95% H-UCL
4 95% Chebyshev UCL
5 97.5% Chebysev UCL
6 99% Chebyshev UCL
7 Kaplan-Meier (KM) t UCL
8 Hall's Bootstrap UCL

ND = Non-Detect

Table A.2.2. Data Summary Table CSSLP Subunit Upland Area Soil (1 to 4 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
2-Methylnaphthalene	mg/kg	19	18	1	1	X	7	0.0103	0.0114	0.0134	ND	0.0114	CSSLP-15	J	7/1/2019
Acetone	mg/kg	19	13	6	6	X	7	0.0812	0.157	0.521	ND	0.157	CSSLP-15	J	7/1/2019
Aldrin	mg/kg	19	18	1	0	--	--	0.0003	--	0.0032	ND	0.0032	CSSLP-5		6/19/2019
Alpha-Chlordane	mg/kg	19	10	9	5	X	7	0.0009	0.0027	0.0081	ND	0.0027	CSSLP-13		6/24/2019
Aluminum	mg/kg	23	0	23	0	G	2	5417.4	6381	12500	2590	6381	CSSLP-14		6/25/2019
Anthracene	mg/kg	19	17	2	2	X	4	0.0136	0.0438	0.0955	ND	0.0438	CSSLP-4	J	6/19/2019
Antimony	mg/kg	23	14	9	8	X	4	1.354	6.024	23.7	ND	6.024	CSSLP-13		6/24/2019
Aroclor 1254	mg/kg	19	5	14	7	X	5	0.0213	0.0771	0.126	ND	0.0771	CSSLP-15		7/1/2019
Aroclor 1260	mg/kg	19	7	12	3	X	4	0.0122	0.0327	0.0668	ND	0.0327	CSSLP-1		6/26/2019
Arsenic	mg/kg	23	0	23	8	G	2	11.67	18.07	55.2	1.48	18.07	CSSLP-14		6/25/2019
Barium	mg/kg	23	0	23	0	G	2	39.43	52	163	9.12	52	CSSLP-8		6/26/2019
Benzene	mg/kg	19	18	1	1	--	--	0.0032	--	0.0005	ND	0.0005	CSSLP-14	J	6/25/2019
Benzo(g,h,i)perylene	mg/kg	20	11	9	7	X	7	0.0216	0.0288	0.0164	ND	0.0164	CSSLP-14	J	6/25/2019
Benzo[a]anthracene	mg/kg	20	5	15	9	X	7	0.0573	0.139	0.454	ND	0.139	CSSLP-4		6/19/2019
Benzo[a]pyrene	mg/kg	20	8	12	6	L	3	0.0522	0.0869	0.4	ND	0.0869	CSSLP-4		6/19/2019
Benzo[b]fluoranthene	mg/kg	20	6	14	7	X	7	0.0834	0.222	0.719	ND	0.222	CSSLP-4		6/19/2019
Benzo[k]fluoranthene	mg/kg	20	9	11	9	L	3	0.034	0.046	0.269	ND	0.046	CSSLP-4		6/19/2019
Beryllium	mg/kg	23	1	22	22	X	7	0.1797	0.211	0.461	ND	0.211	CSSLP-028	J	10/7/2020
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	19	9	10	8	X	4	0.0943	0.433	1.45	ND	0.433	CSSLP-3	J	6/19/2019
Cadmium	mg/kg	23	19	4	3	X	7	0.1173	0.293	1.18	ND	0.293	CSSLP-18		6/26/2019
Calcium	mg/kg	23	0	23	0	G	2	1183.7	1660	4400	70	1660	CSSLP-14		6/25/2019
Chromium	mg/kg	23	0	23	0	G	2	18.76	22.79	38.1	7.11	22.79	CSSLP-12		6/25/2019
Chrysene	mg/kg	20	8	12	7	L	3	0.0527	0.079	0.474	ND	0.079	CSSLP-4		6/19/2019
Cobalt	mg/kg	23	0	23	1	G	2	1.188	1.448	3.2	0.218	1.448	CSSLP-14		6/25/2019
Copper	mg/kg	23	0	23	0	G	2	17.01	25.02	58.5	2.87	25.02	CSSLP-3		6/19/2019
Cumene (Isopropylbenzene)	mg/kg	19	18	1	0	--	--	0.0034	--	0.0048	ND	0.00477	CSSLP-13		6/24/2019
DDD	mg/kg	19	18	1	1	--	--	0.0002	--	0.0059	ND	0.00591	CSSLP-13	J	6/24/2019
DDE	mg/kg	19	13	6	5	X	7	0.0007	0.0017	0.0054	ND	0.0017	CSSLP-13	J	6/24/2019
DDT	mg/kg	19	18	1	1	--	--	0.0003	--	0.0006	ND	0.0006	CSSLP-17	J	6/25/2019
Dibenz[ah]anthracene	mg/kg	20	17	3	3	X	7	0.0113	0.013	0.0175	ND	0.013	CSSLP-17	J	6/25/2019

Table A.2.2. Data Summary Table CSSLP Subunit Upland Area Soil (1 to 4 ft) *(Continued/End)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Dieldrin	mg/kg	19	16	3	2	X	7	0.0018	0.0043	0.0205	ND	0.0043	CSSLP-5		6/19/2019
Di-n-butyl phthalate	mg/kg	20	10	10	6	X	7	0.0285	0.0388	0.0823	ND	0.0388	CSSLP-5		6/19/2019
Fluoranthene	mg/kg	20	6	14	6	X	4	0.0999	0.31	0.931	ND	0.31	CSSLP-4		6/19/2019
Gamma-Chlordane	mg/kg	19	10	9	6	X	7	0.001	0.0029	0.00872	ND	0.0029	CSSLP-13		6/24/2019
Hexavalent Chromium 7196a	mg/kg	8	6	2	1	X	4	0.2695	0.983	0.698	0.21	0..698	CSSLP-029		10/7/2020
Indeno[1,2,3-cd]pyrene	mg/kg	20	11	9	7	X	7	0.0221	0.0295	0.0591	ND	0.0295	CSSLP-17		6/25/2019
Iron	mg/kg	23	0	23	0	G	2	8550	10019	18300	4200	10019	CSSLP-10		6/24/2019
Lead	mg/kg	23	0	23	1	N	1	13.41	16.11	34.2	5.1	16.11	CSSLP-8		6/26/2019
Lindane	mg/kg	19	18	1	0	--	--	0.0016	--	0.0282	ND	0.0282	CSSLP-13		6/24/2019
Magnesium	mg/kg	23	0	23	0	L	3	356.7	468.8	1470	98.2	468.8	CSSLP-14		6/25/2019
Manganese	mg/kg	23	0	23	0	N	1	74.56	91.89	195	6.27	91.89	CSSLP-14		6/25/2019
Mercury	mg/kg	23	0	23	5	X	4	0.0739	0.24	0.884	0.0105	0.24	CSSLP-18		6/26/2019
Methyl Ethyl Ketone	mg/kg	19	10	9	9	X	7	0.017	0.0033	0.0049	ND	0.0033	CSSLP-6	J	6/26/2019
Methylcyclohexane	mg/kg	19	18	1	1	--	--	0.0032	--	0.0005	ND	0.0005	CSSLP-4	J	6/19/2019
Nickel	mg/kg	23	0	23	0	N	1	4.792	5.994	14.6	1.17	5.994	CSSLP-8		6/26/2019
Phenanthrene	mg/kg	20	10	10	7	X	4	0.0392	0.125	0.373	ND	0.125	CSSLP-4		6/19/2019
Potassium	mg/kg	23	0	23	0	G	2	226.3	291.8	757	47.8	291.9	CSSLP-14		6/25/2019
Pyrene	mg/kg	20	6	14	7	X	7	0.0822	0.226	0.726	ND	0.226	CSSLP-4		6/19/2019
Selenium	mg/kg	23	16	7	7	X	7	0.9362	1.475	3.95	ND	1.475	CSSLP-14	J	6/25/2019
Silver	mg/kg	23	21	2	1	X	7	0.0998	0.188	0.585	ND	0.188	CSSLP-4		6/19/2019
Sodium	mg/kg	23	7	16	7	X	7	42.65	61.7	165	ND	61.7	CSSLP-14		6/25/2019
Thallium	mg/kg	23	22	1	1	--	--	0.2849	--	0.611	ND	0.611	CSSLP-028	J	10/7/2020
Vanadium	mg/kg	23	0	23	0	N	1	19.79	23.64	48.2	8.35	23.64	CSSLP-11		6/25/2019
Zinc	mg/kg	23	0	23	1	G	2	55.19	77.48	180	4.19	77.48	CSSLP-16		7/1/2019
Radionuclides															
Gross Alpha	pCi/g	19	0	19	0	N	1	11.89	13.75	23.7	5.13	13.75	CSSLP-19		7/1/2019
Nonvolatile Beta	pCi/g	19	0	19	4	X	7	5.603	8.235	13.1	4.52	8.235	CSSLP-18		6/26/2019
Thorium-228	mg/kg	1	0	1	1	--	--	1.56	--	1.56	--	1.56	CSSLP-19	J	7/1/2019
Thorium-230	mg/kg	1	0	1	1	--	--	1.12	--	1.12	--	1.12	CSSLP-19	J	7/1/2019
Thorium-232	mg/kg	1	0	1	1	--	--	1.23	--	1.23	--	1.23	CSSLP-19	J	7/1/2019

Distribution Code:
N Normal Distribution
L Lognormal Distribution
G Gamma Distribution
X Non-Parametric

UCL Method Code: (as determined by ProUCL)
1 Student's t UCL
2 Approximate Gamma UCL
3 95% H-UCL
4 95% Chebyshev UCL
5 97.5% Chebysev UCL
6 99% Chebyshev UCL
7 Kaplan-Meier (KM) t UCL
8 Hall's Bootstrap UCL

ND = Non-Detect

Table A.2.3. Data Summary Table CSSLP Subunit Upland Area Soil (All Depths)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
1,2,3-Trichlorobenzene	mg/kg	57	56	1	1	0.0025	0.0004	ND	CSSLP-2	J	9/3/2019
2-Methylnaphthalene	mg/kg	57	52	5	4	0.0094	0.0518	ND	CSSLP-15		9/4/2019
Acenaphthene	mg/kg	57	54	3	2	0.0106	0.129	ND	CSSLP-15		9/4/2019
Acetone	mg/kg	57	34	23	17	0.0719	0.579	ND	CSSLP-15	J	7/1/2019
Aldrin	mg/kg	57	55	2	0	0.0002	0.0032	ND	CSSLP-5		6/19/2019
Alpha-Chlordane	mg/kg	57	45	12	7	0.0004	0.0081	ND	CSSLP-13		6/24/2019
Aluminum	mg/kg	75	0	75	6	7251.3	21200	2190	CSSLP-8		9/4/2019
Anthracene	mg/kg	57	52	5	3	0.0221	0.444	ND	CSSLP-5		6/19/2019
Antimony	mg/kg	75	59	16	15	0.6616	23.7	ND	CSSLP-13		6/24/2019
Aroclor 1248	mg/kg	57	56	1	0	0.0051	0.23	ND	CSSLP-5		9/3/2019
Aroclor 1254	mg/kg	57	31	26	14	0.0168	0.428	ND	CSSLP-5		9/3/2019
Aroclor 1260	mg/kg	57	33	24	10	0.0079	0.101	ND	CSSLP-5		9/3/2019
Arsenic	mg/kg	75	0	75	34	8.362	63.1	0.841	CSSLP-031		10/6/2020
Barium	mg/kg	75	0	75	5	29.17	191	2.71	CSSLP-030	J	10/7/2020
Benzene	mg/kg	57	56	1	1	0.0025	0.000467	ND	CSSLP-14	J	6/25/2019
Benzo(g,h,i)perylene	mg/kg	58	40	18	12	0.0175	0.084	ND	CSSLP-15		9/4/2019
Benzo[a]anthracene	mg/kg	58	27	31	19	0.0508	0.474	ND	CSSLP-15		9/4/2019
Benzo[a]pyrene	mg/kg	58	33	25	13	0.0389	0.4	ND	CSSLP-4		6/19/2019
Benzo[b]fluoranthene	mg/kg	58	28	30	16	0.0665	0.719	ND	CSSLP-4		6/19/2019
Benzo[k]fluoranthene	mg/kg	58	37	21	15	0.0264	0.268	ND	CSSLP-4		6/19/2019
Beryllium	mg/kg	75	14	61	60	0.1561	0.524	ND	CSSLP-18		6/26/2019
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	57	32	25	18	0.0528	1.45	ND	CSSLP-3	J	6/19/2019
Cadmium	mg/kg	75	57	18	16	0.128	2.08	ND	CSSLP-4		9/3/2019
Calcium	mg/kg	75	0	75	7	1087.7	12100	18.2	CSSLP-030		10/7/2020
Carbazole	mg/kg	57	55	2	1	0.0101	0.0893	ND	CSSLP-15		9/4/2019
Chloroethane (Ethyl Chloride)	mg/kg	57	56	1	0	0.0026	0.00269	ND	CSSLP-7		9/4/2019
Chloroethene (Vinyl Chloride)	mg/kg	57	56	1	1	0.0025	0.000422	ND	CSSLP-6	J	9/4/2019
Chloromethane (Methyl Chloride)	mg/kg	57	54	3	3	0.0026	0.000867	ND	CSSLP-5	J	9/3/2019
Chromium	mg/kg	75	0	75	5	15.7	66.6	2.35	CSSLP-4		9/3/2019
Chrysene	mg/kg	58	31	27	16	0.0506	0.474	ND	CSSLP-4		6/19/2019

Table A.2.3. Data Summary Table CSSLP Subunit Upland Area Soil (All Depths) *(Continued)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Cobalt	mg/kg	75	1	74	3	1.289	4.26	ND	CSSLP-18		6/26/2019
Copper	mg/kg	75	0	75	5	13.4	119	1.08	CSSLP-030	J	10/7/2020
Cumene (Isopropylbenzene)	mg/kg	57	53	4	2	0.0114	0.524	ND	CSSLP-4		9/3/2019
Cyanide	mg/kg	18	16	2	2	0.0554	0.203	ND	CSSLP-031	J	10/6/2020
Cyclohexane	mg/kg	57	54	3	1	0.0027	0.0045	ND	CSSLP-9		9/4/2019
DDD	mg/kg	57	56	1	1	0.0004	0.00591	ND	CSSLP-13	J	6/24/2019
DDE	mg/kg	57	47	10	9	0.0005	0.00543	ND	CSSLP-13	J	6/24/2019
DDT	mg/kg	57	54	3	3	0.0003	0.000611	ND	CSSLP-17	J	6/25/2019
Dibenz[ah]anthracene	mg/kg	58	52	6	6	0.0095	0.0274	ND	CSSLP-15	J	9/4/2019
Dibenzofuran	mg/kg	57	56	1	1	0.0807	0.126	ND	CSSLP-15	J	9/4/2019
Dichloromethane (Methylene Chloride)	mg/kg	57	54	3	1	0.0132	0.0123	ND	CSSLP-3		9/3/2019
Dieldrin	mg/kg	57	54	3	2	0.0008	0.0205	ND	CSSLP-5		6/19/2019
Di-n-butyl phthalate	mg/kg	60	32	28	22	0.0212	0.0823	ND	CSSLP-5		6/19/2019
Ethylbenzene	mg/kg	57	55	2	1	0.0139	0.669	ND	CSSLP-4		9/3/2019
Fluoranthene	mg/kg	58	27	31	14	0.0112	1.76	ND	CSSLP-15		9/4/2019
Fluorene	mg/kg	57	53	4	3	0.0115	0.181	ND	CSSLP-15		9/4/2019
Gamma-Chlordane	mg/kg	57	44	13	8	0.0005	0.00872	ND	CSSLP-13		6/24/2019
Hexavalent Chromium 7196a	mg/kg	18	12	6	1	0.2446	0.986	0.21	CSSLP-030		10/7/2020
Indeno[1,2,3-cd]pyrene	mg/kg	58	40	18	13	0.0183	0.0756	ND	CSSLP-18		6/26/2019
Iron	mg/kg	75	0	75	6	10373.7	56900	1870	CSSLP-19		9/5/2019
Lead	mg/kg	75	0	75	5	18.48	241	2.38	CSSLP-7		9/4/2019
Lindane	mg/kg	57	56	1	0	0.0006	0.0282	ND	CSSLP-13		6/24/2019
M,P-Xylene	mg/kg	57	56	1	1	0.0069	0.147	ND	CSSLP-4	J	9/3/2019
Magnesium	mg/kg	75	0	75	6	364.3	2480	63.6	CSSLP-18		6/26/2019
Manganese	mg/kg	75	0	75	8	56.14	264	0.863	CSSLP-18		6/26/2019
Mercury	mg/kg	75	22	53	13	0.0343	0.884	ND	CSSLP-18		6/26/2019
Methyl Acetate	mg/kg	57	54	3	0	0.0227	0.214	ND	CSSLP-9		9/4/2019
Methyl Ethyl Ketone	mg/kg	57	38	19	17	0.0147	0.0259	ND	CSSLP-5		9/3/2019
Methyl Tertiary Butyl Ether (MTBE)	mg/kg	57	53	4	1	0.0027	0.00459	ND	CSSLP-3		9/3/2019
Methylcyclohexane	mg/kg	57	54	3	2	0.0026	0.00217	ND	CSSLP-3		9/3/2019

Table A.2.3. Data Summary Table CSSLP Subunit Upland Area Soil (All Depths) *(Continued/End)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Naphthalene	mg/kg	56	52	4	3	0.0094	0.0773	ND	CSSLP-15		9/4/2019
Nickel	mg/kg	75	0	75	2	4.763	108	0.577	CSSLP-030	J	10/7/2020
O-Xylene	mg/kg	57	55	2	1	0.0052	0.175	ND	CSSLP-4		9/3/2019
Pentachlorophenol	mg/kg	57	56	1	1	0.0822	0.209	ND	CSSLP-4	J	9/3/2019
Phenanthrene	mg/kg	58	36	22	12	0.0574	1.52	ND	CSSLP-15		9/4/2019
Potassium	mg/kg	75	0	75	5	201.9	757	41.9	CSSLP-14		6/25/2019
Pyrene	mg/kg	58	26	32	16	0.0764	1.11	ND	CSSLP-15		9/4/2019
Selenium	mg/kg	75	57	18	18	0.6706	3.95	ND	CSSLP-14	J	6/25/2019
Silver	mg/kg	75	69	6	5	0.123	0.585	ND	CSSLP-4		6/19/2019
Sodium	mg/kg	75	29	46	24	27.83	165	ND	CSSLP-14		6/25/2019
Thallium	mg/kg	75	69	6	6	0.3118	1.08	ND	CSSLP-19	J	9/5/2019
Vanadium	mg/kg	75	0	75	4	24.68	141	3.97	CSSLP-19		9/5/2019
Zinc	mg/kg	75	0	75	34	38.7	242	2.56	CSSLP-4		9/3/2019
Radionuclides											
Gross Alpha	pCi/g	57	0	57	0	11.78	23.7	5.11	CSSLP-19		7/1/2019
Nonvolatile Beta	pCi/g	57	0	57	8	8.526	16.5	4.52	CSSLP-4		6/19/2019
Thorium-228	mg/kg	1	0	1	1	1.56	1.56	--	CSSLP-19	J	7/1/2019
Thorium-230	mg/kg	1	0	1	1	1.12	1.12	--	CSSLP-19	J	7/1/2019
Thorium-232	mg/kg	1	0	1	1	1.23	1.23	--	CSSLP-19	J	7/1/2019

ND = Nondetect

This page was intentionally left blank.

Table A.2.4. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Sediment/Soil (0 to 1 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Acetone	mg/kg	4	1	3	0	X	7	0.0321	0.0707	0.06	ND	0.06	CSSLP-20-SED		10/12/2020
Aluminum	mg/kg	4	0	4	0	N	1	7760	9296	8960	5970	8960	CSSLP-21-SED		10/12/2020
Arsenic	mg/kg	4	0	4	0	N	1	5.94	8.27	8.59	4.12	8.27	CSSLP-20-SED		10/12/2020
Barium	mg/kg	4	0	4	0	N	1	19.3	31.51	33.4	11.4	31.51	CSSLP-22-SED		10/13/2020
Benzo[a]anthracene	mg/kg	4	4	1	1	--	--	0.0117	--	0.0121	ND	0.0121	CSSLP-21-SED	J	10/12/2020
Benzo[b]fluoranthene	mg/kg	4	4	1	1	--	--	0.012	--	0.0133	ND	0.0133	CSSLP-21-SED	J	10/12/2020
Beryllium	mg/kg	4	2	2	2	X	7	0.1148	0.191	0.183	ND	0.183	CSSLP-22-SED	J	10/13/2020
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	4	4	1	1	--	--	0.0141	--	0.0216	ND	0.0216	CSSLP-22-SED	J	10/13/2020
Calcium	mg/kg	4	0	4	0	N	1	344.8	524.3	568	223	524.3	CSSLP-22-SED		10/13/2020
Chromium	mg/kg	4	0	4	0	N	1	11.78	15.7	15	8.66	15	CSSLP-21-SED		10/12/2020
Cobalt	mg/kg	4	0	4	1	N	1	0.6508	0.784	0.778	0.52	0.778	CSSLP-23-SED		10/12/2020
Copper	mg/kg	4	0	4	0	N	1	3.633	4.082	4.13	3.29	4.082	CSSLP-20-SED		10/12/2020
Dimethyl Phthalate	mg/kg	4	4	1	1	--	--	0.0134	--	0.0189	ND	0.0189	CSSLP-22-SED	J	10/13/2020
Gross Alpha	pCi/g	4	0	4	0	N	1	14.38	16.07	15.8	12.9	15.8	CSSLP-23-SED		10/12/2020
Hexavalent Chromium 7196a	mg/kg	4	3	1	1	--	--	0.4071	--	1.36	ND	1.36	CSSLP-22-SED	J	10/13/2020
Iron	mg/kg	4	0	4	0	N	1	10920	14642	14400	8220	14400	CSSLP-21-SED		10/12/2020
Lead	mg/kg	4	0	4	0	N	1	7.548	8.57	8.33	6.5	8.33	CSSLP-21-SED		10/12/2020
Magnesium	mg/kg	4	0	4	0	N	1	190.8	207.7	211	180	207.7	CSSLP-20-SED		10/12/2020
Manganese	mg/kg	4	0	4	0	N	1	50.55	89	81	21.3	81	CSSLP-22-SED		10/13/2020
Mercury	mg/kg	4	0	4	3	N	1	0.0198	0.0254	0.0266	0.0159	0.0254	CSSLP-21-SED		10/12/2020
Methyl Ethyl Ketone	mg/kg	4	2	2	1	X	7	0.0036	0.0084	0.0083	ND	0.0083	CSSLP-20-SED		10/12/2020
Nickel	mg/kg	4	0	4	0	N	1	1.953	2.165	2.18	1.74	2.165	CSSLP-21-SED		10/12/2020
Nonvolatile Beta	pCi/g	4	0	4	1	N	1	9.365	10.79	11.1	8.3	10.79	CSSLP-20-SED		10/12/2020
Potassium	mg/kg	4	0	4	0	N	1	143.5	191	200	113	191	CSSLP-20-SED		10/12/2020
Sodium	mg/kg	4	3	1	1	--	--	5.649	--	10.6	ND	10.6	CSSLP-22-SED	J	10/13/2020
Thallium	mg/kg	4	3	1	1	--	--	0.3689	--	0.619	ND	0.619	CSSLP-22-SED	J	10/13/2020
Toluene	mg/kg	4	2	2	1	X	5	0.0004	0.0083	0.004	ND	0.004	CSSLP-20-SED		10/12/2020
Vanadium	mg/kg	4	0	4	0	N	1	29.8	41.55	39.2	20.2	39.2	CSSLP-21-SED		10/12/2020
Zinc	mg/kg	4	0	4	4	N	1	7.72	9.591	8.81	5.44	8.81	CSSLP-20-SED	J	10/12/2020

Table A.2.4. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Sediment/Soil (0 to 1 ft)
(Continued/End)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Radionuclides															
Thorium-228	mg/kg	2	0	2	0	--	--	3.605	--	4.16	3.05	4.16	CSSLP-20-SED		10/12/2020
Thorium-230	mg/kg	2	0	2	1	--	--	1.33	--	1.44	1.22	1.44	CSSLP-23-SED		10/12/2020
Thorium-232	mg/kg	2	0	2	0	--	--	2.865	--	3.31	2.42	3.31	CSSLP-23-SED		10/12/2020
Uranium-233/234	mg/kg	2	0	2	0	--	--	1.034	--	1.27	0.797	1.27	CSSLP-20-SED		10/12/2020
Uranium-238	mg/kg	2	0	2	1	--	--	0.824	--	1.07	0.578	1.07	CSSLP-20-SED		10/12/2020

Distribution Code:
N Normal Distribution
L Lognormal Distribution
G Gamma Distribution
X Non-Parametric

UCL Method Code: (as determined by ProUCL)
1 Student's t UCL
2 Approximate Gamma UCL
3 95% H-UCL
4 95% Chebyshev UCL
5 97.5% Chebysev UCL
6 99% Chebyshev UCL
7 Kaplan-Meier (KM) t UCL
8 Hall's Bootstrap UCL

ND = Non-Detect

Table A.2.5. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Sediment/Soil (1 to 4 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Acetone	mg/kg	4	0	4	2	N	1	0.0203	0.04	0.0419	0.0021	0.04	CSSLP-21-SED		10/12/2020
Aluminum	mg/kg	4	0	4	0	N	1	9090	11234	10900	6660	10900	CSSLP-23-SED		10/12/2020
Anthracene	mg/kg	4	3	1	1	--	--	0.0078	--	0.0131	ND	0.0131	CSSLP-22-SED	J	10/13/2020
Antimony	mg/kg	4	3	1	1	--	--	0.6355	--	1.95	ND	1.95	CSSLP-22-SED	J	10/13/2020
Arsenic	mg/kg	4	0	4	1	N	1	12.42	18.28	18.4	7.81	18.28	CSSLP-20-SED	J	10/12/2020
Barium	mg/kg	4	0	4	0	N	1	16.45	24.86	26	8.7	24.86	CSSLP-22-SED		10/13/2020
Benzo[a]anthracene	mg/kg	4	3	1	0	--	--	0.0151	--	0.0424	ND	0.0424	CSSLP-22-SED		10/13/2020
Benzo[a]pyrene	mg/kg	4	3	1	1	--	--	0.0108	--	0.0253	ND	0.0253	CSSLP-22-SED	J	10/13/2020
Benzo[b]fluoranthene	mg/kg	4	3	1	1	--	--	0.0139	--	0.0375	ND	0.0375	CSSLP-22-SED	J	10/13/2020
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	4	3	1	0	--	--	0.0199	--	0.0616	ND	0.0616	CSSLP-22-SED		10/13/2020
Calcium	mg/kg	4	0	4	1	N	1	507.8	1070	1210	141	1070	CSSLP-22-SED	J	10/13/2020
Chromium	mg/kg	4	0	4	0	N	1	18.6	21.52	22.3	17.1	21.52	CSSLP-23-SED		10/12/2020
Hexavalent Chromium 7196a	mg/kg	4	2	2	2	X	4	0.4425	1.676	1.2	0.385	1.2	CSSLP-22-SED	J	10/13/2020
Hexavalent Chromium 7199	mg/kg	4	3	1	0	--	--	0.4413	--	1.4	ND	1.4	CSSLP-23-SED		10/12/2020
Chrysene	mg/kg	4	3	1	1	--	--	0.0131	--	0.0343	ND	0.0343	CSSLP-22-SED	J	10/13/2020
Cobalt	mg/kg	4	0	4	1	N	1	0.5713	0.699	0.657	0.412	0.657	CSSLP-22-SED		10/13/2020
Copper	mg/kg	4	0	4	0	N	1	7.343	14.27	15.9	3.28	14.27	CSSLP-22-SED		10/13/2020
Fluoranthene	mg/kg	4	2	2	1	X	5	0.0376	0.259	0.126	ND	0.126	CSSLP-22-SED		10/13/2020
Iron	mg/kg	4	0	4	0	N	1	16635	22997	20300	8640	20300	CSSLP-23-SED		10/12/2020
Lead	mg/kg	4	0	4	0	N	1	7.88	9.447	9.62	6.47	9.447	CSSLP-22-SED		10/13/2020
Magnesium	mg/kg	4	0	4	1	N	1	206	281	254	112	254	CSSLP-20-SED	J	10/12/2020
Manganese	mg/kg	4	0	4	1	N	1	40.4	69.5	71.4	10.9	69.5	CSSLP-22-SED	J	10/13/2020
Mercury	mg/kg	4	0	4	3	N	1	0.0275	0.0467	0.0513	0.0152	0.0467	CSSLP-23-SED		10/12/2020
Methyl Ethyl Ketone	mg/kg	4	2	2	2	X	7	0.0027	0.0055	0.00475	ND	0.0048	CSSLP-21-SED	J	10/12/2020
Nickel	mg/kg	4	0	4	0	N	1	2.688	3.529	3.53	2.04	3.529	CSSLP-22-SED		10/13/2020
Phenanthrene	mg/kg	4	3	1	0	--	--	0.0172	--	0.051	ND	0.051	CSSLP-22-SED		10/13/2020
Potassium	mg/kg	4	0	4	1	N	1	196.9	299.7	274	71.4	274	CSSLP-22-SED		10/13/2020
Pyrene	mg/kg	4	3	1	0	--	--	0.0261	--	0.0865	ND	0.0865	CSSLP-22-SED		10/13/2020
Selenium	mg/kg	4	3	1	1	--	--	0.7166	--	0.754	ND	0.754	CSSLP-22-SED	J	10/13/2020
Sodium	mg/kg	4	3	1	0	--	--	21.29	--	72.6	ND	72.6	CSSLP-22-SED		10/13/2020

Table A.2.5. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Sediment/Soil (1 to 4 ft)
(Continued/End)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Toluene	mg/kg	4	3	1	1	--	--	0.0003	--	0.00047	ND	0.0005	CSSLP-20-SED	J	10/12/2020
Vanadium	mg/kg	4	0	4	0	N	1	41.25	59.13	50.1	18.5	50.1	CSSLP-20-SED		10/12/2020
Zinc	mg/kg	4	0	4	3	N	1	20.27	46.87	53.3	2.88	46.87	CSSLP-22-SED		10/13/2020
Radionuclides															
Gross Alpha	pCi/g	4	0	4	1	N	1	15.13	21.23	21.8	10.1	21.23	CSSLP-21-SED		10/12/2020
Nonvolatile Beta	pCi/g	4	0	4	1	N	1	9.27	13.01	13.2	5.62	13.01	CSSLP-22-SED		10/13/2020
Thorium-228	mg/kg	2	0	2	0	--	--	1.83	--	2.09	1.57	2.09	CSSLP-21-SED		10/12/2020
Thorium-230	mg/kg	2	0	2	2	--	--	0.986	--	1.23	0.742	1.23	CSSLP-21-SED	J	10/12/2020
Thorium-232	mg/kg	2	0	2	0	--	--	1.53	--	1.81	1.25	1.81	CSSLP-21-SED		10/12/2020
Uranium-233/234	mg/kg	2	0	2	0	--	--	0.8865	--	1.14	0.633	1.14	CSSLP-21-SED		10/12/2020
Uranium-238	mg/kg	2	0	2	0	--	--	1.007	--	1.19	0.824	1.19	CSSLP-21-SED		10/12/2020

Distribution Code:
N Normal Distribution
L Lognormal Distribution
G Gamma Distribution
X Non-Parametric

UCL Method Code: (as determined by ProUCL)
1 Student's t UCL
2 Approximate Gamma UCL
3 95% H-UCL
4 95% Chebyshev UCL
5 97.5% Chebysev UCL
6 99% Chebyshev UCL
7 Kaplan-Meier (KM) t UCL
8 Hall's Bootstrap UCL

ND = Non-Detect

Table A.2.6. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Sediment/Soil (All Depths)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Acetone	mg/kg	8	1	7	2	0.0262	0.06	ND	CSSLP-20-SED		10/12/2020
Aluminum	mg/kg	8	0	8	0	8425	10900	5970	CSSLP-23-SED		10/12/2020
Anthracene	mg/kg	8	7	1	1	0.009	0.0131	ND	CSSLP-22-SED	J	10/13/2020
Antimony	mg/kg	8	7	1	1	0.4113	1.95	ND	CSSLP-22-SED	J	10/13/2020
Arsenic	mg/kg	8	0	8	1	9.178	18.4	4.12	CSSLP-20-SED	J	10/12/2020
Barium	mg/kg	8	0	8	0	17.88	33.4	8.7	CSSLP-22-SED		10/13/2020
Benzo[a]anthracene	mg/kg	8	7	2	1	0.0134	0.0424	ND	CSSLP-22-SED		10/13/2020
Benzo[a]pyrene	mg/kg	8	7	1	1	0.0105	0.0253	ND	CSSLP-22-SED	J	10/13/2020
Benzo[b]fluoranthene	mg/kg	8	7	2	2	0.013	0.0375	ND	CSSLP-22-SED	J	10/13/2020
Beryllium	mg/kg	8	6	2	2	0.0868	0.183	ND	CSSLP-22-SED	J	10/13/2020
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	8	7	2	1	0.017	0.0616	ND	CSSLP-22-SED		10/13/2020
Calcium	mg/kg	8	0	8	1	426.3	1210	141	CSSLP-22-SED	J	10/13/2020
Chromium	mg/kg	8	0	8	0	15.19	22.3	8.66	CSSLP-23-SED		10/12/2020
Hexavalent Chomium 7196a	mg/kg	8	5	3	3	0.4248	1.36	ND	CSSLP-22-SED	J	10/13/2020
Chrysene	mg/kg	8	7	1	1	0.0116	0.0343	ND	CSSLP-22-SED	J	10/13/2020
Cobalt	mg/kg	8	0	8	2	0.611	0.778	0.412	CSSLP-23-SED		10/12/2020
Copper	mg/kg	8	0	8	0	5.488	15.9	3.28	CSSLP-22-SED		10/13/2020
Dimethyl Phthalate	mg/kg	8	7	1	1	0.0097	0.0189	ND	CSSLP-22-SED	J	10/13/2020
Fluoranthene	mg/kg	8	7	2	1	0.0239	0.126	0.0114	CSSLP-21-SED	J	10/12/2020
Iron	mg/kg	8	0	8	0	13777.5	20300	8220	CSSLP-23-SED		10/12/2020
Lead	mg/kg	8	0	8	0	7.714	9.62	6.47	CSSLP-22-SED		10/13/2020
Magnesium	mg/kg	8	0	8	1	198.4	254	112	CSSLP-20-SED	J	10/12/2020
Manganese	mg/kg	8	0	8	1	45.48	81	10.9	CSSLP-22-SED		10/13/2020
Mercury	mg/kg	8	0	8	6	0.0236	0.0513	0.0152	CSSLP-23-SED		10/12/2020
Methyl Ethyl Ketone	mg/kg	8	4	4	3	0.0031	0.0083	ND	CSSLP-20-SED		10/12/2020
Nickel	mg/kg	8	0	8	0	2.32	3.53	1.74	CSSLP-22-SED		10/13/2020
Phenanthrene	mg/kg	8	7	1	0	0.0137	0.051	ND	CSSLP-22-SED		10/13/2020
Potassium	mg/kg	8	0	8	1	170.2	274	71.4	CSSLP-22-SED		10/13/2020
Pyrene	mg/kg	8	7	1	0	0.0181	0.0865	ND	CSSLP-22-SED		10/13/2020
Selenium	mg/kg	8	7	1	1	0.5001	0.754	ND	CSSLP-22-SED	J	10/13/2020
Sodium	mg/kg	8	6	2	1	13.47	72.6	ND	CSSLP-22-SED		10/13/2020

Table A.2.6. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Sediment/Soil (All Depths)
(Continued/End)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Thallium	mg/kg	8	7	1	1	0.3316	0.619	ND	CSSLP-22-SED	J	10/13/2020
Toluene	mg/kg	8	5	3	2	0.0007	0.004	ND	CSSLP-20-SED		10/12/2020
Vanadium	mg/kg	8	0	8	0	35.53	50.1	18.5	CSSLP-20-SED		10/12/2020
Zinc	mg/kg	8	0	8	7	14	53.3	2.88	CSSLP-22-SED		10/13/2020
Radionuclides											
Gross Alpha	pCi/g	8	0	8	1	14.75	21.8	10.1	CSSLP-21-SED		10/12/2020
Nonvolatile Beta	pCi/g	8	0	8	2	9.318	13.2	5.62	CSSLP-22-SED		10/13/2020
Thorium-228	pCi/g	4	0	4	0	2.718	4.16	1.57	CSSLP-20-SED		10/12/2020
Thorium-230	pCi/g	4	0	4	3	1.158	1.44	0.742	CSSLP-23-SED		10/12/2020
Thorium-232	pCi/g	4	0	4	0	2.198	3.31	1.25	CSSLP-23-SED		10/12/2020
Uranium-233/234	pCi/g	4	0	4	0	0.96	1.27	0.633	CSSLP-20-SED		10/12/2020
Uranium-238	pCi/g	4	0	4	1	0.9155	1.19	0.578	CSSLP-21-SED		10/12/2020

ND = Nondetect

Table A.2.7. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Surface Water (Unfiltered)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Acetone	µg/L	3	0	3	0	N	1	15.1	18.42	16.7	12.9	16.7	CSSLP-23		9/21/2020
Aluminum	µg/L	3	0	3	0	N	1	369.7	443.6	403	320	403	CSSLP-23		9/21/2020
Antimony	µg/L	3	2	1	1	--	--	2.36	--	3.58	ND	3.58	CSSLP-20	J	9/21/2020
Arsenic	µg/L	3	0	3	3	N	1	17.3	27.07	23.3	11.8	23.3	CSSLP-20	J	9/21/2020
Barium	µg/L	3	0	3	0	N	1	18.77	21.34	20.1	17.1	20.1	CSSLP-20		9/21/2020
Calcium	µg/L	3	0	3	0	N	1	5990	8303	6960	4220	6960	CSSLP-21		9/21/2020
Chromium	µg/L	3	0	3	3	N	1	3.39	3.788	3.65	3.19	3.65	CSSLP-21	J	9/21/2020
Copper	µg/L	3	0	3	1	N	1	27.93	41.12	32.6	18.9	32.6	CSSLP-20		9/21/2020
Iron	µg/L	3	0	3	0	N	1	2143	2911	2660	1800	2660	CSSLP-23		9/21/2020
Lead	µg/L	3	2	1	1	--	--	2.6	--	4.5	ND	4.5	CSSLP-20	J	9/21/2020
Magnesium	µg/L	3	0	3	0	N	1	1560	2297	1870	1060	1870	CSSLP-21		9/21/2020
Manganese	µg/L	3	0	3	0	N	1	251.7	468.3	400	174	400	CSSLP-23		9/21/2020
Potassium	µg/L	3	0	3	0	N	1	4747	6446	5440	3590	5440	CSSLP-21		9/21/2020
Sodium	µg/L	3	0	3	0	N	1	925.7	1049	986	844	986	CSSLP-23		9/21/2020
Vanadium	µg/L	3	0	3	1	N	1	5.393	7.099	6.13	4.24	6.13	CSSLP-21		9/21/2020
Zinc	µg/L	3	0	3	0	N	1	39.53	42.75	41.7	38.1	41.7	CSSLP-20		9/21/2020
Radionuclides															
Gross Alpha	pCi/L	3	0	3	3	N	1	1.27	1.679	1.47	1	1.47	CSSLP-20	J	9/21/2020
Nonvolatile Beta	pCi/L	3	0	3	0	N	1	4.883	6.011	5.65	4.42	5.65	CSSLP-20		9/21/2020

Distribution Code:
N Normal Distribution
L Lognormal Distribution
G Gamma Distribution
X Non-Parametric

UCL Method Code: (as determined by ProUCL)
1 Student's t UCL
2 Approximate Gamma UCL
3 95% H-UCL
4 95% Chebyshev UCL
5 97.5% Chebysev UCL
6 99% Chebyshev UCL
7 Kaplan-Meier (KM) t UCL
8 Hall's Bootstrap UCL

ND = Non-Detect

Table A.2.8. Data Summary Table CSSLP Subunit Surface Water Impoundment Area Surface Water (Filtered)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Aluminum	µg/L	3	0	3	0	N	1	364	425.3	395	324	395	CSSLP-21		9/21/2020
Arsenic	µg/L	3	0	3	3	N	1	15.49	26.98	20.2	7.68	20.2	CSSLP-20	J	9/21/2020
Barium	µg/L	3	0	3	0	N	1	17.1	22.74	19.6	13.3	19.6	CSSLP-20		9/21/2020
Calcium	µg/L	3	0	3	0	N	1	5870	8239	6760	4250	6760	CSSLP-21		9/21/2020
Chromium	µg/L	3	0	3	3	N	1	4.17	5.222	4.89	3.79	4.89	CSSLP-21	J	9/21/2020
Hexavalent Chromium 7196A	µg/L	3	2	1	1	--	--	2.403	--	4.21	ND	4.21	CSSLP-21	J	9/12/2020
Copper	µg/L	3	0	3	1	N	1	28.8	48.7	39.6	16.2	39.6	CSSLP-20		9/21/2020
Iron	µg/L	3	0	3	0	N	1	1957	2301	2190	1810	2190	CSSLP-23		9/21/2020
Lead	µg/L	3	2	1	1	--	--	2.903	--	5.41	ND	5.41	CSSLP-20	J	9/21/2020
Magnesium	µg/L	3	0	3	0	N	1	1557	2225	1810	1100	1810	CSSLP-21		9/21/2020
Manganese	µg/L	3	0	3	0	N	1	212.7	323.5	288	167	288	CSSLP-23		9/21/2020
Potassium	µg/L	3	0	3	0	N	1	4640	6219	5230	3560	5230	CSSLP-21		9/21/2020
Sodium	µg/L	3	0	3	0	N	1	1336	2209	1930	979	1930	CSSLP-23		9/21/2020
Vanadium	µg/L	3	0	3	1	N	1	4.927	7.084	5.87	4.24	5.87	CSSLP-20		9/21/2020
Zinc	µg/L	3	0	3	3	N	1	35.87	48.96	40.6	26.9	40.6	CSSLP-20		9/21/2020

ND = Nondetect

Table A.2.9. Data Summary Table Background CSSLP Subunit Upland Area Soil (0 to 1 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Aluminum	mg/kg	3	0	3	0	2383.3	2690	2200	CSSLP-026-BKG		10/5/2020
Antimony	mg/kg	3	1	2	2	0.3858	0.519	ND	CSSLP-024-BKG	J	10/5/2020
Arsenic	mg/kg	3	2	1	1	0.504	1	ND	CSSLP-025-BKG	J	10/5/2020
Barium	mg/kg	3	0	3	0	15.9	22.8	11.5	CSSLP-026-BKG		10/5/2020
Beryllium	mg/kg	3	2	1	1	0.0691	0.105	ND	CSSLP-025-BKG	J	10/5/2020
Calcium	mg/kg	3	0	3	0	73.13	93.1	46.4	CSSLP-026-BKG		10/5/2020
Chromium	mg/kg	3	0	3	0	2.763	3.28	2.36	CSSLP-024-BKG		10/5/2020
Copper	mg/kg	3	0	3	3	0.9703	15.8	2.89	CSSLP-024-BKG	J	10/5/2020
Cyanide	mg/kg	3	1	2	2	0.0699	0.0945	ND	CSSLP-024-BKG	J	10/5/2020
Iron	mg/kg	3	0	3	0	1916.7	2000	1770	CSSLP-026-BKG		10/5/2020
Lead	mg/kg	3	0	3	3	3.91	4.52	3.51	CSSLP-024-BKG	J	10/5/2020
Magnesium	mg/kg	3	0	3	0	49.73	56.8	39.2	CSSLP-026-BKG		10/5/2020
Manganese	mg/kg	3	0	3	0	69.57	97	23.5	CSSLP-026-BKG		10/5/2020
Mercury	mg/kg	3	1	2	1	0.0208	0.0196	ND	CSSLP-024-BKG		10/5/2020
Nickel	mg/kg	3	0	3	0	0.6337	0.746	0.574	CSSLP-024-BKG		10/5/2020
Potassium	mg/kg	3	0	3	0	38.73	42.9	33.8	CSSLP-025-BKG		10/5/2020
Vanadium	mg/kg	3	0	3	0	4.623	5	4.15	CSSLP-026-BKG		10/5/2020
Zinc	mg/kg	3	0	3	3	2.563	2.74	2.43	CSSLP-024-BKG	J	10/5/2020

ND = Nondetect

Table A.2.10. Data Summary Table Background CSSLP Subunit Upland Area Soil (1 to 4 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Aluminum	mg/kg	3	0	3	1	10166.7	13200	4200	CSSLP-026-BKG		10/5/2020
Arsenic	mg/kg	3	0	3	1	4.093	6.29	1.8	CSSLP-026-BKG		10/5/2020
Barium	mg/kg	3	0	3	0	31.9	64.4	13.6	CSSLP-024-BKG		10/5/2020
Beryllium	mg/kg	3	0	3	3	0.1943	0.277	0.114	CSSLP-024-BKG	J	10/5/2020
Calcium	mg/kg	3	0	3	0	133.8	190	55.4	CSSLP-024-BKG		10/5/2020
Chromium	mg/kg	3	0	3	0	12.36	3.28	2.36	CSSLP-026-BKG		10/5/2020
Cobalt	mg/kg	3	1	2	1	0.3588	0.739	ND	CSSLP-024-BKG		10/5/2020
Copper	mg/kg	3	0	3	1	2.933	4.4	1.31	CSSLP-024-BKG		10/5/2020
Hexavalent Chromium 7196a	mg/kg	3	1	2	0	1.39	2.63	ND	CSSLP-026-BKG		10/5/2020
Hexavalent Chromium 7199	mg/kg	3	2	1	0	0.575	1.5	ND	CSSLP-026-BKG		10/5/2020
Iron	mg/kg	3	0	3	0	11086.7	18600	5620	CSSLP-026-BKG		10/5/2020
Lead	mg/kg	3	0	3	3	6.353	8.39	4.03	CSSLP-024-BKG		10/5/2020
Magnesium	mg/kg	3	0	3	0	150.3	252	75.9	CSSLP-024-BKG		10/5/2020
Manganese	mg/kg	3	0	3	1	18.33	25.8	10.8	CSSLP-024-BKG		10/5/2020
Mercury	mg/kg	3	0	3	2	0.025	0.0406	0.0145	CSSLP-024-BKG		10/5/2020
Nickel	mg/kg	3	0	3	0	2.021	0.743	0.574	CSSLP-024-BKG		10/5/2020
Potassium	mg/kg	3	0	3	0	111.8	174	63.2	CSSLP-024-BKG		10/5/2020
Sodium	mg/kg	3	2	1	1	5.17	7.95	ND	CSSLP-024-BKG	J	10/5/2020
Vanadium	mg/kg	3	0	3	0	29.23	50	13.4	CSSLP-026-BKG		10/5/2020
Zinc	mg/kg	3	0	3	3	4.51	6.79	2.75	CSSLP-024-BKG	J	10/5/2020

ND = Nondetect

Table A.2.11. Data Summary Table Background CSSLP Subunit Upland Area Soil (All Depths)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Aluminum	mg/kg	12	0	12	1	4880.8	13200	2200	CSSLP-026-BKG		10/5/2020
Antimony	mg/kg	12	8	4	4	0.3162	0.691	ND	CSSLP-025-BKG	J	10/5/2020
Arsenic	mg/kg	12	2	10	8	2.213	6.29	ND	CSSLP-026-BKG		10/5/2020
Barium	mg/kg	12	0	12	0	15.35	64.4	0.827	CSSLP-024-BKG		10/5/2020
Beryllium	mg/kg	12	4	8	8	0.1291	0.277	ND	CSSLP-024-BKG	J	10/5/2020
Calcium	mg/kg	12	0	12	2	76.35	190	9.95	CSSLP-024-BKG		10/5/2020
Chromium	mg/kg	12	0	12	0	7.393	19.9	2.36	CSSLP-026-BKG		10/5/2020
Cobalt	mg/kg	12	8	4	3	0.181	0.739	ND	CSSLP-024-BKG		10/5/2020
Copper	mg/kg	12	0	12	6	2.359	4.5	0.883	CSSLP-024-BKG		10/5/2020
Cyanide	mg/kg	12	10	2	2	0.0471	0.0945	ND	CSSLP-024-BKG	J	10/5/2020
Hexavalent Chromium 7196a	mg/kg	12	10	2	0	0.4095	2.63	ND	CSSLP-026-BKG		10/5/2020
Hexavalent Chromium 7199	mg/kg	12	11	1	0	0.2288	1.5	ND	CSSLP-026-BKG		10/5/2020
Iron	mg/kg	12	0	12	0	8815.8	25700	1770	CSSLP-025-BKG		10/5/2020
Lead	mg/kg	12	0	12	12	5.949	13.5	2.83	CSSLP-025-BKG	J	10/5/2020
Magnesium	mg/kg	12	0	12	2	75.96	252	14	CSSLP-024-BKG		10/5/2020
Manganese	mg/kg	12	0	12	1	24.39	97	2.31	CSSLP-026-BKG		10/5/2020
Mercury	mg/kg	12	6	6	4	0.015	0.0406	ND	CSSLP-024-BKG		10/5/2020
Nickel	mg/kg	12	3	9	1	0.8568	3.59	ND	CSSLP-024-BKG		10/5/2020
Potassium	mg/kg	12	0	12	1	59.22	174	19.2	CSSLP-024-BKG		10/5/2020
Selenium	mg/kg	12	11	1	1	0.346	1.2	ND	CSSLP-025-BKG	J	10/5/2020
Sodium	mg/kg	12	11	1	1	4.118	7.95	ND	CSSLP-024-BKG	J	10/5/2020
Thallium	mg/kg	12	11	1	1	0.3015	0.666	ND	CSSLP-025-BKG	J	10/5/2020
Vanadium	mg/kg	12	0	12	0	23.21	75	4.15	CSSLP-025-BKG		10/5/2020
Zinc	mg/kg	12	0	12	12	3.001	6.79	1.51	CSSLP-024-BKG	J	10/5/2020

ND = Nondetect

Table A.2.12. Data Summary Table CSSLP Background Sediment – Carolina Bay (0 to 1 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Acetone	mg/kg	3	0	3	1	0.0356	0.0453	0.0174	CB125-002-BKG	J	10/8/2020
Aluminum	mg/kg	3	0	3	0	11080	14800	8990	CB125-003-BKG		10/8/2020
Antimony	mg/kg	3	2	1	1	0.5982	1.37	ND	CB125-002-BKG	J	10/8/2020
Arsenic	mg/kg	3	0	3	1	5.07	7.95	3.43	CB125-003-BKG		10/8/2020
Barium	mg/kg	3	0	3	1	114.4	148	83.2	CB125-002-BKG	J	10/8/2020
Beryllium	mg/kg	3	0	3	3	0.3523	0.561	0.212	CB125-003-BKG	J	10/8/2020
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	3	1	2	2	0.0146	0.0191	0.0149	CB125-003-BKG	J	10/8/2020
Calcium	mg/kg	3	0	3	1	506.3	1140	132	CB125-002-BKG	J	10/8/2020
Chromium	mg/kg	3	0	3	0	8.87	11	7.16	CB125-003-BKG		10/8/2020
Cobalt	mg/kg	3	0	3	0	1.122	1.56	0.797	CB125-003-BKG		10/8/2020
Copper	mg/kg	3	0	3	0	7.307	10.6	4.4	CB125-002-BKG		10/8/2020
Cyanide	mg/kg	3	2	1	1	0.1082	0.234	ND	CB125-002-BKG	J	10/8/2020
Iron	mg/kg	3	0	3	0	6573.3	10500	4570	CB125-003-BKG		10/8/2020
Lead	mg/kg	3	0	3	0	22.5	31.1	14.3	CB125-002-BKG		10/8/2020
Magnesium	mg/kg	3	0	3	1	222.3	298	128	CB125-003-BKG		10/8/2020
Manganese	mg/kg	3	0	3	1	110.2	159	51.5	CB125-002-BKG	J	10/8/2020
Mercury	mg/kg	3	0	3	0	0.0851	0.107	0.0638	CB125-002-BKG		10/8/2020
Methyl Ethyl Ketone	mg/kg	3	1	2	2	0.0041	0.0059	ND	CB125-003-BKG	J	10/8/2020
Nickel	mg/kg	3	0	3	0	3.843	4.65	2.51	CB125-003-BKG		10/8/2020
Potassium	mg/kg	3	0	3	0	174.7	233	115	CB125-002-BKG		10/8/2020
Sodium	mg/kg	3	2	1	1	7.968	14.9	ND	CB125-002-BKG	J	10/8/2020
Vanadium	mg/kg	3	0	3	0	17.67	26.2	11.5	CB125-003-BKG		10/8/2020
Zinc	mg/kg	3	0	3	3	8.677	12.1	4.29	CB125-002-BKG	J	10/8/2020
Radionuclides											
Gross Alpha	pCi/g	3	0	3	0	17.8	20.4	16.4	CB125-002-BKG		10/8/2020
Nonvolatile Beta	pCi/g	3	0	3	0	12.05	14.2	8.76	CB125-002-BKG		10/8/2020
Thorium-228	pCi/g	3	0	3	1	1.584	2.44	0.972	CB125-003-BKG		10/8/2020
Thorium-230	pCi/g	3	0	3	2	0.934	1.55	0.578	CB125-003-BKG		10/8/2020
Thorium-232	pCi/g	3	0	3	0	1.407	1.71	1.13	CB125-003-BKG		10/8/2020
Uranium-233/234	pCi/g	3	0	3	1	0.8547	1.22	0.608	CB125-003-BKG		10/8/2020
Uranium-238	pCi/g	3	0	3	0	0.961	1.11	0.868	CB125-003-BKG		10/8/2020

ND = Nondetect

Table A.2.13. Data Summary Table CSSLP Background Sediment – Carolina Bay (1 to 4 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Acetone	mg/kg	3	0	3	1	0.0084	0.0138	0.0039	CB125-001-BKG		10/8/2020
Aluminum	mg/kg	3	0	3	0	4973.3	7220	2790	CB125-002-BKG		10/8/2020
Arsenic	mg/kg	3	0	3	3	1.264	1.51	0.932	CB125-002-BKG	J	10/8/2020
Barium	mg/kg	3	0	3	0	30.63	46.7	13.1	CB125-002-BKG		10/8/2020
Benzo[a]anthracene	mg/kg	4	3	1	1	0.0077	0.0113	ND	CB125-003-BKG	J	10/8/2020
Beryllium	mg/kg	3	1	2	2	0.1203	0.194	ND	CB125-002-BKG	J	10/8/2020
Calcium	mg/kg	3	0	3	1	214	324	137	CB125-002-BKG		10/8/2020
Chromium	mg/kg	3	0	3	0	4.337	6.06	3.01	CB125-002-BKG		10/8/2020
Cobalt	mg/kg	3	1	2	2	0.258	0.367	ND	CB125-001-BKG	J	10/8/2020
Copper	mg/kg	3	0	3	2	1.937	3.06	1.06	CB125-002-BKG		10/8/2020
Iron	mg/kg	3	0	3	1	682.7	1270	386	CB125-001-BKG	J	10/8/2020
Lead	mg/kg	3	0	3	0	5.553	6.59	3.66	CB125-002-BKG		10/8/2020
Magnesium	mg/kg	3	0	3	0	69.73	102	45.3	CB125-002-BKG		10/8/2020
Manganese	mg/kg	3	0	3	0	31.26	65.2	1.58	CB125-001-BKG		10/8/2020
Mercury	mg/kg	3	0	3	2	0.0198	0.0301	0.0124	CB125-002-BKG		10/8/2020
Nickel	mg/kg	3	0	3	0	1.587	2.24	1.01	CB125-002-BKG		10/8/2020
Potassium	mg/kg	3	0	3	0	48.5	58.2	33	CB125-002-BKG		10/8/2020
Vanadium	mg/kg	3	0	3	0	5.517	7.09	4.02	CB125-002-BKG		10/8/2020
Zinc	mg/kg	3	0	3	3	1.443	1.51	1.38	CB125-002-BKG	J	10/8/2020
Radionuclides											
Gross Alpha	pCi/g	3	0	3	1	11.07	16.9	5.21	CB125-001-BKG		10/8/2020
Nonvolatile Beta	pCi/g	3	1	2	2	5.512	7.91	ND	CB125-001-BKG	J	10/8/2020
Thorium-228	pCi/g	1	0	1	0	2.15	2.15	--	CB125-001-BKG		10/8/2020
Thorium-230	pCi/g	1	0	1	1	0.831	0.831	--	CB125-001-BKG	J	10/8/2020
Thorium-232	pCi/g	1	0	1	0	1.91	1.91	--	CB125-001-BKG		10/8/2020
Uranium-233/234	pCi/g	1	0	1	0	0.591	0.591	--	CB125-001-BKG		10/8/2020
Uranium-238	pCi/g	1	0	1	0	0.738	0.738	--	CB125-001-BKG		10/8/2020

ND = Nondetect

This page was intentionally left blank.

Table A.2.14. Data Summary Table CSSLP Background Sediment – Carolina Bay (All Depths)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
2-Chloronaphthalene	mg/kg	6	5	1	1	0.008	0.0144	ND	CB125-003-BKG	J	10/8/2020
Acetone	mg/kg	6	0	6	2	0.022	0.0453	0.0039	CB125-002-BKG	J	10/8/2020
Aluminum	mg/kg	6	0	6	0	8026.7	14800	2790	CB125-003-BKG		10/8/2020
Antimony	mg/kg	6	5	1	1	0.3896	1.37	ND	CB125-002-BKG	J	10/8/2020
Arsenic	mg/kg	6	0	6	4	3.167	7.95	0.932	CB125-003-BKG		10/8/2020
Barium	mg/kg	6	0	6	1	72.52	148	13.1	CB125-002-BKG	J	10/8/2020
Benzo[a]anthracene	mg/kg	6	5	1	1	0.0077	0.0113	ND	CB125-003-BKG	J	10/8/2020
Beryllium	mg/kg	6	1	5	5	0.2363	0.561	ND	CB125-003-BKG	J	10/8/2020
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	6	4	2	2	0.0102	0.0191	ND	CB125-003-BKG	J	10/8/2020
Calcium	mg/kg	6	0	6	2	360.2	1140	132	CB125-002-BKG	J	10/8/2020
Chromium	mg/kg	6	0	6	0	6.603	11	3.01	CB125-003-BKG		10/8/2020
Cobalt	mg/kg	6	1	5	2	0.6902	1.56	ND	CB125-003-BKG		10/8/2020
Copper	mg/kg	6	0	6	2	4.622	10.6	1.06	CB125-002-BKG		10/8/2020
Cyanide	mg/kg	6	5	1	1	0.0735	0.234	ND	CB125-002-BKG	J	10/8/2020
Iron	mg/kg	6	0	6	1	3628	10500	386	CB125-003-BKG		10/8/2020
Lead	mg/kg	6	0	6	0	14.03	31.1	3.66	CB125-002-BKG		10/8/2020
Magnesium	mg/kg	6	0	6	1	146.03	298	45.3	CB125-003-BKG		10/8/2020
Manganese	mg/kg	6	0	6	1	70.71	159	1.58	CB125-002-BKG	J	10/8/2020
Mercury	mg/kg	6	0	6	2	0.0525	0.107	0.0124	CB125-002-BKG		10/8/2020
Methyl Ethyl Ketone	mg/kg	6	4	2	2	0.0025	0.0059	ND	CB125-002-BKG	J	10/8/2020
Nickel	mg/kg	6	0	6	0	2.715	4.65	1.01	CB125-003-BKG		10/8/2020
Potassium	mg/kg	6	0	6	0	111.6	233	33	CB125-002-BKG		10/8/2020
Sodium	mg/kg	6	5	1	1	5.904	14.9	ND	CB125-002-BKG	J	10/8/2020
Vanadium	mg/kg	6	0	6	0	11.59	26.2	4.02	CB125-003-BKG		10/8/2020
Zinc	mg/kg	6	0	6	6	5.06	12.1	1.38	CB125-002-BKG	J	10/8/2020
Radionuclides											
Gross Alpha	pCi/g	6	0	6	1	14.44	20.4	5.21	CB125-002-BKG		10/8/2020
Nonvolatile Beta	pCi/g	6	1	5	2	8.783	14.2	ND	CB125-002-BKG		10/8/2020
Thorium-228	pCi/g	4	0	4	1	1.726	2.44	0.972	CB125-003-BKG		10/8/2020

Table A.2.14. Data Summary Table CSSLP Background Sediment - Carolina Bay (All Depths) *(Continued/End)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Thorium-230	pCi/g	4	0	4	3	0.9083	1.55	0.578	CB125-003-BKG		10/8/2020
Thorium-232	pCi/g	4	0	4	0	1.533	1.91	1.13	CB125-001-BKG		10/8/2020
Uranium-233/234	pCi/g	4	0	4	1	0.7888	1.22	0.591	CB125-003-BKG		10/8/2020
Uranium-238	pCi/g	4	0	4	0	0.9053	1.11	0.738	CB125-003-BKG		10/8/2020

ND = Nondetect

Table A.2.15. Data Summary Table CSSLP Background Surface Water – Carolina Bay (Unfiltered)

Analyte	Filtered?	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Acetone		µg/L	3	0	3	1	7.273	13.7	3	CB125-003-BKG		9/29/2020
Aluminum		µg/L	6	0	6	1	1022.3	1630	727	CB125-001-BKG		10/6/2020
Antimony		µg/L	6	4	2	2	2.887	5.36	ND	CB125-003-BKG	J	9/29/2020
Barium		µg/L	6	0	6	0	139	180	105	CB125-003-BKG		9/29/2020
Calcium		µg/L	6	0	6	4	6716.7	8190	5240	CB125-003-BKG		9/29/2020
Chromium		µg/L	6	0	6	5	5.823	11.8	1.87	CB125-001-BKG		10/6/2020
Cobalt		µg/L	6	0	6	6	2.317	3.15	1.51	CB125-001-BKG	J	10/6/2020
Copper		µg/L	6	1	5	5	4.667	6.3	ND	CB125-002-BKG	J	9/22/2020
Cyanide		µg/L	6	0	6	6	3.367	4.12	2.91	CB125-003-BKG	J	9/29/2020
Iron		µg/L	6	0	6	2	7083.3	9840	4130	CB125-003-BKG		9/29/2020
Lead		µg/L	6	5	1	1	2.122	4.48	ND	CB125-002-BKG	J	9/22/2020
Magnesium		µg/L	6	0	6	0	1453.3	1670	1210	CB125-003-BKG		9/29/2020
Manganese		µg/L	6	0	6	0	1713.3	2160	1300	CB125-003-BKG		9/29/2020
Nickel		µg/L	6	3	3	3	1.718	3.12	ND	CB125-001-BKG	J	10/6/2020
Potassium		µg/L	6	0	6	0	2750	3260	1780	CB125-003-BKG		9/29/2020
Sodium		µg/L	6	0	6	1	2090	2650	1750	CB125-001-BKG		10/6/2020
Toluene		µg/L	3	2	1	1	0.2543	0.43	ND	CB125-003-BKG	J	9/29/2020
Vanadium		µg/L	6	0	6	4	4.817	6.91	2.86	CB125-003-BKG		9/29/2020
Zinc		µg/L	6	0	6	2	39.57	74.9	35.4	CB125-003-BKG		9/29/2020
Radionuclides												
Gross Alpha		pCi/L	3	0	3	0	4.237	6.31	2.69	CB125-003-BKG		9/29/2020
Nonvolatile Beta		pCi/L	3	0	3	0	9.357	14.8	6.54	CB125-003-BKG		9/29/2020

ND = Nondetect

This page was intentionally left blank.

Table A.2.16. Unit Specific Constituent Screening Table CSSLP Subunit Upland Area Soils (All Depths)

Analyte	Units	Max[1] Result	Max Qualifier	Max Location	Top Depth *(ft)*	Bottom Depth *(ft)*	SRS 2x Mean Background[2]	Is Max Detect >2X SRS Mean Bkg?[3]
Inorganics								
Aluminum	mg/kg	21200		CSSLP-8	8.0	10.0	13395	Yes
Antimony	mg/kg	23.7		CSSLP-13	1.0	2.0	2.65	Yes
Arsenic	mg/kg	63.1		CSSLP-031	0.0	1.0	4.45	Yes
Barium	mg/kg	191	J	CSSLP-030	8.0	10.0	33.1	Yes
Beryllium	mg/kg	0.524		CSSLP-18	0.0	1.0	0.305	Yes
Cadmium	mg/kg	2.08		CSSLP-4	8.0	10.0	0.444	Yes
Calcium	mg/kg	12100		CSSLP-030	8.0	10.0	334	Yes
Chromium	mg/kg	66.6		CSSLP-4	8.0	10.0	22.9	Yes
Chromium, Hexavalent	mg/kg	0.986		CSSLP-030	0.0	1.0	N/A	Yes
Cobalt	mg/kg	4.26		CSSLP-18	0.0	1.0	1.40	Yes
Copper	mg/kg	119	J	CSSLP-030	8.0	10.0	6.35	Yes
Cyanide	mg/kg	0.203	J	CSSLP-031	0.0	1.0	N/A	Yes
Iron	mg/kg	56900		CSSLP-19	8.0	10.0	22001	Yes
Lead	mg/kg	241		CSSLP-7	8.0	10.0	10.8	Yes
Magnesium	mg/kg	2480		CSSLP-18	0.0	1.0	246	Yes
Manganese	mg/kg	264		CSSLP-18	0.0	1.0	63.3	Yes
Mercury	mg/kg	0.884		CSSLP-18	1.0	4.0	0.067	Yes
Nickel	mg/kg	108	J	CSSLP-030	8.0	10.0	4.15	Yes
Potassium	mg/kg	757		CSSLP-14	1.0	2.0	213	Yes
Selenium	mg/kg	3.95	J	CSSLP-14	1.0	2.0	3.71	Yes
Silver	mg/kg	0.585		CSSLP-4	1.0	4.0	0.637	No
Sodium	mg/kg	165		CSSLP-14	1.0	2.0	43.6	Yes
Thallium	mg/kg	1.08	J	CSSLP-19	8.0	10.0	2.94	No
Vanadium	mg/kg	141		CSSLP-19	8.0	10.0	58.1	Yes
Zinc	mg/kg	242		CSSLP-16	1.0	2.5	7.44	Yes
Herbicides & Pesticides								
Aldrin	mg/kg	0.00324		CSSLP-5	1.0	4.0	N/A	Yes
Alpha-Chlordane	mg/kg	0.00810		CSSLP-13	1.0	2.0	N/A	Yes

Table A.2.16. Data Unit Specific Constituent Screening Table CSSLP Subunit Upland Area Soils (All Depths *(Continued)*

Analyte	Units	Max[1] Result	Max Qualifier	Max Location	Top Depth *(ft)*	Bottom Depth *(ft)*	SRS 2x Mean Background[2]	Is Max Detect >2X SRS Mean Bkg?[3]
Herbicides & Pesticides *(cont'd)*								
DDD	mg/kg	0.00591	J	CSSLP-13	1.0	2.0	N/A	Yes
DDE	mg/kg	0.00543	J	CSSLP-13	1.0	2.0	N/A	Yes
Dieldrin	mg/kg	0.02050		CSSLP-5	1.0	4.0	N/A	Yes
Gamma-Chlordane	mg/kg	0.00872		CSSLP-13	1.0	2.0	N/A	Yes
Lindane	mg/kg	0.02820		CSSLP-13	1.0	2.0	N/A	Yes
Polychlorinated Biphenyls (PCBs)								
Aroclor 1248	mg/kg	0.230		CSSLP-5	8.0	10.0	N/A	Yes
Aroclor 1254	mg/kg	0.428		CSSLP-5	8.0	10.0	N/A	Yes
Aroclor 1260	mg/kg	0.101		CSSLP-5	8.0	10.0	N/A	Yes
Volatile Organic Compounds (VOCs)								
1,2,3-Trichlorobenzene	mg/kg	0.000387	J	CSSLP-2	8.0	10.0	N/A	Yes
Acetone	mg/kg	0.579000	J	CSSLP-15	0.0	1.0	N/A	Yes
Benzene	mg/kg	0.000467	J	CSSLP-14	1.0	2.0	N/A	Yes
Chloroethane (Ethyl Chloride)	mg/kg	0.002690		CSSLP-7	8.0	10.0	N/A	Yes
Chloroethene (Vinyl Chloride)	mg/kg	0.000422	J	CSSLP-6	8.0	10.0	N/A	Yes
Chloromethane (Methyl Chloride)	mg/kg	0.000867	J	CSSLP-5	8.0	10.0	N/A	Yes
Cumene (Isopropylbenzene)	mg/kg	0.524000		CSSLP-4	8.0	10.0	N/A	Yes
Cyclohexane	mg/kg	0.004480		CSSLP-9	8.0	10.0	N/A	Yes
Dichloromethane (Methylene Chloride)	mg/kg	0.012300		CSSLP-3	8.0	10.0	N/A	Yes
Ethylbenzene	mg/kg	0.669000		CSSLP-4	8.0	10.0	N/A	Yes
M,P-Xylene	mg/kg	0.147000	J	CSSLP-4	8.0	10.0	N/A	Yes
Methyl Acetate	mg/kg	0.214000		CSSLP-9	8.0	10.0	N/A	Yes
Methyl Ethyl Ketone	mg/kg	0.025900		CSSLP-5	8.0	10.0	N/A	Yes
Methyl Tertiary Butyl Ether (MTBE)	mg/kg	0.004590		CSSLP-3	8.0	10.0	N/A	Yes
Methylcyclohexane	mg/kg	0.002170		CSSLP-3	8.0	10.0	N/A	Yes
O-Xylene	mg/kg	0.175000		CSSLP-4	8.0	10.0	N/A	Yes
Semi-Volatile Organic Compounds (SVOCs)								
2-Methylnaphthalene	mg/kg	0.0518		CSSLP-15	8.0	10.0	N/A	Yes
Acenaphthene	mg/kg	0.1290		CSSLP-15	8.0	10.0	N/A	Yes

Table A.2.16. Unit Specific Constituent Screening Table CSSLP Subunit Upland Area Soils (All Depths) *(Continued/End)*

Analyte	Units	Max[1] Result	Max Qualifier	Max Location	Top Depth *(ft)*	Bottom Depth *(ft)*	SRS 2x Mean Background[2]	Is Max Detect >2X SRS Mean Bkg?[3]
Semi-Volatile Organic Compounds (SVOCs) *(cont'd)*								
Anthracene	mg/kg	0.4440		CSSLP-5	0.0	1.0	N/A	Yes
Benzo(g,h,i)perylene	mg/kg	0.0840		CSSLP-15	8.0	10.0	N/A	Yes
Benzo[a]anthracene	mg/kg	0.4740		CSSLP-15	8.0	10.0	N/A	Yes
Benzo[a]pyrene	mg/kg	0.4000		CSSLP-4	1.0	4.0	N/A	Yes
Benzo[b]fluoranthene	mg/kg	0.7190		CSSLP-4	1.0	4.0	N/A	Yes
Benzo[k]fluoranthene	mg/kg	0.2680		CSSLP-4	1.0	4.0	N/A	Yes
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	1.4500	J	CSSLP-3	1.0	4.0	N/A	Yes
Carbazole	mg/kg	0.0893		CSSLP-15	8.0	10.0	N/A	Yes
Chrysene	mg/kg	0.4740		CSSLP-4	1.0	4.0	N/A	Yes
Dibenz[ah]anthracene	mg/kg	0.0274	J	CSSLP-15	8.0	10.0	N/A	Yes
Dibenzofuran	mg/kg	0.1260	J	CSSLP-15	8.0	10.0	N/A	Yes
Di-n-butyl phthalate	mg/kg	0.0823		CSSLP-5	1.0	4.0	N/A	Yes
Fluoranthene	mg/kg	1.7600		CSSLP-15	8.0	10.0	N/A	Yes
Fluorene	mg/kg	0.1810		CSSLP-15	8.0	10.0	N/A	Yes
Indeno[1,2,3-cd]pyrene	mg/kg	0.1020		CSSLP-15	8.0	10.0	N/A	Yes
Naphthalene	mg/kg	0.0773		CSSLP-15	8.0	10.0	N/A	Yes
Pentachlorophenol	mg/kg	0.2090	J	CSSLP-4	8.0	10.0	N/A	Yes
Phenanthrene	mg/kg	1.5200		CSSLP-15	8.0	10.0	N/A	Yes
Pyrene	mg/kg	1.1100		CSSLP-15	8.0	10.0	N/A	Yes
Radionuclides								
Gross Alpha	pCi/g	23.7		CSSLP-19	1.0	2.0	21.6	Yes
Nonvolatile Beta	pCi/g	16.5		CSSLP-4	0.0	1.0	17.3	No
Thorium-228	pCi/g	1.56	J	CSSLP-19	1.0	2.0	2.21	No
Thorium-230	pCi/g	1.12	J	CSSLP-19	1.0	2.0	1.35	No
Thorium-232	pCi/g	1.23	J	CSSLP-19	1.0	2.0	2.09	No

Table Notes:

1 = Max = Maximum Detected Concentration from All Depth Intervals.

2 = *Background Soils Statistical Summary Report for the Savannah River Site*, ERD-EN-2005-0223, Appendix B-2 (All Depth Intervals).

3 = Constituents Identified as an USC if Maximum Detected Concentration is Greater Than 2X SRS Mean Concentration.

J = Estimated Value.

NA = Not Available.

This page was intentionally left blank.

Table A.2.17. Unit Specific Constituent Screening Table CSSLP Subunit Surface Water Impoundment Area Sediment (All Depths)

Analyte	Units	Max[1] Result	Max Qualifier	Max Location	Top Depth *(ft)*	Bottom Depth *(ft)*	SRS 2x Mean Background[2]	Is Max Detect >2X SRS Mean Bkg?[3]
Inorganics								
Aluminum	mg/kg	10900		CSSLP-23-SED	1	4	13395	No
Antimony	mg/kg	1.95	J	CSSLP-22-SED	1.0	4.0	2.65	No
Arsenic	mg/kg	18.4	J	CSSLP-20-SED	1.0	4.0	4.45	Yes
Barium	mg/kg	33.4		CSSLP-22-SED	0.0	1.0	33.1	Yes
Beryllium	mg/kg	0.183	J	CSSLP-22-SED	0.0	1.0	0.305	No
Calcium	mg/kg	1210	J	CSSLP-22-SED	1.0	4.0	334	Yes
Chromium	mg/kg	22.3		CSSLP-23-SED	1.0	4.0	22.9	No
Chromium, Hexavalent	mg/kg	1.36	J	CSSLP-22-SED	0.0	1.0	N/A	Yes
Chromium, Hexavalent	mg/kg	1.40		CSSLP-23-SED	1.0	4.0	N/A	Yes
Cobalt	mg/kg	0.778		CSSLP-23-SED	0.0	1.0	1.40	No
Copper	mg/kg	15.9		CSSLP-22-SED	1.0	4.0	6.35	Yes
Iron	mg/kg	20300		CSSLP-23-SED	1.0	4.0	22001	No
Lead	mg/kg	9.62		CSSLP-22-SED	1.0	4.0	10.8	No
Magnesium	mg/kg	254	J	CSSLP-20-SED	1.0	4.0	246	Yes
Manganese	mg/kg	81.0		CSSLP-22-SED	0.0	1.0	63.3	Yes
Mercury	mg/kg	0.0513		CSSLP-23-SED	1.0	4.0	0.0668	No
Nickel	mg/kg	3.53		CSSLP-22-SED	1.0	4.0	4.15	No
Potassium	mg/kg	274		CSSLP-22-SED	1.0	4.0	213	Yes
Selenium	mg/kg	0.754	J	CSSLP-22-SED	1.0	4.0	3.71	No
Sodium	mg/kg	72.6		CSSLP-22-SED	1.0	4.0	43.6	Yes
Thallium	mg/kg	0.619	J	CSSLP-22-SED	0.0	1.0	2.94	No
Vanadium	mg/kg	50.1		CSSLP-20-SED	1.0	4.0	58.1	No
Zinc	mg/kg	53.3		CSSLP-22-SED	1.0	4.0	7.44	Yes
Volatile Organic Compounds (VOCs)								
Acetone	mg/kg	0.06000		CSSLP-20-SED	0.0	1.0	N/A	Yes
Methyl Ethyl Ketone	mg/kg	0.00825		CSSLP-20-SED	0.0	1.0	N/A	Yes
Toluene	mg/kg	0.00403		CSSLP-20-SED	0.0	1.0	N/A	Yes
Anthracene	mg/kg	0.0131	J	CSSLP-22-SED	1.0	4.0	N/A	Yes

Table A.2.17. Unit Specific Constituent Screening Table CSSLP Subunit Surface Water Impoundment Area Subunit (All Depths) *(Continued/End)*

Analyte	Units	Max[1] Result	Max Qualifier	Max Location	Top Depth *(ft)*	Bottom Depth *(ft)*	SRS 2x Mean Background[2]	Is Max Detect >2X SRS Mean Bkg?[3]
Volatile Organic Compounds (VOCs) *(cont'd)*								
Benzo[a]anthracene	mg/kg	0.0424		CSSLP-22-SED	1.0	4.0	N/A	Yes
Benzo[a]pyrene	mg/kg	0.0253	J	CSSLP-22-SED	1.0	4.0	N/A	Yes
Benzo[b]fluoranthene	mg/kg	0.0375	J	CSSLP-22-SED	1.0	4.0	N/A	Yes
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	0.0616		CSSLP-22-SED	1.0	4.0	N/A	Yes
Chrysene	mg/kg	0.0343	J	CSSLP-22-SED	1.0	4.0	N/A	Yes
Dimethyl Phthalate	mg/kg	0.0189	J	CSSLP-22-SED	0.0	1.0	N/A	Yes
Fluoranthene	mg/kg	0.1260		CSSLP-22-SED	1.0	4.0	N/A	Yes
Phenanthrene	mg/kg	0.0510		CSSLP-22-SED	1.0	4.0	N/A	Yes
Pyrene	mg/kg	0.0865		CSSLP-22-SED	1.0	4.0	N/A	Yes
Radionuclides								
Gross Alpha	pCi/g	21.8		CSSLP-21-SED	1.0	4.0	21.6	Yes
Nonvolatile Beta	pCi/g	13.2		CSSLP-22-SED	1.0	4.0	17.3	No
Uranium-233/234	pCi/g	1.27		CSSLP-20-SED	0.0	1.0	1.29	No
Uranium-238	pCi/g	1.19		CSSLP-21-SED	1.0	4.0	1.01	Yes
Thorium-228	pCi/g	4.16		CSSLP-20-SED	0.0	1.0	2.21	Yes
Thorium-230	pCi/g	1.44		CSSLP-23-SED	0.0	1.0	1.35	Yes
Thorium-232	pCi/g	3.31		CSSLP-23-SED	0.0	1.0	2.09	Yes

Table Notes:

1 = Max = Maximum Detected Concentration from All Depth Intervals.

2 = *Background Soils Statistical Summary Report for the Savannah River Site*, ERD-EN-2005-0223, Appendix B-2 (All Depth Intervals).

3 = Constituents Identified as an USC if Maximum Detected Concentration is Greater Than 2X SRS Mean Concentration.

J = Estimated Value.

NA = Not Available.

Table A.3.1. Data Summary Table Ford Building Subunit Soil (0 to 1 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Acetone	mg/kg	37	25	12	8	L	3	0.004	0.00452	0.0542	ND	0.00452	FBFA-25	–	8/22/2019
Aluminum	mg/kg	38	0	38	3	N	1	7127.3	8105	16700	2440	8105	FBFA-13	–	7/15/2019
Antimony	mg/kg	38	35	3	3	X	7	0.2002	0.353	0.541	ND	0.353	FBFA-34	J	7/24/2019
Aroclor 1254	mg/kg	37	29	8	3	G	2	0.0065	0.0198	0.119	ND	0.0198	FBFA-19	–	7/17/2019
Aroclor 1260	mg/kg	37	23	8	9	G	2	0.005	0.0122	0.0713	ND	0.0122	FBFA-19	–	7/17/2019
Arsenic	mg/kg	38	0	19	19	G	2	3.68	4.526	14.5	0.586	4.526	FBFA-11	–	7/15/2019
Barium	mg/kg	38	0	38	1	N	1	14.25	17.07	40.7	1.24	17.07	FBFA-4	–	7/10/2019
Benzo(g,h,i)perylene	mg/kg	36	34	2	2	X	4	0.0074	0.0225	0.0716	ND	0.0225	FBFA-28	J	8/22/2019
Benzo[a]anthracene	mg/kg	36	35	1	1	–	–	0.0054	–	0.0684	ND	0.0684	FBFA-28	J	8/22/2019
Benzo[a]pyrene	mg/kg	36	34	2	2	X	7	0.0076	0.0159	0.0614	ND	0.0159	FBFA-28	J	8/22/2019
Benzo[b]fluoranthene	mg/kg	36	31	5	5	X	7	0.0118	0.0245	0.163	ND	0.0245	FBFA-28	J	8/22/2019
Benzo[k]fluoranthene	mg/kg	36	34	2	2	X	4	0.0075	0.0219	0.0658	ND	0.0219	FBFA-28	J	8/22/2019
Beryllium	mg/kg	38	6	32	28	X	4	0.3166	0.848	4.55	ND	0.848	FBFA-21	–	7/17/2019
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	36	28	8	6	X	7	0.011	0.0191	0.0858	ND	0.0191	FBFA-37	–	7/22/2019
Cadmium	mg/kg	38	33	5	4	G	2	0.0963	0.196	1.03	ND	0.196	FBFA-20	–	7/17/2019
Calcium	mg/kg	38	0	38	5	L	3	612.7	855.4	5150	50.2	855.4	FBFA-21	–	7/17/2019
Carbazole	mg/kg	36	35	1	1	–	–	0.0057	–	0.0173	ND	0.0173	FBFA-15	J	7/16/2019
Chromium	mg/kg	38	0	38	3	L	3	20.61	24.79	230	3.05	24.79	FBFA-11	–	7/15/2019
Chrysene	mg/kg	36	34	2	2	X	7	0.0112	0.0254	0.114	ND	0.0254	FBFA-15	J	7/16/2019
Cobalt	mg/kg	38	2	36	15	G	2	0.896	1.204	3.72	ND	1.204	FBFA-21	–	7/17/2019
Copper	mg/kg	38	0	38	13	L	3	4.672	5.801	27.1	0.629	5.801	FBFA-15	–	7/16/2019
Cumene (Isopropylbenzene)	mg/kg	37	35	2	0	X	4	0.0015	0.0127	0.0473	ND	0.0127	FBFA-26	–	8/22/2019
Dichloromethane (Methylene Chloride)	mg/kg	37	35	2	2	X	7	0.001	0.00163	0.0021	ND	0.00163	FBFA-20	J	7/17/2019
Di-n-butyl phthalate	mg/kg	36	27	9	9	X	7	0.0089	0.0145	0.0338	ND	0.0145	FBFA-21	J	7/17/2019
Fluoranthene	mg/kg	36	32	4	4	X	7	0.0193	0.0463	0.421	ND	0.0463	FBFA-15	J	7/16/2019
Indeno[1,2,3-cd]pyrene	mg/kg	36	34	2	2	X	4	0.0075	0.0234	0.0767	ND	0.0234	FBFA-28	J	8/22/2019
Iron	mg/kg	38	0	38	2	G	2	13341.6	16068	47200	2640	16068	FBFA-11	–	7/15/2019
Lead	mg/kg	38	0	38	4	G	2	6.801	8.275	21.7	1.59	8.275	FBFA-20	–	7/17/2019
Magnesium	mg/kg	38	0	38	3	X	4	294.8	702.1	2880	23.2	702.1	FABF-21	–	7/17/2019
Manganese	mg/kg	38	0	38	2	L	3	67.996	131.9	540	2.92	131.9	FABF-21	–	7/17/2019

Table A.3.1. Data Summary Table Ford Building Subunit Soil (0 to 1 ft) *(Continued)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Mercury	mg/kg	37	2	35	12	X	4	0.0221	0.0387	0.144	ND	0.0387	FBFA-19	–	7/17/2019
Methyl Ethyl Ketone	mg/kg	37	36	1	0	–	–	0.0011	–	0.00727	ND	0.00727	FBFA-25	–	8/22/2019
Nickel	mg/kg	38	0	38	3	G	2	2.117	2.589	8.17	0.463	2.589	FBFA-37	–	7/22/2019
Pentachlorophenol	mg/kg	36	35	1	1	–	–	0.0582	–	0.229	ND	0.229	FBFA-26	J	8/22/2019
Phenanthrene	mg/kg	36	35	1	1	–	–	0.0116	–	0.238	ND	0.238	FBFA-15	J	7/16/2019
Potassium	mg/kg	38	0	38	1	X	4	155.3	302.8	1030	37.3	302.8	FBFA-21	–	7/17/2019
Pyrene	mg/kg	36	32	4	4	X	7	0.0171	0.0386	0.309	ND	0.0386	FBFA-15	J	7/16/2019
Selenium	mg/kg	38	31	7	4	X	7	0.9317	1.747	9.05	ND	1.747	FBFA-26	–	8/22/2019
Silver	mg/kg	38	35	3	1	X	7	0.0904	0.177	0.743	ND	0.177	FBFA-3	–	7/11/2019
Sodium	mg/kg	38	27	11	10	G	2	7.643	12.62	42	ND	12.62	FBFA-21	–	7/17/2019
Tetrachloroethylene (PCE)	mg/kg	37	36	1	1	–	–	0.0002	–	0.318	ND	0.0004	FBFA-15	J	7/16/2019
Thallium	mg/kg	38	34	4	0	X	7	1.817	3.78	23.6	ND	3.78	FBFA-26	–	8/22/2019
Toluene	mg/kg	37	35	2	2	X	4	0.0002	4.28E-04	0.0009	ND	4.28E-04	FBFA-36	J	7/18/2019
Vanadium	mg/kg	38	0	38	0	G	2	39.46	49.29	187	7.17	49.29	FBFA-11	–	7/15/2019
Zinc	mg/kg	38	0	38	21	X	4	48.23	117.2	426	1.18	117.2	FBFA-20	–	7/17/2019
Radionuclides															
Actinium-228	pCi/g	7	0	7	0	N	1	1.677	1.947	2.22	1.28	1.947	FBFA-17	–	7/17/2019
Bismuth-212	pCi/g	7	1	6	6	X	7	1.772	2.305	3.03	ND	2.305	FBFA-17	J	7/17/2019
Bismuth-214	pCi/g	7	0	7	0	G	2	0.8406	1.333	1.73	0.458	1.333	FBFA-21	–	7/17/2019
Cesium-137	pCi/g	6	1	5	5	X	7	0.102	0.139	0.153	0.0594	0.139	FBFA-3	J	7/11/2019
Cobalt-60	pCi/g	7	6	1	0	–	–	0.0375	–	0.545	ND	0.545	FBFA-21	–	7/17/2019
Gross Alpha	pCi/g	37	0	37	0	N	1	13.66	15.35	29.7	2.82	15.35	FBFA-13	–	7/15/2019
Lead-212	pCi/g	7	0	7	0	N	1	1.654	1.954	2.07	1.02	1.954	FBFA-17	–	7/17/2019
Lead-214	pCi/g	7	0	7	0	G	2	1.085	1.613	2.03	0.664	1.613	FBFA-21	–	7/17/2019
Nonvolatile Beta	pCi/g	37	0	37	3	G	2	7.722	9.025	31.8	2.18	9.025	FBFA-21	–	7/17/2019
Potassium-40	pCi/g	7	0	7	4	X	8	5.436	56.16	24.8	1.07	24.8	FBFA-21	–	7/17/2019
Thallium-208	pCi/g	7	0	7	0	N	1	0.4774	0.561	0.618	0.285	0.561	FBFA-17	–	7/17/2019
Thorium-228	pCi/g	4	0	4	4	N	1	1.29	1.559	1.58	1.07	1.559	FBFA-21	J	7/17/2019
Thorium-230	pCi/g	4	2	1	1	X	7	1.189	2.729	2.6	ND	2.6	FBFA-21	–	7/17/2019

Table A.3.1. Data Summary Table Ford Building Subunit Soil (0 to 1 ft) *(Continued/End)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Thorium-232	pCi/g	4	0	4	3	N	1	1.172	1.579	1.64	0.806	1.579	FBFA-5	–	7/11/2019
Uranium-233/234	pCi/g	4	0	4	2	N	1	0.96	1.23	1.22	0.66	1.22	FBFA-21	–	7/17/2019
Uranium-238	pCi/g	4	0	4	1	N	1	1.068	1.588	1.67	0.619	1.588	FBFA-21	–	7/17/2019

Distribution Code:
N Normal Distribution
L Lognormal Distribution
G Gamma Distribution
X Non-Parametric

UCL Method Code: (as determined by ProUCL)
1 Student's t UCL
2 Approximate Gamma UCL
3 95% H-UCL
4 95% Chebyshev UCL
5 97.5% Chebysev UCL
6 99% Chebyshev UCL
7 Kaplan-Meier (KM) t UCL
8 Hall's Bootstrap UCL

ND = Non-Detect

This page was intentionally left blank.

Table A.3.2. Data Summary Table Ford Building Subunit Soil (1 to 4 ft)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Acetone	mg/kg	36	24	12	9	X	4	0.002	0.0218	0.0853	ND	0.0218	FBFA-26	–	8/22/2019
Aluminum	mg/kg	36	0	36	0	N	1	10330.6	11973	22300	2630	11973	FBFA-23	–	7/18/2019
Anthracene	mg/kg	36	35	1	0	–	–	0.0092	–	0.134	ND	0.134	FBFA-15	–	7/16/2019
Antimony	mg/kg	36	31	5	5	X	7	0.3295	0.572	2.4	ND	0.572	FBFA-7	J	7/9/2019
Aroclor 1254	mg/kg	36	32	4	1	X	7	0.003	0.00648	0.0546	ND	0.0068	FBFA-22	–	7/18/2019
Aroclor 1260	mg/kg	36	30	6	3	X	7	0.0016	0.00297	0.016	ND	0.00297	FBFA-22	–	7/18/2019
Arsenic	mg/kg	36	0	36	12	N	1	4.7267	5.392	9.2	0.54	5.392	FBFA-15	–	7/16/2019
Barium	mg/kg	36	0	36	0	G	2	11.97	16.63	62.1	0.776	16.63	FBFA-4	–	7/10/2019
Benzo(g,h,i)perylene	mg/kg	36	35	1	1	–	–	0.0061	–	0.0193	ND	0.0193	FBFA-22	J	7/18/2019
Benzo[a]anthracene	mg/kg	36	35	1	1	–	–	0.0059	–	0.0135	ND	0.0135	FBFA-22	J	7/18/2019
Benzo[a]pyrene	mg/kg	36	35	1	1	–	–	0.006	–	0.0162	ND	0.0162	FBFA-22	J	7/18/2019
Benzo[b]fluoranthene	mg/kg	36	34	2	2	X	4	0.0068	0.0159	0.0356	ND	0.0159	FBFA-22	J	7/18/2019
Benzo[k]fluoranthene	mg/kg	36	35	1	1	–	–	0.0059	–	0.0128	ND	0.0128	FBFA-22	J	7/18/2019
Beryllium	mg/kg	36	8	28	28	G	2	0.1717	0.209	0.382	ND	0.209	FBFA-3	J	7/11/2019
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	36	31	5	5	X	7	0.0514	0.0121	0.0204	ND	0.0121	FBFA-20	J	7/17/2019
Butyl Benzyl Phthalate	mg/kg	36	35	1	1	–	–	0.0061	–	0.021	ND	0.021	FBFA-26	J	8/22/2019
Calcium	mg/kg	36	0	36	8	N	1	293.1	359	874	10.2	359	FBFA-10	–	7/11/2019
Carbazole	mg/kg	36	35	1	1	–	–	0.0059	–	0.0129	ND	0.0129	FBFA-15	J	7/16/2019
Chromium	mg/kg	36	0	36	0	N	1	20.9	23.46	48.3	5.06	23.46	FBFA-26	–	8/22/2019
Chrysene	mg/kg	36	34	2	2	X	7	0.0071	0.0138	0.0367	ND	0.0138	FBFA-15	J	7/16/2019
Cobalt	mg/kg	36	2	34	14	X	7	0.6544	0.759	1.43	ND	0.759	FBFA-26	–	8/22/2019
Copper	mg/kg	36	0	36	5	X	4	16.85	73.05	468	0.788	73.05	FBFA-37	–	8/26/2019
Cyclohexane	mg/kg	36	35	1	1	–	–	0.0002	–	0.000573	ND	0.000573	FBFA-26	J	8/22/2019
Dichloromethane (Methylene Chloride)	mg/kg	36	34	2	2	X	4	0.0014	0.00467	0.0166	ND	0.00467	FBFA-37	J	8/26/2019
Di-n-butyl phthalate	mg/kg	36	28	8	8	X	7	0.0094	0.0149	0.0335	ND	0.0149	FBFA-20	J	7/17/2019
Fluoranthene	mg/kg	36	34	2	1	X	4	0.0106	0.0431	0.175	ND	0.0431	FBFA-15	–	7/16/2019
Indeno[1,2,3-cd]pyrene	mg/kg	36	35	1	1	–	–	0.006	–	0.0178	ND	0.0178	FBFA-22	J	7/18/2019
Iron	mg/kg	36	0	36	0	N	1	18238.89	20538	34200	2880	20538	FBFA-15	–	7/16/2019
Lead	mg/kg	36	0	36	3	G	2	5.576	6.661	21	1.64	6.661	FBFA-37	–	8/26/2019

Table A.3.2. Data Summary Table Ford Building Subunit Soil (1 to 4 ft) *(Continued/)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Magnesium	mg/kg	36	0	36	6	N	1	97.89	115.9	260	13.4	115.9	FBFA-23	–	7/18/2019
Manganese	mg/kg	36	0	36	0	N	1	16.79	20.4	61.5	1.42	20.4	FBFA-10	–	7/11/2019
Mercury	mg/kg	36	2	34	14	G	2	0.0293	0.0387	0.108	ND	0.0387	FBFA-23	–	7/18/2019
Methyl Ethyl Ketone	mg/kg	36	32	4	4	X	7	0.0013	0.00224	0.005	ND	0.00224	FBFA-25	J	8/22/2019
Methyl Tertiary Butyl Ether (MTBE)	mg/kg	36	35	1	1	–	–	0.0003	–	0.0033	ND	0.0033	FBFA-37	J	8/26/2019
Nickel	mg/kg	36	0	36	2	N	1	2.384	2.798	6.57	0.44	2.798	FBFA-26	–	8/22/2019
Phenanthrene	mg/kg	36	35	1	1	–	–	0.0094	–	0.14	ND	0.14	FBFA-15	J	7/16/2019
Potassium	mg/kg	36	0	36	0	N	1	93.74	107.7	197	29.3	107.7	FBFA-6	–	7/9/2019
Pyrene	mg/kg	36	34	2	1	X	4	0.0088	0.0301	0.109	ND	0.0301	FBFA-15	–	7/16/2019
Selenium	mg/kg	36	28	8	4	G	2	1.465	3.22	16.5	ND	3.22	FBFA-26	–	8/22/2019
Silver	mg/kg	36	34	2	2	X	7	0.0584	0.104	0.117	ND	0.104	FBFA-6	J	7/9/2019
Sodium	mg/kg	36	23	13	13	X	7	6.927	9.942	16.3	ND	9.942	FBFA-25	J	8/22/2019
Styrene	mg/kg	36	34	2	2	X	7	0.0002	3.55E-04	0.0004	ND	3.55E-04	FBFA-23	J	7/18/2019
Tetrachloroethylene (PCE)	mg/kg	36	35	1	1	–	–	0.0002	–	0.0007	ND	0.0007	FBFA-18	J	7/16/2019
Thallium	mg/kg	36	31	5	1	X	7	3.09	6.088	43.1	ND	6.088	FBFA-26	–	8/22/2019
Toluene	mg/kg	36	34	2	2	X	7	0.0002	3.54E-04	0.0005	ND	3.54E-04	FBFA-36	J	7/18/2019
Vanadium	mg/kg	36	0	36	0	N	1	58.06	65.56	21.0	14.3	65.56	FBFA-26	–	8/22/2019
Zinc	mg/kg	36	2	34	23	X	4	13.2	42.99	247	ND	42.99	FBFA-37	–	8/26/2019
Radionuclides															
Actinium-228	pCi/g	2	0	2	0	–	–	2.025	–	2.41	1.64	2.41	FBFA-1	–	7/9/2019
Bismuth-212	pCi/g	2	0	2	2	–	–	2.615	–	3.35	1.88	3.35	FBFA-11	J	7/15/2019
Bismuth-214	pCi/g	2	0	2	0	–	–	0.864	–	0.94	0.788	0.94	FBFA-1	–	7/9/2019
Gross Alpha	pCi/g	36	0	36	0	N	1	14.51	16.12	30.7	5.63	16.12	FBFA-27	–	7/22/2019
Lead-212	pCi/g	2	0	2	0	–	–	1.77	–	1.97	1.57	1.97	FBFA-11	–	7/15/2019
Lead-214	pCi/g	2	0	2	0	–	–	1.002	–	1.14	0.863	1.14	FBFA-1	–	7/9/2019
Nonvolatile Beta	pCi/g	36	0	36	4	N	1	7.056	7.823	13.9	3	7.823	FBFA-27	–	7/22/2019
Potassium-40	pCi/g	2	0	2	0	–	–	2.235	–	2.98	1.49	2.98	FBFA-1		7/9/2019
Thallium-208	pCi/g	2	0	2	0	–	–	0.5705	–	0.578	0.563	0.578	FBFA-11	–	7/15/2019
Thorium-228	pCi/g	6	0	6	4	N	1	1.898	2.498	3.33	1.24	2.498	FBFA-27	–	7/22/2019

Table A.3.2. Data Summary Table Ford Building Subunit Soil (1 to 4 ft) *(Continued/End)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Distr. Code	UCL Method	Mean	95% UCL	Max	Min	RME	Max Location	Qualifier of Max	Max Date
Thorium-230	pCi/g	6	4	2	2	X	7	0.6804	1.311	1.57	ND	1.311	FBFA-17	J	7/17/2019
Thorium-232	pCi/g	6	0	6	2	G	2	2.322	3.334	3.75	1.67	3.334	FBFA-27	–	7/22/2019
Uranium-233/234	pCi/g	6	1	5	4	X	7	0.9935	1.329	1.58	ND	1.329	FBFA-27	J	7/22/2019
Uranium-238	pCi/g	6	1	5	3	X	7	0.7072	0.995	1.18	ND	0.995	FBFA-13	–	7/15/2019

Distribution Code:
N Normal Distribution
L Lognormal Distribution
G Gamma Distribution
X Non-Parametric

UCL Method Code: (as determined by ProUCL)
1 Student's t UCL
2 Approximate Gamma UCL
3 95% H-UCL
4 95% Chebyshev UCL
5 97.5% Chebysev UCL
6 99% Chebyshev UCL
7 Kaplan-Meier (KM) t UCL
8 Hall's Bootstrap UCL

ND = Non-Detect

This page was intentionally left blank.

Table A.3.3. Data Summary Table Ford Building Subunit Soil (All Depths)

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Acetone	mg/kg	88	49	39	26	0.0067	0.0853	ND	FBFA-26	--	8/22/2019
Aluminum	mg/kg	89	0	89	4	8733.8	35700	1230	FBFA-17	--	8/21/2019
Anthracene	mg/kg	87	86	1	0	0.007	0.134	ND	FBFA-15	--	7/15/2019
Antimony	mg/kg	89	81	8	8	0.2499	2.4	ND	FBFA-7	J	7/9/2019
Aroclor 1254	mg/kg	88	76	12	4	0.0041	0.119	ND	FBFA-19	--	7/17/2019
Aroclor 1260	mg/kg	88	68	20	12	0.0029	0.0713	ND	FBFA-19	--	7/17/2019
Arsenic	mg/kg	89	0	89	43	3.875	14.5	0.54	FBFA-11	--	7/15/2019
Barium	mg/kg	89	0	89	8	11.97	62.1	0.315	FBFA-4	--	7/10/2019
Benzo(g,h,i)perylene	mg/kg	87	84	3	3	0.0066	0.0716	ND	FBFA-28	J	8/22/2019
Benzo[a]anthracene	mg/kg	87	85	2	2	0.0064	0.0684	ND	FBFA-28	J	8/22/2019
Benzo[a]pyrene	mg/kg	87	84	3	3	0.0066	0.0614	ND	FBFA-28	J	8/22/2019
Benzo[b]fluoranthene	mg/kg	87	80	7	7	0.0087	0.163	ND	FBFA-28	J	8/22/2019
Benzo[k]fluoranthene	mg/kg	87	84	3	3	0.0065	0.0658	ND	FBFA-28	J	8/22/2019
Beryllium	mg/kg	89	19	70	65	0.2424	4.55	ND	FBFA-21	--	7/17/2019
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	87	72	15	13	0.0089	0.0858	ND	FBFA-37	--	7/22/2019
Butyl Benzyl Phthalate	mg/kg	87	86	1	1	0.0058	0.021	ND	FBFA-26	J	8/22/2019
Cadmium	mg/kg	89	84	5	4	0.0829	1.03	ND	FBFA-20	--	7/17/2019
Calcium	mg/kg	89	4	85	16	388.8	5150	ND	FBFA-21	--	7/17/2019
Carbazole	mg/kg	87	85	2	2	0.0058	0.0173	ND	FBFA-15	J	7/16/2019
Chromium	mg/kg	89	0	89	4	19.66	230	2.44	FBFA-11	--	7/15/2019
Chrysene	mg/kg	87	83	4	4	0.0086	0.114	ND	FBFA-15	J	7/16/2019
Cobalt	mg/kg	89	10	79	34	0.8139	9.45	ND	FBFA-17	--	8/21/2019
Copper	mg/kg	89	0	89	25	9.56	468	0.476	FBFA-37	--	8/26/2019
Cumene (Isopropylbenzene)	mg/kg	88	84	4	2	0.0007	0.0473	ND	FBFA-26	--	8/22/2019
Cyclohexane	mg/kg	88	87	1	1	0.0002	0.0006	ND	FBFA-26	J	8/22/2019
Dichloromethane (Methylene Chloride)	mg/kg	88	74	14	10	0.0023	0.0178	ND	FBFA-38	J	8/28/2019
Di-n-butyl phthalate	mg/kg	87	69	18	18	0.0087	0.0338	ND	FBFA-21	J	7/17/201
Fluoranthene	mg/kg	87	81	6	5	0.0135	0.421	ND	FBFA-15	J	7/16/2019
Indeno[1,2,3-cd]pyrene	mg/kg	87	84	3	3	0.0066	0.0767	ND	FBFA-28	J	8/22/2019

Table A.3.3. Data Summary Table Ford Building Subunit Soil (All Depths) *(Continued)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Iron	mg/kg	89	0	89	3	15276	47200	919	FBFA-11	--	7/17/2019
Magnesium	mg/kg	89	1	88	19	201.2	2880	8.77	FBFA-21	--	7/17/2019
Lead	mg/kg	89	1	88	13	5.911	21.7	ND	FBFA-20	--	7/17/2019
Manganese	mg/kg	89	0	89	3	37.45	540	1.42	FBFA-21	--	7/17/2019
Mercury	mg/kg	88	14	74	31	0.022	0.144	ND	FBFA-19	--	7/17/2019
Methyl Ethyl Ketone	mg/kg	88	81	7	6	0.0012	0.0073	ND	FBFA-25	--	8/22/2019
Methyl Tertiary Butyl Ether (MTBE)	mg/kg	88	80	8	4	0.0005	0.0069	ND	FBFA-37	J	8/26/2019
N-Dioctyl Phthalate	mg/kg	87	86	1	1	0.0057	0.0146	ND	FBFA-17	J	8/21/2019
Nickel	mg/kg	89	0	89	8	2.255	17.2	0.182	FBFA-17	--	8/21/2019
Pentachlorophenol	mg/kg	87	86	1	1	0.0581	0.229	ND	FBFA-26	J	8/22/2019
Phenanthrene	mg/kg	87	85	2	2	0.0098	0.238	ND	FBFA-15	J	7/162019
Potassium	mg/kg	89	0	89	10	136.8	2170	16.1	FBFA-17	--	8/21/2019
Pyrene	mg/kg	87	81	6	5	0.0118	0.309	ND	FBFA-15	J	7/16/2019
Selenium	mg/kg	89	60	29	17	1.961	26.2	ND	FBFA-38	--	8/28/2019
Silver	mg/kg	89	84	5	3	0.0742	0.743	ND	FBFA-3	--	7/11/2019
Sodium	mg/kg	89	59	30	29	7.898	42.3	ND	FBFA-17	J	8/21/2019
Styrene	mg/kg	88	83	5	5	0.0002	0.0005	ND	FBFA-36	J	8/26/2019
Tetrachloroethylene (PCE)	mg/kg	88	86	2	2	0.0002	0.0007	ND	FBFA-18	J	7/16/2019
Thallium	mg/kg	89	67	22	5	3.905	55.1	ND	FBFA-38	--	8/28/2019
Toluene	mg/kg	88	84	4	4	0.0002	0.0009	ND	FBFA-36	J	7/18/2019
Tph By Gc/Fid Diesel Range Organics	mg/kg	6	4	2	2	43.68	159	ND	FBFA-37	J	8/26/2019
Trichloroethylene (TCE)	mg/kg	88	87	1	0	0.0002	0.0015	ND	FBFA-17	--	8/21/2019
Vanadium	mg/kg	89	0	89	2	46.12	187	7.17	FBFA-11	--	7/15/2019
Zinc	mg/kg	89	6	83	51	26.65	426	ND	FBFA-20	--	7/17/2019
Radionuclides											
Actinium-228	pCi/g	10	0	10	0	3.129	15.5	1.22	FBFA-7	--	8/19/2019
Bismuth-212	pCi/g	10	1	9	8	3.494	17.3	ND	FBFA-7	--	8/19/2019
Bismuth-214	pCi/g	10	0	10	0	1.377	6.16	0.458	FBFA-7	--	8/19/2019
Cesium-137	pCi/g	9	4	5	5	0.0771	0.153	ND	FBFA-3	J	7/11/2019
Cobalt-60	pCi/g	10	9	1	0	0.0872	0.545	ND	FBFA-21	--	7/17/2019

Table A.3.3. Data Summary Table Ford Building Subunit Soil (All Depths) *(Continued/End)*

Analyte	Units	Samples	Non-Detects	Detects	J-Detects	Mean	Max	Min	Max Location	Qualifier of Max	Max Date
Gross Alpha	pCi/g	88	0	88	0	14.65	90.2	2.82	FBFA-7	--	8/19/2019
Lead-212	pCi/g	10	0	10	0	3.132	16.2	1.02	FBFA-7	--	8/19/2019
Lead-214	pCi/g	10	0	10	0	1.593	7.37	0.664	FBFA-7	--	9/19/2019
Nonvolatile Beta	pCi/g	88	0	88	9	7.662	40.3	2.18	FBFA-7	--	8/19/2019
Potassium-40	pCi/g	10	0	10	6	4.398	24.8	1.07	FBFA-21	--	7/17/2019
Thallium-208	pCi/g	10	0	10	0	0.8783	4.56	0.285	FBFA-7	--	8/19/2019
Thorium-228	pCi/g	13	0	13	9	1.808	3.33	1.07	FBFA-27	--	7/22/2019
Thorium-230	pCi/g	13	6	7	6	0.8934	2.6	ND	FBFA-21	--	7/17/2019
Thorium-232	pCi/g	13	0	13	6	2.013	3.97	1.1	FBFA-7	--	8/19/2019
Uranium-233/234	pCi/g	13	2	11	8	1.068	1.89	ND	FBFA-7	J	8/19/2019
Uranium-238	pCi/g	13	1	12	5	1.09	2.57	ND	FBFA-7	--	8/19/2019

N D = Non-Detect

This page was intentionally left blank.

Table A.3.4. Unit Specific Constituent Screening Table Ford Building Subunit (All Depths)

Analyte	Units	Max[1] Result	Max Qualifier	Max Location	Top Depth *(ft)*	Bottom Depth *(ft)*	SRS 2X Mean Background[2]	Is Max Detect >2X SRS Mean Bkg?[3]
Inorganics								
Aluminum	mg/kg	35700		FBFA-17	28	30	13395	Yes
Antimony	mg/kg	2.40	J	FBFA-7	1	4	2.653	No
Arsenic	mg/kg	14.5		FBFA-11	0	1	4.453	Yes
Barium	mg/kg	62.1		FBFA-4	1	4	33.11	Yes
Beryllium	mg/kg	4.55		FBFA-21	0	1	0.305	Yes
Cadmium	mg/kg	1.03		FBFA-20	0	1	0.444	Yes
Calcium	mg/kg	5150		FBFA-21	0	1	334.0	Yes
Chromium	mg/kg	230		FBFA-11	0	1	22.87	Yes
Cobalt	mg/kg	9.45		FBFA-17	28	30	1.396	Yes
Copper	mg/kg	468		FBFA-37	1	4	6.352	Yes
Iron	mg/kg	47200		FBFA-11	0	1	22001	Yes
Lead	mg/kg	21.7		FBFA-20	0	1	10.83	Yes
Magnesium	mg/kg	2880		FBFA-21	0	1	245.7	Yes
Manganese	mg/kg	540		FBFA-21	0	1	63.28	Yes
Mercury	mg/kg	0.144		FBFA-19	0	1	0.067	Yes
Nickel	mg/kg	17.2		FBFA-17	28	30	4.154	Yes
Potassium	mg/kg	2170		FBFA-17	28	30	213.0	Yes
Selenium	mg/kg	26.2		FBFA-38	8	10	3.706	Yes
Silver	mg/kg	0.743		FBFA-3	0	1	0.637	Yes
Sodium	mg/kg	42.0	J	FBFA-17	28	30	43.56	No
Thallium	mg/kg	55.1		FBFA-38	8	10	2.936	Yes
Vanadium	mg/kg	187		FBFA-11	0	1	58.06	Yes
Zinc	mg/kg	426		FBFA-20	0	1	7.440	Yes
Polychlorinated Biphenyls (PCBs)								
Aroclor 1254	mg/kg	0.1190		FBFA-19	0	1	N/A	Yes
Aroclor 1260	mg/kg	0.0713		FBFA-19	0	1	N/A	Yes

Table A.3.4. Unit Specific Constituent Screening Table Ford Building Subunit (All Depths) *(Continued)*

Analyte	Units	Max[1] Result	Max Qualifier	Max Location	Top Depth *(ft)*	Bottom Depth *(ft)*	SRS 2X Mean Background[2]	Is Max Detect >2X SRS Mean Bkg?[3]
Volatile Organic Compounds								
Acetone	mg/kg	0.0853		FBFA-26	1	4	N/A	Yes
Cumene (Isopropylbenzene)	mg/kg	0.0473		FBFA-26	0	1	N/A	Yes
Cyclohexane	mg/kg	0.000573	J	FBFA-26	1	4	N/A	Yes
Dichloromethane (Methylene Chloride)	mg/kg	0.017800	J	FBFA-38	8	10	N/A	Yes
Methyl Ethyl Ketone	mg/kg	0.007270		FBFA-25	0	1	N/A	Yes
Methyl Tertiary Butyl Ether (MTBE)	mg/kg	0.006930	J	FBFA-37	28	30	N/A	Yes
Styrene	mg/kg	0.000454	J	FBFA-36	8	10	N/A	Yes
Tetrachloroethylene (PCE)	mg/kg	0.000720	J	FBFA-18	1	4	N/A	Yes
Toluene	mg/kg	0.000902	J	FBFA-36	0	1	N/A	Yes
Trichloroethylene (TCE)	mg/kg	0.001450		FBFA-17	28	30	N/A	Yes
Semi-Volatile Organic Compounds								
Anthracene	mg/kg	0.1340		FBFA-15	1	4	N/A	Yes
Benzo(g,h,i)perylene	mg/kg	0.0716	J	FBFA-28	0	1	N/A	Yes
Benzo[a]anthracene	mg/kg	0.0684	J	FBFA-28	0	1	N/A	Yes
Benzo[a]pyrene	mg/kg	0.0614	J	FBFA-28	0	1	N/A	Yes
Benzo[b]fluoranthene	mg/kg	0.1630	J	FBFA-28	0	1	N/A	Yes
Benzo[k]fluoranthene	mg/kg	0.0658	J	FBFA-28	0	1	N/A	Yes
Bis(2-ethylhexyl)phthalate (DEHP)	mg/kg	0.0858		FBFA-37	0	1	N/A	Yes
Butyl Benzyl Phthalate	mg/kg	0.0210	J	FBFA-26	1	4	N/A	Yes
Carbazole	mg/kg	0.0173	J	FBFA-15	0	1	N/A	Yes
Chrysene	mg/kg	0.1140	J	FBFA-15	0	1	N/A	Yes
Di-n-butyl phthalate	mg/kg	0.0338	J	FBFA-21	0	1	N/A	Yes
Fluoranthene	mg/kg	0.4210	J	FBFA-15	0	1	N/A	Yes
Indeno[1,2,3-cd]pyrene	mg/kg	0.0767	J	FBFA-28	0	1	N/A	Yes
N-Dioctyl Phthalate	mg/kg	0.0146	J	FBFA-17	18	20	N/A	Yes
Pentachlorophenol	mg/kg	0.2290	J	FBFA-26	0	1	N/A	Yes

Table A.3.4. Unit Specific Constituent Screening Table Ford Building Subunit (All Depths) *(Continued/End)*

Analyte	Units	Max[1] Result	Max Qualifier	Max Location	Top Depth *(ft)*	Bottom Depth *(ft)*	SRS 2X Mean Background[2]	Is Max Detect >2X SRS Mean Bkg?[3]
Semi-Volatile Organic Compounds *(cont'd)*								
Phenanthrene	mg/kg	0.2380	J	FBFA-15	0	1	N/A	Yes
Pyrene	mg/kg	0.3090	J	FBFA-15	0	1	N/A	Yes
Tph By Gc/Fid Diesel Range Organics	mg/kg	159	J	FBFA-37	28	30	N/A	Yes
Radionuclides								
Actinium-228	pCi/g	15.5		FBFA-7	28	30	2.146	Yes
Bismuth-212	pCi/g	17.3		FBFA-7	28	30	N/A	Yes
Bismuth-214	pCi/g	6.16		FBFA-7	28	30	2.115	Yes
Cesium-137	pCi/g	0.153	J	FBFA-3	0	1	0.093	Yes
Cobalt-60	pCi/g	0.545		FBFA-21	0	1	N/A	Yes
Gross Alpha	pCi/g	90.2		FBFA-7	28	30	21.639	Yes
Lead-212	pCi/g	16.2		FBFA-7	28	30	2.241	Yes
Lead-214	pCi/g	7.37		FBFA-7	28	30	N/A	Yes
Nonvolatile Beta	pCi/g	40.3		FBFA-7	28	30	17.296	Yes
Potassium-40	pCi/g	24.8		FBFA-21	0	1	2.519	Yes
Thallium-208	pCi/g	4.56		FBFA-7	28	30	N/A	Yes
Thorium-228	pCi/g	3.33		FBFA-27	1	4	2.213	Yes
Thorium-230	pCi/g	2.60		FBFA-21	0	1	1.352	Yes
Thorium-232	pCi/g	3.97		FBFA-7	28	30	2.085	Yes
Uranium-233/234	pCi/g	1.89	J	FBFA-7	28	30	1.295	Yes
Uranium-238	pCi/g	2.57		FBFA-7	28	30	1.009	Yes

Table Notes:

1 = Max = Maximum Detected Concentration from All Depth Intervals.

2 = *Background Soils Statistical Summary Report for the Savannah River Site*, ERD-EN-2005-0223, Appendix B-2 (All Depth Intervals).

3 = Constituents Identified as an USC if Maximum Detected Concentration is Greater Than 2X SRS Mean Concentration.

J = Estimated Value.

NA = Not Available.

This page was intentionally left blank.

APPENDIX B

CONTAMINANT FATE AND TRANSPORT

(This page was intentionally left blank)

TABLE OF CONTENTS

Section **Page**

LIST OF FIGURES **B-4**
LIST OF TABLES **B-4**
LIST OF ABBREVIATIONS AND ACRONYMS **B-5**
B-1. Contaminant Fate and Transport **B-9**
B-2. Contaminant Migration Model **B-10**
B-2.1. Background ***B-10***
B-2.2. Screening Methods ***B-11***
B-2.3. Soil Screening Equations ***B-13***
B-2.3.1. Dilution Attenuation Factor B-14
B-2.3.2. Soil Partitioning B-15
B-2.3.3. Mean Travel Time B-18
B-2.3.4. Incorporating Decay B-19
B-2.3.5. Saturation Concentration B-20
B-2.3.6. Groundwater Concentration B-20
B-2.4. ECODS N-1, CSSLP, and Ford Building OU Modeling Parameters ***B-21***
B-2.5. Results of the Tier I and Tier II Analyses ***B-23***
B-2.5.1. ECODS N-1 Subunit B-24
B-2.5.2. CSSLP Subunit Upland Soil B-25
B-2.5.3. CSSLP Subunit Surface Water Impoundment Area B-26
B-2.5.4. Surrounding Soils of the Ford Building Subunit B-26
B-2.6. Uncertainty Discussion ***B-27***
B-2.6.1. CSSLP Subunit Upland Soil Uncertainty Analysis B-28
B-2.6.2. CSSLP Subunit Surface Water Impoundment Area Uncertainty Analysis B-29
B-2.7. Supplemental Modeling ***B-30***
B-2.7.1. Approach B-30
B-2.7.2. Conceptual Model B-30
B-2.7.3. Model Inputs B-31
B-2.7.4. Model Results B-32
B-2.8. Conclusions ***B-33***
B-3. References **B-33**

LIST OF FIGURES

Figure		Page
Figure B-1.	Location of ECODS N-1 (NBN) Subunit Samples	35
Figure B-2.	Location of Central Shops Scrap Lumber Pile (631-2G) Subunit Samples	36
Figure B-3.	Location of Surrounding Soils of the Ford Building (690-N) Subunit Samples	37
Figure B-4.	VZCOMML© Contamination Migration Conceptual Diagram	39
Figure B-5.	GoldSim® Predicted Arsenic Concentrations at the Points of Assessment	41

LIST OF TABLES

Table		Page
Table B-1.	Chemical Parameters Used for Screening	43
Table B-2.	Vadose Zone Layers for the Four ECODS N-1, CSSLP, and Ford Building OU Subunits	47
Table B-3.	Physical Parameters Used for Screening	48
Table B-4.	Subunit-Specific Model Parameters	49
Table B-5.	Tier I Screening Results for the ECODS N-1 Subunit	50
Table B-6.	Tier II Simulation Results for the ECODS N-1 Subunit	52
Table B-7.	Tier I Screening Results for the CSSLP Subunit Upland Soil	53
Table B-8.	Tier II Simulation Results for the CSSLP Subunit Upland Soil	56
Table B-9.	Tier I Screening Results for the CSSLP Subunit Surface Water Impoundment Area	57
Table B-10.	Tier II Simulation Results for the CSSLP Subunit Surface Water Impoundment Area	58
Table B-11.	Tier I Screening Results for the Surrounding Soils of the Ford Building Subunit	59
Table B-12.	Tier II Simulation Results for the Surrounding Soils of the Ford Building Subunit	63
Table B-13.	Summary Table of Tier I and Tier II Screening Results	64

LIST OF ABBREVIATIONS AND ACRONYMS

θ_e	effective moisture content
θ_{ei}	layer *i* effective moisture content
θ_w	water-filled soil porosity
θ_{wi}	layer *i* water-filled soil porosity
θ_a	air-filled soil porosity
η_e	effective porosity
η_{ei}	layer *i* effective porosity
η_t	total porosity
η_{ti}	layer *i* total porosity
ρ_b	dry soil bulk density
λ	decay rate constant
ac	acre
bgs	below ground surface
b_i	layer *i* Clapp and Hornberger "*b*" parameter based on soil texture
C_{gw}	groundwater concentration
CM	contaminant migration
COC	constituent of concern
COPC	constituent of potential concern
C_{sat}	saturation concentration
CSSLP	Central Shops Scrap Lumber Pile (631-2G)
C_t	input contaminant soil concentration
d	mixing zone depth (minimum of d_i and d_a)
D&D	Deactivation and Decommissioning
d_a	measured saturated zone thickness
DAF	dilution attenuation factor
DDD	dichlorodiphenyldichloroethane
d_i	calculated mixing zone depth
d_s	average source thickness
ECODS	Early Construction and Operational Disposal Site
ED	exposure duration
ft/ft	feet per feet
f_{oc}	soil organic carbon content as mass fraction
ft	feet, foot

LIST OF ABBREVIATIONS AND ACRONYMS

ft/yr	feet per year
Ford Building	Process Heat Exchanger Repair Facility (Building 690-N)
H', *H*	Henry's Law Constant
ha	hectare
i	saturated zone hydraulic gradient
in	inch
I	infiltration rate through vadose zone
K_a	saturated zone hydraulic conductivity
K_d, K_d	soil-water partitioning coefficient
kg/L	kilogram per liter
kg/m^3	kilogram per cubic meter
K_{oc}, K_{oc}	organic carbon partitioning coefficient
K_{si}	layer *i* Clapp and Hornberger "*K*" parameter based on soil texture
kV	kilovolt
L	length of the source parallel to groundwater flow
L/kg	liter per kilogram
LUC	land use control
L_v	length from the bottom of the source zone to the top of the water table
m	meter
MCL	maximum contaminant level
µg/L	microgram per liter
mg/kg	milligram per kilogram
mg/L	milligram per liter
MLSSL	mass-limited soil screening level
NA	not available
NBN	no building number
NAPL	non-aqueous phase liquid
OU	Operable Unit
PCB	polychlorinated biphenyl
pCi/g	picocurie per gram
POA	point of assessment
R	retardation coefficient
RCOC	refined constituent of concern
RGO	remedial goal options

LIST OF ABBREVIATIONS AND ACRONYMS

RSL	regional screening level
S, *S*	solubility
SCDHEC	South Carolina Department of Health and Environmental Control
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
SSL	soil screening limit
t	time of exposure
$T_{1/2}$, $t_{1/2}$	half-life
T_c	total depth of soil column
T_e	evaluation time
T_{hi}	layer *i* vertical thickness
T_{Mean}, T_t	mean travel time
T_{ti}	layer *i* mean travel time
µg/L	microgram per liter
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
V_s	vadose zone mean pore water velocity
V_{si}	layer *i* mean pore water velocity
VZCOMML©	Vadose Zone Contaminant Migration Multi-Layered Model, Version 4.0
WSRC	Washington Savannah River Company
WSRC	Westinghouse Savannah River Company
yr	year

This page was intentionally left blank.

B-1. CONTAMINANT FATE AND TRANSPORT

The purpose of this Appendix is to determine the fate and transport of contaminants associated with 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) [ECODS N-1, CSSLP, and Ford Building] Operable Unit (OU) subunits. The ECODS N-1, CSSLP, and Ford Building OU is comprised of three subunits:

- ECODS N-1
- CSSLP
- Ford Building

For the purpose of fate and transport modelling and evaluation, the three subunits were further broken down into the ECODS N-1 (Figure B-1), the CSSLP subunit upland soils (Figure B-2), the sediment of the CSSLP subunit surface water impoundment area(Figure B-2), the Ford Building slab and underlying soils, and the soils surrounding the Ford Building (Figure B-3). The fate and transport modeling for the Ford building slab and underlying soils was performed and documented in the Ford Building Decommissioning Project Final Report (SRNS 2021). Characterization activities for the ECODS N-1, CSSLP, and Ford Building OU subunits were completed for soil, sediment, and surface water media in 2001, 2014, and 2019. Additionally, a recent characterization effort was conducted in 2020 to address any data gaps from previous investigations. Collected soil and sediment data was used to evaluate the fate and transport of contaminants in the ECODS N-1, CSSLP, and Ford Building OU subunits. Sampling locations are shown in Figures B-1 through B-3.

The contaminant fate and transport assessment was performed using the spreadsheet model VZCOMML© (V.4.0)[a], which accounts for decay processes, infiltration rate, soil properties,

[a] Vadose Zone Contaminant Migration Multi-Layered Model (VZCOMML©) Version 4.0, Copyright TXu 1-663-361, 2009, Savannah River Nuclear Services, LLC.

vadose zone thickness, and chemical behavior. Soil screening limits (SSLs) were calculated by the model and an exceedance of a SSL by a vadose zone constituent indicates that the resultant maximum groundwater concentration has the potential to exceed the regulatory limits (e.g., maximum contaminant levels [MCLs]).

B-2. CONTAMINANT MIGRATION MODEL

B-2.1. Background

As discussed, the ECODS N-1, CSSLP, and Ford Building OU consists of three subunits. The ECODS N-1 subunit is located just south of N Area in relatively flat terrain, approximately 23 m (75 ft) south of the railroad tracks, which run adjacent to N Area (Figure B-1). The area surrounding the ECODS N-1 subunit is wooded with heavy underbrush. It contains no stressed vegetation or other visual indications of contamination. The ECODS N-1 subunit was used to dispose of materials associated with the construction and operation of N Area. The ECODS N-1 subunit was in use from August 1952 to June 1954. The subunit is approximately107 m (350 ft) long by 15 m (50 ft) wide. Waste disposed of in ECODS N-1 was buried in two trenches, each approximately 46 m (150 ft) long, located end to end.

The CSSLP subunit was historically used as an equipment laydown and rubble storage area in addition to an area for burning construction related materials. Various unknown amounts and types of wood scrap were burned at the CSSLP subunit which may have included treated lumber and/or creosote-treated wood. The CSSLP subunit surface water impoundment area was constructed between 1992 and 1994 in the southern portion. Surface water runoff from the CSSLP subunit upland soil area flows into the CSSLP subunit surface water impoundment area. The U.S. Department of Energy (USDOE), the U.S. Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC) agreed to address the surface water impoundment area and upland soil together as the CSSLP subunit. For purposes of contaminant fate and transport modelling, the two units were evaluated separately as the CCSLP upland soil and the CSSLP subunit surface water impoundment area. The CSSLP subunit as a whole measure approximately 91.4 m (300 ft) by 91.4 m (300 ft) and covers about 0.84 ha (2.07 ac).

The Ford Building was constructed in the 1950s and performed multiple missions while active until the 1990s. At points in the building's history, it was used to test Ford Company-manufactured motor control packages, and repair/rework of leaking contaminated process water heat exchangers for Savannah River Site's (SRS) reactors. After completion of active missions, the building and surrounding area was used to store excess equipment (in waste containers [e.g., Sealands] and/or bagged/wrapped in plastic) that was chemically and/or radiologically contaminated. The Ford Building is located on the southeastern side of N Area, within the facility boundary. The administrative plan for the Ford Building structure is for it to undergo Deactivation and Decommissioning (D&D) using the Integrated Sampling Model. Following D&D, an engineered concrete cap was installed, extending out 0.3 m (1 ft) from the building edge (SRNS 2019, 2021). Post-decommissioning facility remnants (including the building slab) will be closed as part of the ECODS N-1, CSSLP, and Ford Building OU. Ancillary equipment and other areas that will also be included in the closure process of this OU are the remnants of a: 1) 13.8 kilovolt (kV) Substation (652-44N), 2) a Fuel Oil Tank Containment Dike, 3) Shielding Remnant Area, and 4) the 745-N Excess Equipment Yard (Figure B-3). These four areas were included in the Contaminant Fate and Transport modelling for the surrounding soils of the Ford Building subunit. The fuel oil tank has been removed and only the concrete dike remains. The 13.8 kV substation has been dismantled and now only contains fencing. The surrounding soils of the Ford Building subunit cover an area that is approximately 145 m by 154 m (475 ft by 505 ft) and is approximately168 ha (416 ac).

B-2.2. Screening Methods

This section describes screening methods used for identifying contaminant migration (CM) constituents of potential concern (COPCs) and CM constituents of concern (COCs). The identification of CM COPCs and CM COCs is facilitated by the program VZCOMML© V.4.0.

This CM evaluation follows the protocols and guidelines established in the *Environmental Compliance and Area Completion Projects Regulatory Document Handbook* (SRNS 2012). For the Tier I screen, each subunit was modeled under 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). Constituents predicted by the model to impact

groundwater at concentrations exceeding action levels were retained as Tier I CM COPCs. A less conservative set of assumptions were used for the Tier II analysis to assess impact to groundwater at concentrations exceeding action levels within the evaluation timeframe of 1,000 years.

Both the Tier I and Tier II screens include infinite source mass and limited source mass calculations. In reality, the consideration of an infinite source mass is not reasonable, so the mass-limited calculations (default mass-limited SSLs and SRS site-specific mass-limited SSLs [MLSSL] $_{T1/2}{}^{s}$) consider the entire release of the source mass within a 70-year exposure period. This prevents a source mass balance error (i.e., releasing more contaminant mass than is actually contained in the source) in the calculation, which is likely with the infinite source scenario. Equations used to calculate Tier I SSLs and MLSSLs, and Tier II $SSL_{T1/2}{}^{s}$ and $MLSSL_{T1/2}{}^{s}$ are provided below in the following Section B-2.3.

The spreadsheet model VZCOMML© (V.4.0) was developed at SRS to facilitate SSL calculations and Tier I/Tier II soil data screens. VZCOMML© simultaneously calculates SSLs for Target Analyte List and Target Compound List constituents, and for specified radionuclides (a total of 219 constituents). VZCOMML© compares user-entered soil concentrations to SSLs and identifies constituents that are Tier I and Tier II CM COPCs and Tier II CM COCs. Chemical properties of analytes used by VZCOMML© (e.g., soil/water distribution coefficient, Henry's Law constant, etc.) are listed in Table B-1. VZCOMML© also contains assigned hydraulic functions for different types of soil layers (e.g., source layer, soil layer, or engineered barrier layer) and texture classifications (e.g., sand, loamy sand, clay, concrete) within the soil column. VZCOMML© calculates groundwater concentrations and migration times from input data and compares and evaluates user-entered concentrations to SSLs to identify constituents that are CM COPCs and CM COCs.

If CM COCs are identified, it is up to the user to evaluate results and apply professional judgment, other modeling approaches, and/or knowledge of site conditions and geochemistry to further refine the list of CM COCs. The CM refined COCs (RCOCs) include those constituents that are mobile at that waste unit and can leach to the aquifer within a 1,000-year travel time (per the Federal

Facilities Agreement protocols) and exceed drinking water standards at a receptor well located adjacent to the edge of the waste unit.

B-2.3. Soil Screening Equations

Equations used by VZCOMML© are consistent with USEPA Soil Screening Guidance (USEPA 1996, 2000). A conceptual framework of the model and vadose zone and screening parameters for VZCOMML© is provided in Figure B-4. Model assumptions include:

1. A receptor drinking water well at the downgradient edge of the source zone with the well screen located in the plume.

2. Linear equilibrium isotherms are used rather than exponential isotherms (this is typically a conservative estimate [i.e., likely transports more contaminant to water table] of partitioning into the aqueous phase of a moving front).

3. Uniformly distributed contamination in the subsurface (this is also typically a conservative estimate using the highest measured concentration value; however, limited soil sampling in an area with widely varying, heterogeneous contaminant distributions may lead to underprediction of localized contaminant transport).

4. Instantaneous equilibrium partitioning within soil, vapor, and liquid phases (this is typically a conservative estimate [i.e., likely transports more contaminant to water table] of partitioning into the aqueous phase of a moving front for compounds that have lower Henry's Law constants).

Generally, the source zone layer thickness represents the vertical extent of contamination. Layer 1 is the source zone and Layers 2 through 5 (if applicable) are the vadose zone layers beneath the source zone and were used to simulate soil heterogeneity in the soil column. These layers can accommodate different hydraulic functions, soil textures, properties, and layer thicknesses for up to five soil layers. The aquifer layer represents the shallowest water table aquifer. Following is a discussion of the equations used by VZCOMML© for the soil screening process.

B-2.3.1. Dilution Attenuation Factor

The dilution attenuation factor (*DAF*) represents leachate dilution in the water table aquifer. The *DAF* calculation assumes that the aquifer is unconfined, unconsolidated, isotropic and homogeneous. The minimum *DAF* is one, which indicates no dilution occurs in the aquifer. The USEPA recommends a default *DAF* of 20 for sites up to 0.2 ha (0.5 ac) whenever site-specific data are not available (USEPA 1996). The *DAF* (dimensionless) is calculated as follows:

$$DAF = 1 + \frac{K_a \cdot i \cdot d}{I \cdot L}$$

where;

K_a = saturated zone (aquifer) hydraulic conductivity (ft/yr)

i = saturated zone (aquifer) hydraulic gradient (ft/ft)

I = infiltration rate through vadose zone (ft/yr)

L = length of the source (parallel to groundwater flow) (ft)

d_a = measured saturated zone (aquifer) thickness (ft)

d_i = calculated mixing zone depth (ft)

d = mixing zone depth (minimum of d_i and d_a) (ft)

If the input infiltration rate through the vadose zone is greater than any of the individual vadose zone layer saturated hydraulic conductivities, then the infiltration rate is adjusted to the maximum of the individual vadose zone layer saturated hydraulic conductivities. The mixing zone depth (d_i) is calculated as follows:

$$d_i = \sqrt{0.0112 \cdot L^2} + d_a\left(1 - e^{\left(-L \cdot I/(K_a \cdot i \cdot d_a)\right)}\right)$$

The d_i calculated value cannot exceed the actual aquifer thickness. Therefore, the mixing zone depth is the minimum of d_i or d_a. This can tend to underpredict localized contaminant concentrations in groundwater by immediately diluting the concentrations over the full aquifer extent when the contaminant reaches groundwater but is adjustable to accommodate mixing or lack thereof.

B-2.3.2. Soil Partitioning

The SSL soil concentration is back-calculated by two methods: 1) SSL (infinite source) and 2) MLSSL (finite source). The Tier I SSL assumes an infinite source and uses a linear equilibrium soil-water partitioning isotherm. The Tier I SSL (*TierI_SSL*, mg/kg) is calculated for organic contaminants and mercury (with vapor phase) as follows:

$$TierI_SSL = \frac{MCL}{1000} \cdot DAF \cdot \left[K_d + \frac{(\theta_w + \theta_a \cdot H)}{\rho_b}\right]$$

where;

MCL = water-phase concentration limit standard (i.e., MCL or regional screening level [RSL]) micrograms per liter (µg/L)

K_d = soil-water partitioning coefficient (liter per kilogram [L/kg])

θ_w = water-filled soil porosity (unitless)

θ_a = air-filled soil porosity (unitless), $\theta_a = n_t - \theta_w$

n_t = total porosity (unitless)

H = Henry's Law constant (dimensionless)

ρ_b = dry soil bulk density (kilogram per liter [kg/L])

The Tier I SSL (*TierI_SSL*, mg/kg) equation for inorganic contaminants (without vapor phase) is:

$$TierI_SSL = \frac{MCL}{1000} \times DAF \times \left(K_d + \frac{\theta_w}{\rho_b}\right)$$

The Tier I SSL (*TierI_SSL*, pCi/g) for radionuclides is:

$$TierI_SSL = DefaultSSL \times \left(\frac{\lambda t}{1 - e^{(-\lambda t)}}\right)$$

where;

t = time of exposure (USEPA default value of 30 yrs)

λ = decay rate constant ($\frac{\ln(2)}{t_{1/2}}$ [yrs^{-1}])

$t_{½}$ = half-life (yrs)

For organic constituents, the soil-water partitioning coefficient (K_d) (L/kg) is defined by:

$$K_d = f_{OC} \cdot K_{OC}$$

where;

f_{oc} = soil organic carbon content as mass fraction (unitless)

K_{oc} = organic carbon partitioning coefficient (L/kg)

For metals or radionuclides, the K_d is taken from literature and is dependent on the chemical form that exists and the geochemical environment at each site. Normally, the K_d is derived from laboratory column studies. The water-filled porosity (θ_w) is based on a weighted average for all vadose zone layers and calculated as follows:

$$\theta_w = \sum_{i=1}^{n} \left(\frac{T_{hi}}{T_c}\right) \theta_{wi}$$

where;

T_{hi} = layer *i* vertical thickness (ft)

T_c = total depth of soil column (ft), $T_c = (d_s + L_v)$

L_v = length from the bottom of the source zone to the top of the water table (ft)

θ_{wi} = layer *i* water-filled soil porosity (unitless)

The soil texture is determined for the different layers or soil types observed in the vadose zone, and the soil layer parameters are used to calculate the volumetric water content as follows:

$$\theta_{wi} = n_{ti} \left(\frac{I}{K_{si}}\right)^{\left[\frac{1}{(2b_i+3)}\right]}$$

where;

n_{ti} = layer *i* total porosity (unitless)

K_{si} = layer *i* Clapp and Hornberger "*K*" parameter based on soil texture (ft/yr)

b_i = layer *i* Clapp and Hornberger "*b*" parameter based on soil texture (dimensionless)

The vadose zone total porosity (n_t, unitless) and vadose zone effective porosity (n_e, unitless) are both based on a weighted average for all vadose zone layers and calculated as follows:

$$n_t = \sum_{i=1}^{n} \left(\frac{T_{hi}}{T_c}\right) \times n_{ti}$$

$$n_e = \sum_{i=1}^{n} \left(\frac{T_{hi}}{T_c}\right) \times n_{ei}$$

where;

n_{ei} = layer *i* effective porosity (unitless)

The effective moisture content θ_e (fraction) is a weighted average for all vadose zone layers as follows:

$$\theta_e = \sum_{i=1}^{n} \left(\frac{T_{hi}}{T_c}\right) \times \theta_{ei}$$

where;

θ_{ei} = layer *i* effective moisture content (unitless)

To solve the mass-balance violations inherent in the infinite source equation, USEPA developed the MLSSL (*TierI_MLSSL*, mg/kg) for organics and metals as follows:

$$TierI_MLSSL = \frac{MCL}{1000} \cdot DAF \cdot \frac{I \times ED}{(\rho_b \times d_s)}$$

where;

ED = exposure duration in years (USEPA default value of 70 yrs)

d_s = average source thickness (ft)

The MLSSL (*TierI_MLSSL*, pCi/g) equation for radionuclides is:

$$TierI_MLSSL = DefaultMLSSL \cdot \left(\frac{\lambda t}{1 - e^{(-\lambda t)}}\right)$$

B-2.3.3. Mean Travel Time

The mean travel time (T_{Mean} or T_t, yrs) through the vadose zone layers below the source is calculated in VZCOMML© as follows:

$$T_{Mean} = \frac{L_v \cdot R}{V_s}$$

The retardation coefficient (R, dimensionless) is calculated as:

$$R = 1 + \frac{\left(K_d \cdot \rho_\beta\right)}{\theta_e}$$

The mean pore water velocity in the vadose zone (V_s, ft/yr) is a weighted average calculated by:

$$V_s = \sum_{i=1}^{n} \left(\frac{T_{ti}}{T_t}\right) \cdot V_{si}$$

where;

V_{si} = layer i mean pore water velocity (ft/yr)

T_{ti} = layer i mean travel time (yr)

T_t = travel time (yr)

By applying Darcy's Law in the unsaturated zone and assuming steady-state conditions;

$$V_{si} = \frac{\mathrm{I}}{\theta_{wi}}$$

Darcy's Law is not applicable to unstable vadose zone flow, which typically exhibits fingering and other nonlinear behavior, however over most areas this method will typically be a conservative one (i.e., likely transports more contaminant on average to the water table) assuming appropriate

hydraulic conductivity values are selected. One pitfall is that preferential pathways are not uncommon and can rapidly transport water (and contaminant) faster than Darcy derived flow in small, localized areas.

B-2.3.4. Incorporating Decay

To account for the radioactive decay, chemical degradation, hydrolysis, or biodegradation of constituents and for redistribution of mass in the vadose zone, the Tier I SSLs and Tier I MLSSLs are adjusted using first-order equations in the Tier II SSL $T_{1/2}$ ($TierII_SSL_{T1/2}$) and Tier II MLSSL $T_{1/2}$ ($TierII_MLSSL_{T1/2}$) as follows:

$$TierII_SSL_{T1/2} = \left(\frac{TierI_SSL}{e^{(-\lambda T_{Mean})}}\right) \cdot \left(\frac{T_c}{d_s}\right)$$

$$TierII_MLSSL_{T1/2} = \frac{TierI_MLSSL}{e^{(-\lambda ED)}}$$

where;

T_{Mean} = the mean travel time (yr)

A half-life for a chemical compound is largely determined from literature sources. Because there is usually variability of the reported half-life of a chemical compound (e.g., aerobic and anaerobic rates), the most conservative (longest) half-life is selected as the rate constant in the equations. The rate constants used in the VZCOMML© model are primarily derived from the publications of P. H. Howard, et al and D. McKay, et al, but other references were also used such as USEPA's Estimation Program Interface Suite software and USEPA's Human Health Risk Assessment Parameters database.

VZCOMML© assumes equilibration, mass redistribution, and conservation of mass in the source zone between phases (i.e., volatilized, dissolved, or sorbed) and throughout the entire vadose zone volume. This results in more realistic SSLs, which accounts for vadose zone thickness, travel time, and chemical behavior in the subsurface.

The VZCOMML© screening decision logic for a constituent 'fails' if; 1) the mean travel time (T_{Mean}) through the vadose zone is less than 1,000 years, and 2) the source concentration exceeds the Tier II $MLSSL_{T1/2}$ and 3) the groundwater concentration exceeds an action level (i.e., the calculated concentration in groundwater would exceed the regulatory limit; MCLs or RSLs). In this case, the constituent would be retained as a CM COC and subject to further CM COC refinement steps.

B-2.3.5. Saturation Concentration

For organic (non-radioactive) constituents, the saturation concentration (C_{sat}) (mg/kg) is calculated from the solubility constant in water (S) (milligrams per liter [mg/L]) as follows:

$$C_{sat=}\frac{S}{\rho_b}\cdot(K_d+\rho_b+\theta_w+H\cdot\theta_a)$$

The C_{sat} is a theoretical concentration that represents a pure non-aqueous phase liquid (NAPL) or solid threshold concentration in soil. The C_{sat} is compared to the detected concentration to predict if a NAPL phase compound is present in the soil.

B-2.3.6. Groundwater Concentration

The concentration of constituents in groundwater in the water table aquifer is directly calculated by VZCOMML© for comparison to groundwater regulatory limits. The groundwater concentration (C_{gw}, µg/L) is calculated as follows (Rucker 2011):

For organic contaminants (including mercury with vapor phase);

$$C_{gw}=\frac{\left(\frac{C_t\cdot 1000}{DAF}\right)\times e^{(-\lambda T_{mean})}}{\left(K_d+\frac{(\theta_w+H\cdot\theta_a)}{\rho_b}\right)\times\left(\frac{\lambda t}{1-e^{(-\lambda t)}}\right)}\cdot\left(\frac{d_s}{T_c}\right)$$

where;

C_t = input contaminant soil concentration (mg/kg)

For inorganic contaminants (including metals [note: metals use an infinite half-life] and radionuclides and excluding mercury with vapor phase):

$$C_{gw} = \frac{\left(\frac{C_t \cdot 1000}{DAF}\right) \cdot e^{(-\lambda T_{mean})}}{\left(K_d + \frac{\theta_w}{\rho_b}\right) \cdot \left(\frac{\lambda t}{1 - e^{(-\lambda t)}}\right)} \cdot \left(\frac{d_s}{T_c}\right)$$

VZCOMML© assumes equilibration, redistribution, and conservation of mass of the source between phases (i.e., volatilized, dissolved, or sorbed) and distribution throughout the entire vadose zone volume. The concentration of constituents in groundwater in the water table aquifer is directly calculated by VZCOMML© for comparison to groundwater regulatory limits or standards.

B-2.4. ECODS N-1, CSSLP, and Ford Building OU Modeling Parameters

Vadose zone contaminant migration simulations are presented in this section, using the VZCOMML© spreadsheet, for the four ECODS N-1, CSSLP, and Ford Building OU subunits. The vadose zone soil layers for the various subunits were modeled based on the best available data from previous soil boring activities, as well as recent soil core descriptions. The layers differed for each subunit and were modeled as shown in Table B-2.

These steps are used to perform the CM analysis, for each subunit:

1. Analytical soil data are compiled and evaluated. The data are processed to purge all quality assurance data and rejected (R qualified) data. The data were further processed to select the maximum detected concentration for each analyte.

2. A conceptual site model is developed for the waste unit, which includes depth of contamination (source zone; Layer 1), vadose zone thickness below the source (Soil Layers 2-5) and assigned values for several hydrogeological parameters.

3. VZCOMML© Tier I screening is performed, using two conservative assumptions: a) for each analyte, the maximum detected soil concentration is used to represent the soil concentration (C_t), and b) the thickness of the source zone is assumed to be equal to the depth of the deepest

available soil sample. An analyte was retained as a Tier I CM COPC if the source zone concentration was greater than both the Tier I Source-Specific SSL and the Tier I MLSSL.

4. VZCOMML© Tier II Simulation 1 is run, using two conservative assumptions: (a) for each analyte, the maximum detected soil concentration is used to represent the soil concentration (C_t), and (b) the thickness of the source zone is assumed to be equal to the depth of the deepest available soil sample. Analytes predicted to impact groundwater at concentrations exceeding action levels within the evaluation time of 1,000 years, under the conservative conditions simulated, are retained as Tier II CM COPCs. Action levels refer to the Tier II $SSL_{T1/2}$, the Tier II $MLSSL_{T1/2}$, and either the November 2020 USEPA MCL or RSL. For an analyte to be retained as a Tier II CM COPC in VZCOMML©, the "predicted concentration in aquifer" must be greater than all three action levels and the analyte must have a mean travel time of less than 1,000 years.

5. Additional simulations are performed for any Tier II CM COPCs retained from Step 4. These simulations represent more realistic conditions than the maximally conservative Simulation 1. For example, an estimate of the mean analyte concentration may be used, rather than the maximum concentration; or the actual depth of the maximum concentration may be used for Layer 1, rather than the depth of the deepest sample. Analytes predicted to adversely impact groundwater under the more realistic simulations are retained as CM COCs.

6. CM COCs are evaluated further, using additional lines of inquiry. After evaluation, retained analytes are called refined COCs, or CM RCOCs.

7. Screening-level CM remedial goal options (RGOs) are calculated for each CM RCOC (generally, the CM RGO is the highest Tier II SSL concentration).

For the Tier I screen, as well as the first Tier II simulation, the thickness of Layer 1 is assumed to be the maximum depth of available data, which is typically highly conservative. This was a different depth for each subunit (Table B-2). If any constituents fail the initial Tier II simulation, additional simulations will be run with less conservative but more realistic parameters.

Table B-1 presents chemical and nuclear property parameters for each evaluated analyte. These parameters include organic carbon partitioning coefficient, soil-water partitioning coefficient, half-life (biological degradation for organics; radioactive decay for radionuclides), Henry's Law constant, solubility, and regulatory action level. In addition to chemical parameters, several physical parameters are also employed in CM simulations. Since the geologic environment of all evaluated subunits is similar, many physical parameters were used for all subunits. These are presented in Table B-3. In contrast to global parameters listed in Table B-3, physical parameters, which are specific to certain subunits and refined simulations are presented in Table B-4.

There were two values that differed in the global parameters for Table B-3. The infiltration rate used for the CSSLP-Ponded subunit was increased by a factor of 1.5X. This factor was used to account for runoff from higher elevation areas of the CSSLP unit. The additional runoff captured in the ponded area would likely be balanced by increased losses associated with evapotranspiration due to standing water in the basin and an abundance of vegetation around the exterior of the area, as well as within the basin itself. Therefore, the 1.5X increase is assumed to bound any increase infiltration due to runoff. For the Ford Building Surrounding Soils subunit, an aquifer saturated horizontal hydraulic conductivity of 131 ft/yr was used. This hydraulic conductivity was estimated based on site specific lithology data for the aquifer unit in the vicinity of the Ford Building Surrounding Soils subunit.

B-2.5. Results of the Tier I and Tier II Analyses

In this section, results of the Tier I and Tier II screening are presented for each of the four subunits of the ECODS N-1, CSSLP, Ford Building OU. Certain constituents did not undergo SSL calculations. These constituents included compounds, which lack both MCLs and RSLs (e.g., phenanthrene), constituents that are essential nutrients (e.g., calcium), and radiological progeny of radium-226 and radium-228 (the radium-226/228 MCL takes risk due to progeny into account). These analytes did not undergo CM COC evaluation and were listed as "NA" in Tables B-5, B-7, B-9, and B-11. However, travel times and groundwater concentrations were predicted for the compounds, which lack MCLs/RSLs.

B-2.5.1. ECODS N-1 Subunit

The ECODS N-1 subunit consists of relatively flat terrain forested with young pines. The area of the ECODS N-1 subunit is approximately 0.16 ha (0.40 ac) and has a source length 92.8 m (304 ft) parallel to the groundwater flow direction.

B-2.5.1.1. ECODS N-1 Subunit Tier I Analysis

The Tier I screen was performed with a 6.1 m (20 ft) source layer (Layer 1), corresponding to the depth of the deepest available soil sample. Layer 2 consisted of a 1.5 m (5 ft) clay layer, followed by a 2.7 m (9 ft) sandy clay layer (Layer 3), and finally a 4.0 (13 ft) sandy loam layer (Layer 4). The water table was modeled at 14 m (47 ft) below ground surface (bgs). The Tier I analysis identified 19 constituents as CM COPCs: 1,1,2,2-tetrachloroethane, benzo(a)anthracene, bis(2-ethylhexyl) phthalate, polychlorinated biphenyl (PCB) 1254, PCB 1260, antimony, arsenic, cadmium, cobalt, copper, cyanide, iron, lead, manganese, mercury, selenium, thallium, vanadium, and zinc (Table B-5).

B-2.5.1.2. ECODS N-1 Subunit Tier II Analysis

The 19 constituents, which failed the Tier I screen, were evaluated in a Tier II simulation. The Tier II screen identified cobalt and cyanide as initial CM COPCs (Table B-6). The K_d value for cobalt was revised from 10 L/kg to 40 L/kg based on most recent site-specific data (Kaplan 2021). The deepest sample with a detection for cyanide was located at 3 m (10 ft) bgs. There is no evidence of cyanide contamination below 3 m (10 ft) within the subunit. The VZCOMML© model was refined to lessen the source zone thickness from 6.1 m (20 ft) to 3 m (10 ft), and the clay loam soil texture classification was retained. Below the new source zone, a 3 m (10 ft) soil layer was added, which contained a clay loam soil texture classification. The soil layers are consistent with what is described in Table B-2 and are based on soil class descriptions from Field Geologic Logs collected during the RFI/RI Work Plan effort in 2020 (SRNS 2020). The new 3 m (10 ft) soil layer in the refined Tier II model for cyanide is assumed to be clean, consistent with soil sample results. The revisions in the model resulted in both cobalt and cyanide passing the Tier II simulation.

B-2.5.2. CSSLP Subunit Upland Soil

The CSSLP unit is located on the northeastern side of N Area. The majority of the unit, the CSSLP subunit upland soil, is approximately 83.8 m (275 ft) above mean sea level and gently slopes toward the CSSLP subunit surface water impoundment area. The CSSLP subunit upland soil aerial extent is 0.84 ha (2.07 ac) with a source length of 167 m (548 ft) parallel to groundwater flow.

B-2.5.2.1. CSSLP Subunit Upland Soil Tier I Analysis

The Tier I screen was performed with a 3.7 m (12 ft) source layer (Layer 1), corresponding to the depth of the deepest available soil sample. Layer 2 consisted of a 0.61 m (2 ft) thick sandy loam layer. The water table was modeled at 4.3 m (14 ft) bgs. The Tier I analysis identified 25 constituents as CM COPCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl) phthalate, naphthalene, pentachlorophenol, aldrin, dieldrin, lindane, p,p'-dichlorodiphenyldichloroethane (DDD), PCB 1248, PCB 1254, PCB 1260, arsenic, barium, cadmium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, and vanadium (Table B-7).

B-2.5.2.2. CSSLP Subunit Upland Soil Tier II Analysis

The 25 constituents, which failed the Tier I screen, were evaluated in a Tier II simulation. Eleven constituents were further identified as Tier II CM COPCs: arsenic, barium, cadmium, cobalt, copper, iron, lead, manganese, mercury, nickel, and selenium (Table B-8). The K_d values for mercury, selenium, and lead were updated based on the most recent site-specific data available (Kaplan 2021). The K_d value for mercury was increased from 52 L/kg to 800 L/kg, for selenium from 55 L/kg to 1,000 L/kg, and lead from 270 L/kg to 2,000 L/kg. After revision of the K_d values, the three constituents passed the Tier II simulation.

In the case of barium, copper, and nickel, the average detected soil concentrations were used for a second run of the Tier II simulation. Justification for this step differs for each constituent. For barium, the maximum detection was an estimated value (J qualified) and most barium detections were found within the top 0.91 m (3 ft) of the source zone. Similarly, the maximum detection for nickel was an estimated value and was significantly higher than other samples. For copper, the

maximum detection was the only detected result above the SRS average copper background concentration. After revising the source zone concentration to the average values, the three constituents passed the Tier II simulation.

Following the Tier II simulation, five constituents were retained as CM COCs: arsenic, cadmium, cobalt, iron, and manganese.

B-2.5.3. CSSLP Subunit Surface Water Impoundment Area

The CSSLP subunit surface water impoundment area consists of a depression within the CSSLP subunit, on the southwestern side. Precipitation and runoff from the CSSLP subunit upland soil, which slopes toward the depression, collects in the CSSLP subunit surface water impoundment area. The source zone is a sediment layer modeled as 1.2 m (4 ft) thick. The source length parallel to groundwater flow is 93.1 m (305 ft).

B-2.5.3.1. CSSLP Subunit Surface Water Impoundment Area Tier I Analysis

The Tier I screening was performed with a 1.2 m (4 ft) source layer (Layer 1), corresponding to the depth of the deepest available soil sample. Below the source layer is a 0.91 m (3 ft) thick soil layer with texture classification of sandy loam. The final soil layer above the water table is a 1.2 m (4 ft) thick sandy clay layer. The water table was modeled at 3.4 m (11 ft) bgs. The Tier I analysis identified five constituents as CM COPCs: benzo(a)anthracene, arsenic, manganese, thorium-232, and uranium-238 (Table B-9).

B-2.5.3.2. CSSLP Subunit Surface Water Impoundment Area Tier II Analysis

The five constituents, which failed Tier I screening were evaluated in a Tier II simulation. Three of the constituents failed the Tier II simulation and were retained as CM COCs: arsenic, manganese, and uranium-238 (Table B-10).

B-2.5.4. Surrounding Soils of the Ford Building Subunit

Three areas surrounding the Ford Building facility were sampled based on process knowledge of the facility and infrastructure surrounding the building. The areas were considered as one source,

The surrounding soils of the Ford Building subunit, for modeling purposes. The area of the combined surrounding soils is approximately 1.8 ha (4.5 ac) with a source length of 159 m (522 ft) parallel to groundwater flow.

B-2.5.4.1. Surrounding Soils of the Ford Building Subunit Tier I Analysis

The Tier I screen was performed with a 9.1 m (30 ft) source layer (Layer 1), corresponding to the depth of the deepest available soil sample. Layer 2 consisted of a 4.6 m (15 ft) thick sandy loam layer. The water table was modeled at 13.7 m (45 ft) bgs. The Tier I analysis identified 24 constituents as CM COPCs: dichloromethane (methylene chloride), benzo(a)anthracene, pentachlorophenol, PCB 1254, PCB 1260, aluminum, arsenic, beryllium, cadmium, cobalt, copper, iron, lead, manganese, mercury, selenium, thallium, vanadium, zinc, potassium-40, thorium-230, thorium-232, uranium-233/234, and uranium-238 (Table B-11).

B-2.5.4.2. Surrounding Soils of the Ford Building Subunit Tier II Analysis

The 24 constituents, which failed the Tier I screen, were evaluated in a Tier II simulation. Two constituents, cobalt and copper, failed the initial Tier II simulation (Table B-12). The K_d value for cobalt was revised from 10 L/kg to 40 L/kg. Likewise, the K_d value for copper was revised from 25 L/kg to 50 L/kg. The revisions were made based on recent site-specific data that provides a more accurate model for the two analytes (Kaplan 2021). After completing the revisions, no constituents in surrounding soils of the Ford Building subunit were identified as Tier II CM COCs.

B-2.6. Uncertainty Discussion

Following the Tier II simulations, eight constituents were retained as CM COCs. For the CSSLP Upland subunit, arsenic, cadmium, cobalt, iron, and manganese were retained. For the CSSLP Ponded subunit, arsenic, manganese, and uranium-238 were retained. These constituents were evaluated further using additional lines of evidence to determine the appropriate CM RCOCs for the ECODS N-1, CSSLP, and Ford Building OU subunits.

B-2.6.1. CSSLP Subunit Upland Soil Uncertainty Analysis

Arsenic – The maximum inorganic arsenic detection in the CSSLP subunit upland soil was 63.1 mg/kg at a depth of 0.30 m (1 ft). Inorganic arsenic is found in the subunit throughout the 3.7 m (12 ft) source zone. The average concentration of samples above 2X the SRS mean background was 16.4 mg/kg. The average soil concentration results in a Tier II failure for arsenic. The maximum detection is significantly higher than the maximum SRS background arsenic concentration of 22.9 mg/kg (WSRC 2006). Due to the mentioned lines of evidence, inorganic arsenic was not eliminated as a CM COC for the CSSLP subunit upland soil. The Tier II $SSL_{T1/2}$ determined for inorganic arsenic is 0.467 mg/kg. VZCOMML© has limitations in modeling contaminant impact on groundwater, and therefore arsenic was assessed further using a more complete fate and transport model in Section B-2.7.

Cadmium – The CSSLP subunit upland soil had a maximum cadmium detection of 2.08 mg/kg. Only two samples in the CSSLP subunit upland soil had detectable concentrations of cadmium. The SRS maximum cadmium background concentration is 2.01 mg/kg (WSRC 2006). Cadmium was not retained as a CM RCOC for the CSSLP subunit upland soil based on the following lines of evidence:

- Only two detections of cadmium
- A maximum detection within 3.5% of the SRS maximum background
- It is a naturally occurring constituent that is common in SRS background soils
- It does not appear to be unit related since it is indistinguishable from background

Cobalt – The maximum cobalt detection in the CSSLP subunit upland soil was 4.26 mg/kg. This soil concentration is below the SRS maximum cobalt background concentration of 5.04 mg/kg (WSRC 2006). Cobalt was not retained as a CM RCOC for the CSSLP subunit upland soil based on the following lines of evidence:

- It is a naturally occurring constituent that is common in SRS background soils
- It does not appear to be unit related since it is indistinguishable from background

Iron – The CSSLP subunit upland soil had a maximum iron detection of 56,900 mg/kg. There were only three samples with iron detections above 2X the SRS average background. The average of the three samples was 37,070 mg/kg, which is below the SRS maximum iron background concentration of 44,300 mg/kg (WSRC 2006). Therefore, iron was not retained as a CM RCOC.

Manganese – The CSSLP subunit upland soil had a maximum manganese detection of 264 mg/kg. The SRS maximum manganese background concentration is 346 mg/kg, which is greater than the maximum detection (WSRC 2006). Manganese was not retained as a CM RCOC for the CSSLP subunit upland soil based on the following lines of evidence:

- A maximum detection below SRS maximum background
- It is a naturally occurring constituent that is common in SRS background soils
- It does not appear to be unit related since it is indistinguishable from background

B-2.6.2. CSSLP Subunit Surface Water Impoundment Area Uncertainty Analysis

Arsenic – The CSSLP subunit surface water impoundment area had a maximum inorganic arsenic detection of 18.4 mg/kg, which is below the SRS maximum manganese background concentration of 22.9 mg/kg (WSRC 2006). However, arsenic in the surface water impoundment area may be unit related due to a history of use in the CSSLP subunit upland soil. Further, the combinative effects of arsenic in both the upland soil and surface water impoundment area should be evaluated. Therefore, arsenic was assessed further using a more complete fate and transport model in Section B-2.7

Manganese – The CSSLP subunit surface water impoundment area had a maximum manganese detection of 81 mg/kg, which is below the SRS maximum manganese background concentration of 346 mg/kg (WSRC 2006). Manganese was not retained as a CM RCOC for the CSSLP subunit surface water impoundment area based on the following lines of evidence:

- A maximum detection below SRS maximum background
- It is a naturally occurring constituent that is common in SRS background soils

- It does not appear to be unit related since it is indistinguishable from background

Uranium-238 – The CSSLP subunit surface water impoundment area had a maximum uranium-238 detection of 1.19 pCi/g, which is below the SRS maximum uranium-238 background concentration of 1.9 pCi/g (WSRC 2006). Uranium was not retained as a CM RCOC for the CSSLP subunit surface water impoundment area based on the following lines of evidence:

- A maximum detection below SRS maximum background
- It does not appear to be unit related since it is indistinguishable from background
- No history of use at or near the unit

B-2.7. Supplemental Modeling

B-2.7.1. Approach

An additional fate and transport model was developed deterministically in GoldSim® (Version 12.1, GTG 2018) to further evaluate the transport of arsenic from the CSSLP subunit upland soil and surface water impoundment area to groundwater. GoldSim® provides a means to evaluate the transport within the source zone, the clean vadose zone, and the saturated aquifer. VZCOMML© only incorporates transport through the clean vadose as a conservative measure, resulting in faster mean travel times to peak concentration. Only including the clean vadose zone transport is overly conservative in the case of the CSSLP subunit upland soil, where the 3.6 m (12 ft) source zone is much larger than the 0.61 m (2 ft) clean vadose zone. The transport time through the source zone should then be assessed to properly capture and predict the fate of contaminants from the subunit. VZCOMML© also does not provide a means to compare combinative effects of concentration relative to time. GoldSim® allows for multiple sources zones and points of assessment to facilitate such an evaluation.

B-2.7.2. Conceptual Model

A slice approach was used to accurately capture the transport time and provide a bounding maximum concentration of the inorganic arsenic leached from CSSLP subunit upland soil and

surface water impoundment area. The slice approach models a cross sectional slice across the longest transect of the area of interest. This slice then represents the largest cumulative concentration as groundwater flows beneath each subunit. The selected slice was 0.33 m (1 ft) thick. Groundwater first flows under the upland soil then under the surface water impoundment area of the CSSLP subunit, the point of assessment (POA) is the saturation zone was at the edge of the surface water impoundment area. A second POA was added to determine the effect of the upland soil only on groundwater concentrations. This POA was placed at the edge of the upland soil. Predicted groundwater concentrations at the POA were then compared to the 10 µg/L MCL for arsenic. GoldSim® also accounts for dispersion during transport, therefore time of initial exceedance rather than time to peak (as done in VZCOMML©) was determined and compared to the 1,000 year evaluation timeframe of compliance.

B-2.7.3. Model Inputs

Inputs to the model were largely the same as those for VZCOMML© with slight modification dimensions to account for the combinative effects of both units.

For the upland soil, the unit length parallel to groundwater flow was 101 m (330 ft). This unit length is smaller than that used in VZCOMML© as the slice was drawn through both units rather than each unit separately. The source zone concertation was the average of the sample with detections (16.4 mg/kg). The source zone depth was 3.6 m (12 ft), the depth of the deepest detection. The source zone was modeled as sandy clay with a saturation of 0.3262 (from VZCOMML©), dispersivity of 0.39 m (1.3 ft), a bulk density of 1,700 kilogram per cubic meter (kg/m^3), porosity of 0.39, and the arsenic sorption coefficient to clayey sediment (200 L/kg, Kaplan 2021). The clean vadose zone was modeled as a 0.61 m (2 ft) layer of sandy loam with a saturation of 0.2528 (from VZCOMML©), dispersivity of 0.39 m (1.3 ft), a bulk density of 1,700 kg/m^3, porosity of 0.41, and the arsenic sorption coefficients to sandy sediment (100 L/kg, Kaplan 2021). The infiltration rate was 38.1 cm/yr (15 in/yr).

For the surface water impoundment area, the unit length parallel to groundwater flow was 33 m (108 ft). The source zone concertation was the average of the sample with detections (9.2 mg/kg). The source zone depth was 1 m (4 ft), the depth of the deepest detection. The source zone was

modeled as sandy clay with a saturation of 0.3262 (from VZCOMML©), dispersivity of 0.39 m (1.3 ft), a bulk density of 1,700 kilogram per cubic meter (kg/m^3), porosity of 0.39, and the arsenic sorption coefficient to clayey sediment (200 L/kg, Kaplan 2021). The clean vadose zone was modeled two layers. The first was a 0.9 m (3 ft) layer of sandy loam with a saturation of 0.6 (inferred due to the presence of sanding water above the unit), dispersivity of 0.39 m (1.3 ft), a bulk density of 1,700 kg/m^3, porosity of 0.41, and the arsenic sorption coefficients to sandy sediment (100 L/kg, Kaplan 2021). The second was a 1.2 m (4 ft) layer of sandy clay with a saturation of 0.6 (inferred due to the presence of standing water above the unit), dispersivity of 0.39 m (1.3 ft), a bulk density of 1,700 kg/m^3, porosity of 0.41, and the arsenic sorption coefficients to clayey sediment (200 L/kg, Kaplan 2021). The infiltration rate was 57.15 cm/yr (22.5 in/yr).

Two aquifer zones were incorporated; one that received the source for the upland soil, and a second zone that received source from the surface water impoundment area and flow from the aquifer zone under the upland soil. The length of each aquifer was the unit length for each corresponding subunit. Both aquifer zones were modeled as saturated sand with a dispersivity of 1 m (3.3 ft), a bulk density of 1,040 kg/m^3, porosity of 0.25, and arsenic sorption coefficient to sandy sediment. The thickness of the aquifer was set to 3 m (10 ft). The flow in the aquifer was determined through Darcy's law and the ground water elevations in the area. The flow in the aquifer, assumed to be clean water, was minimal compared to the water infiltrating into the large unit. The simulation was run for 10,000 years.

B-2.7.4. Model Results

Model results predict that arsenic will not exceed the MCL of 10 µg/L within 1,000 years at the POA at the edge of both units. Below the upland soil, the predicted maximum concentration in the aquifer was 86 µg/L with a time to peak of 3,200 years and an initial exceedance at 1,600 years (Figure B-5). Below the surface water impoundment area, the predicted maximum concentration in the aquifer was 57 µg/L (mass mostly from upland unit) with a time to peak of 3,300 years and an initial exceedance at 1,500 years (Figure B-5). Therefore, GoldSim® modeling concludes that arsenic should not be retained as a CM RCOC for the CSSLP subunit upland soil or CSSLP subunit surface water impoundment area.

B-2.8. Conclusions

This contaminant migration analysis performed using VZCOMML© and GoldSim® revealed no soil contaminants in the vadose zone with the potential to migrate to groundwater and exceed groundwater action levels within 1,000 years. Table B-13 summarizes the Tier I and Tier II Screening Results.

B-3. REFERENCES

Aadland, R. K., Gellici, J. A., and Thayer, P. A., 1995. *Hydrogeologic Framework of West-Central South Carolina*, Water Resources Division, Report 5, State of South Carolina Department of Natural Resources.

GTG 2018. *GoldSim® User's Guide Version 12.1*. GoldSim® Technology Group. Issaquah, WA. June 2018.

Kaplan, D. I., 2021. *Geochemical Data Package for Performance Assessment Calculations Related to the Savannah River Site*, SRNL-STI-2021-00017, Revision 0, Savannah River National Laboratory, Savannah River Site, Aiken, SC.

Rucker, Gregory G., 2011. *Soil Contaminant Migration Screen Software Calculation Check (U) for VZCOMML© v.4.0*, Q-CLC-G-00089, Revision 0, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC.

SRNS, 2012. *Environmental Compliance and Area Completion Projects Regulatory Document Handbook*, ERD-AG-003, Revision 17, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC.

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

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

USEPA, 1996. *Soil Screening Guidance: Technical Background Document*, EPA/540/R95/128, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

USEPA, 2000. *Soil Screening Guidance for Radionuclides*, Technical Background Document, EPA/540-R-00-006, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

WSRC, 1996. *Groundwater Flow and Tritium Migration from the SRS Old Burial Ground to Fourmile Branch*, WSRC-TR-1996-0106, Revision 0, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC.

WSRC, 1998. *Regulatory Document Handbook: Contaminant Migration Constituents of Potential Concern*, ERD-AG-003, Revision 1, Westinghouse Savannah River Company, Savannah River Site, 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.

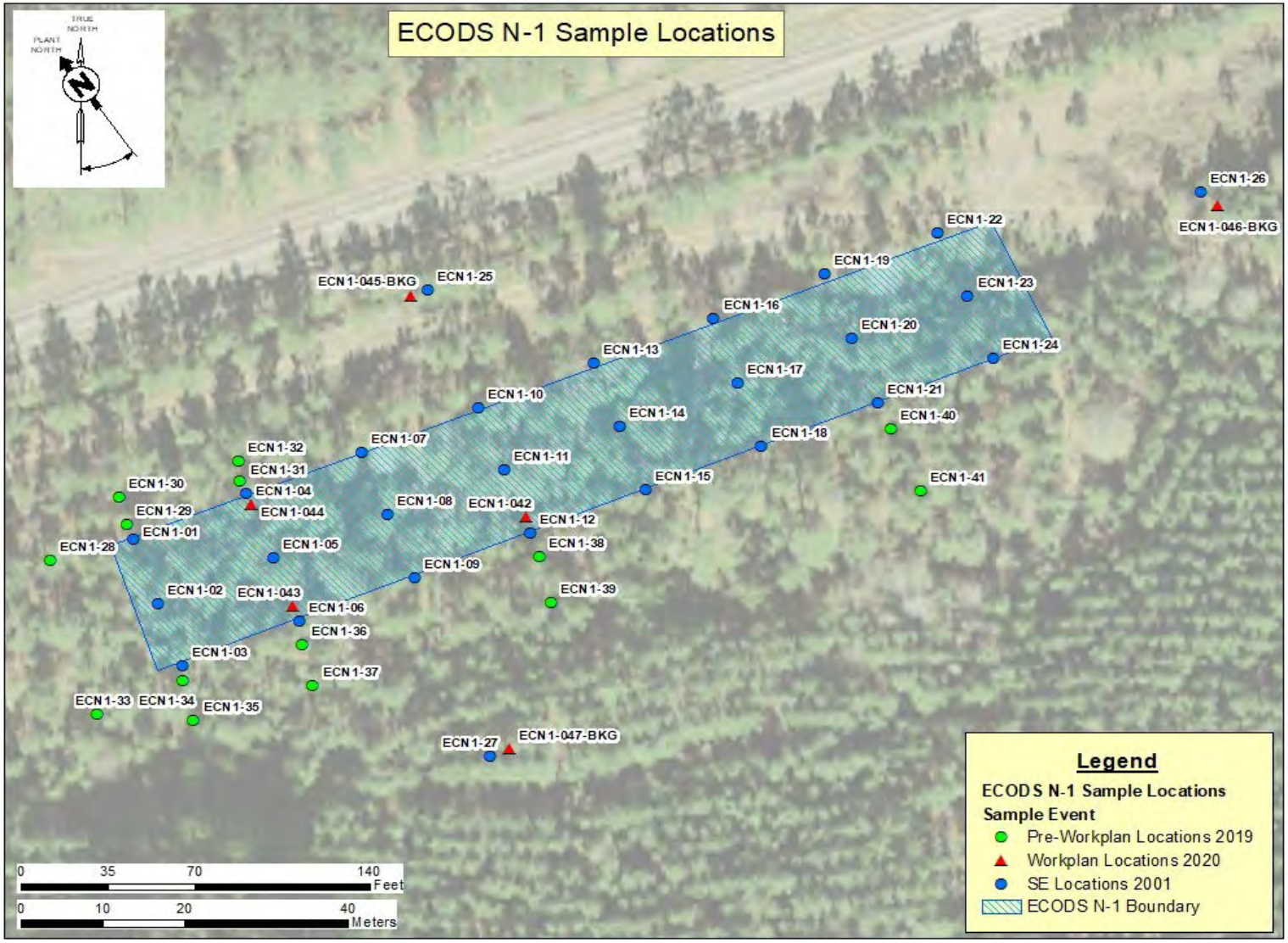


Figure B-1. Location of ECODS N-1 (NBN) Subunit Samples

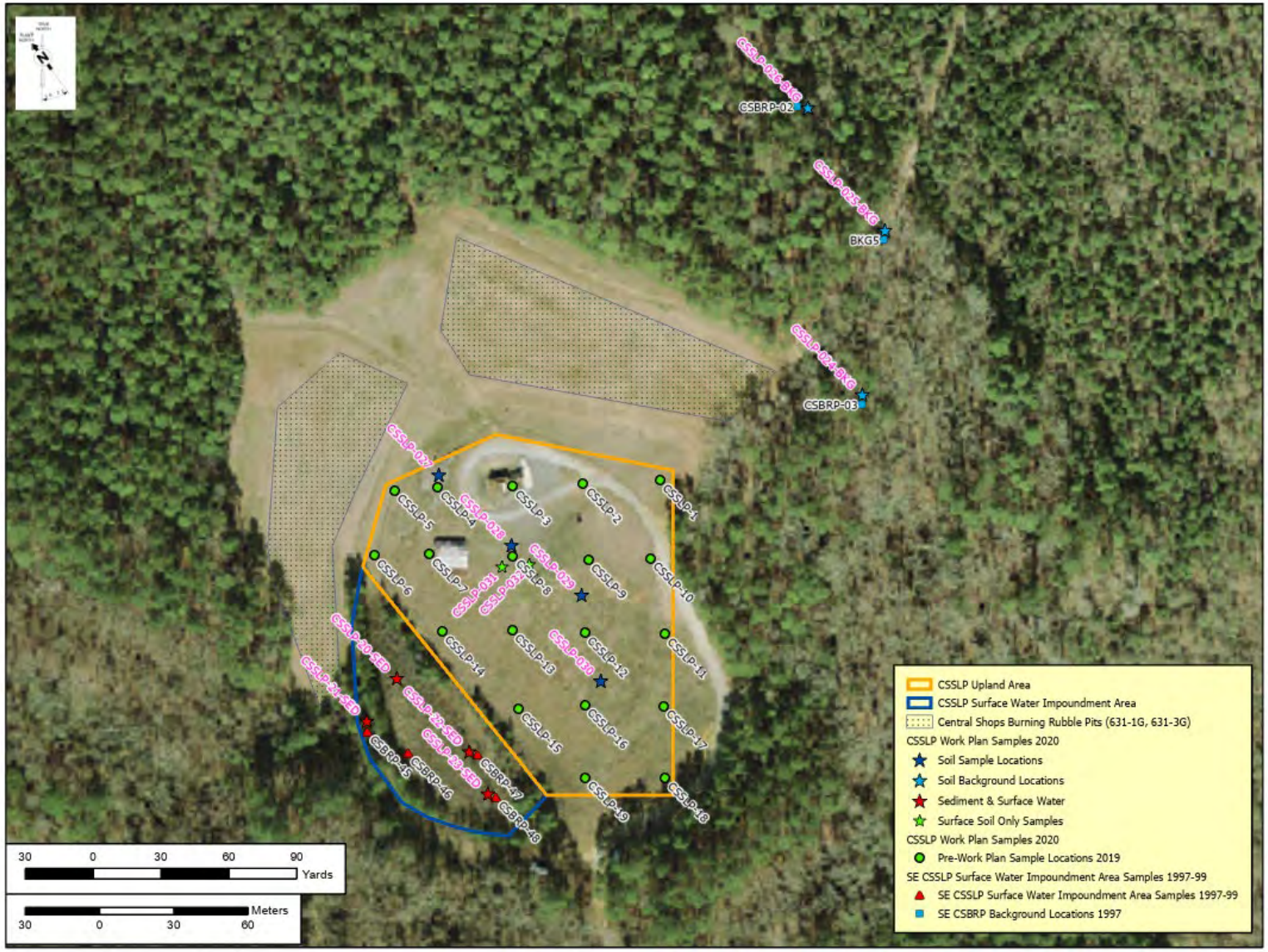


Figure B-2. Location of Central Shops Scrap Lumber Pile (631-2G) Subunit Samples

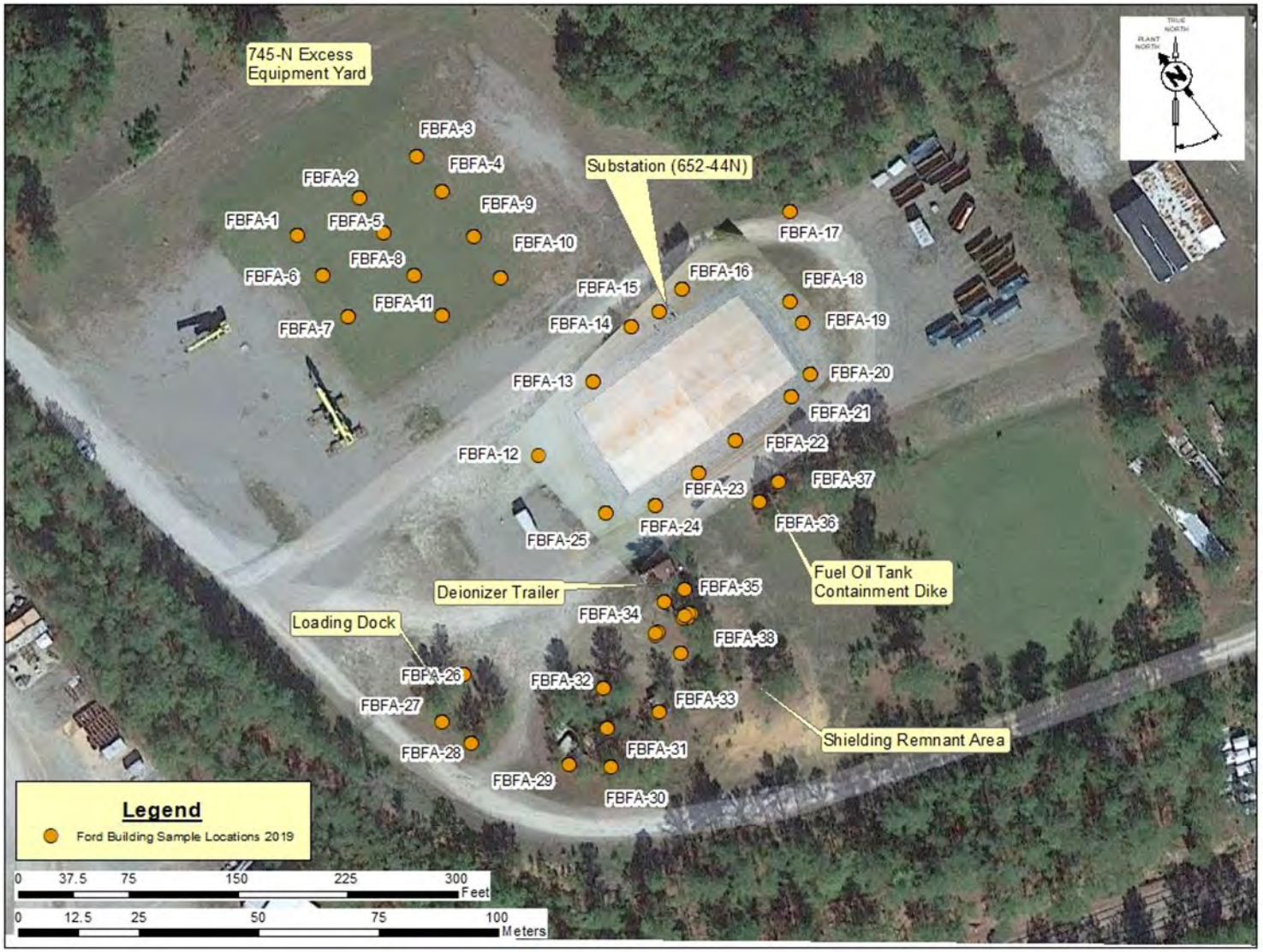


Figure B-3. Location of Surrounding Soils of the Ford Building (690-N) Subunit Samples

This page was intentionally left blank.

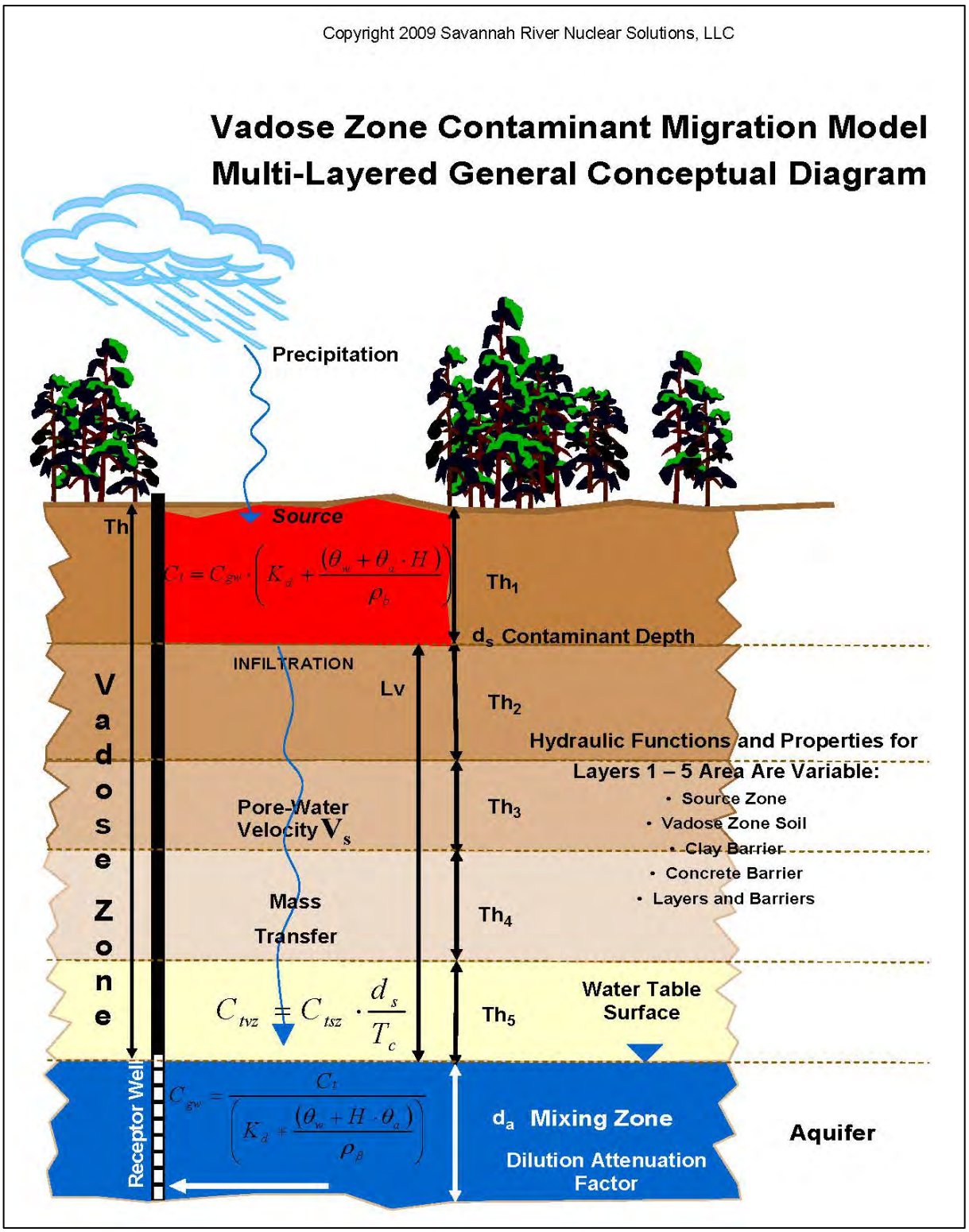


Figure B-4. VZCOMML© Contamination Migration Conceptual Diagram

This page was intentionally left blank.

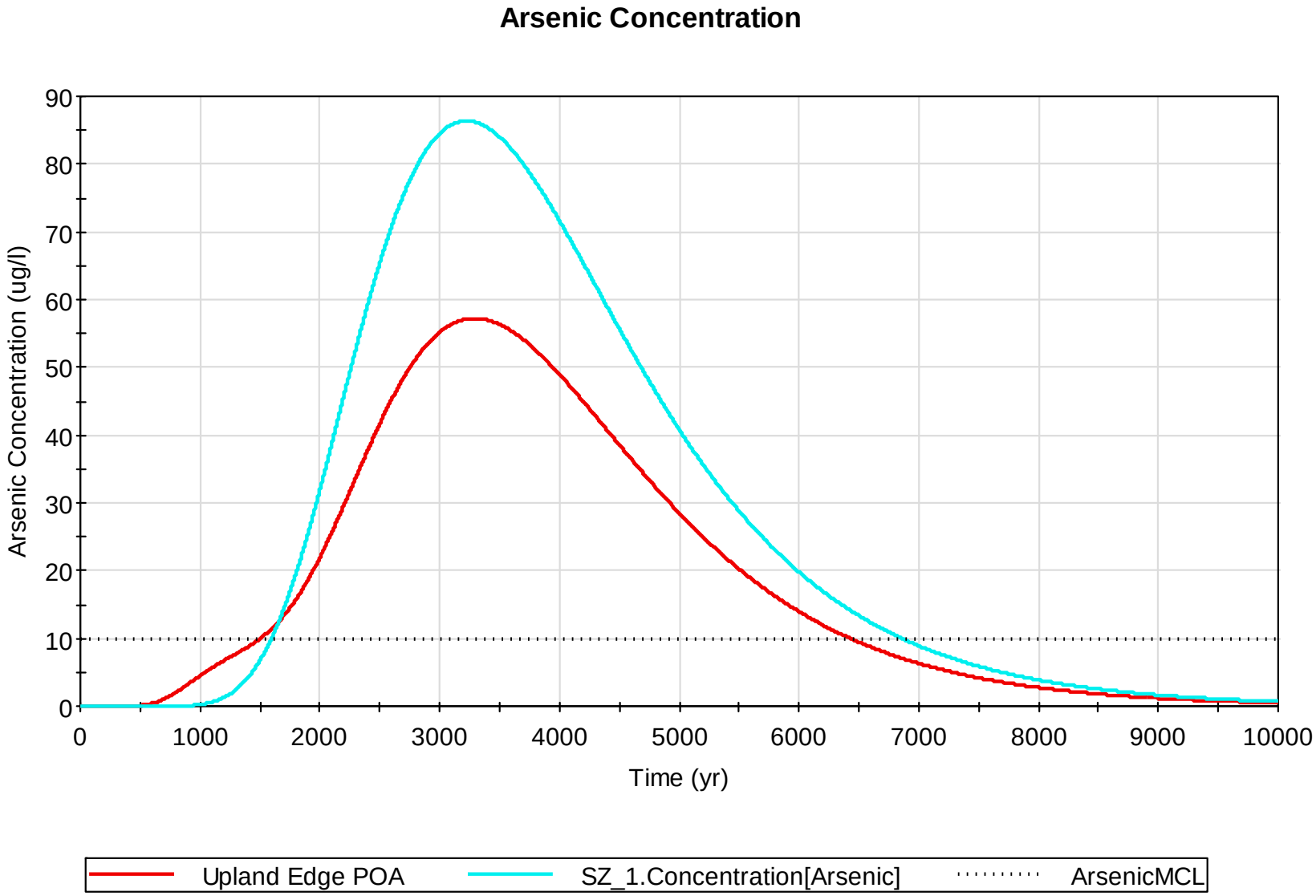


Figure B-5. GoldSim® Predicted Arsenic Concentrations at the Points of Assessment

This page was intentionally left blank.

Table B-1. Chemical Parameters Used for Screening

Analyte	K_{OC} *[L/kg]*	K_d *[L/kg]*	$T_{1/2}$ *[yr]*	H' *[-]*	S *[mg/L]*	Action Level[A] *[µg/L or pCi/L]*
Volatile Organic Analytes						
1,1,2,2-Tetrachloroethane	7.90E+01	1.58E-01	1.23E-01	1.41E-02	2.97E+03	7.60E-02
1,2,3-Trichlorobenzene	7.33E+02	1.47E+00	3.29E-01	5.13E-02	1.80E+01	7.00E+00
Acetone	2.20E+00	4.40E-03	1.90E-02	1.59E-03	1.00E+06	1.40E+04
Benzene	6.17E+01	1.23E-01	4.40E-02	2.28E-01	1.75E+03	5.00E+00
Carbon disulfide	5.40E+01	1.08E-01	9.34E-03	1.24E+00	1.19E+03	8.10E+02
Chloroethane	1.50E+01	3.00E-02	7.70E-02	8.20E-02	5.74E+03	2.10E+04
Chloroethene (Vinyl chloride)	8.20E+00	1.64E-02	5.00E-01	1.11E+00	2.76E+03	2.00E+00
Chloromethane (Methyl chloride)	5.50E+00	1.10E-02	7.70E-02	4.06E-01	6.50E+03	1.90E+02
Cyclohexane	4.82E+02	9.64E-01	5.00E-01	8.00E+00	5.50E+01	1.30E+04
Dichloromethane (Methylene chloride)	1.00E+01	2.00E-02	3.07E-01	8.98E-02	1.30E+04	5.00E+00
Ethylbenzene	2.04E+02	4.08E-01	2.70E-02	3.23E-01	1.69E+02	7.00E+02
Isopropylbenzene (Cumene)	4.54E+02	9.08E-01	2.19E-02	4.92E+01	6.10E+01	4.50E+02
Methyl Acetate	2.20E+00	4.40E-03	1.00E+99	8.40E-04	2.50E+05	2.00E+04
Methyl ethyl ketone (2-Butanone)	4.51E+00	9.02E-03	1.90E-02	2.10E-03	2.68E+05	5.60E+03
Methyl tert-butyl ether (MBET)	1.23E+01	2.46E-02	5.00E-01	2.42E-02	5.10E+04	1.40E+01
Methylcyclohexane	6.07E+03	1.21E+01	6.28E-02	1.76E+03	1.40E+01	NA
Styrene	9.12E+02	1.82E+00	7.70E-02	1.13E-01	3.10E+02	1.00E+02
Tetrachloroethylene	1.55E+02	3.10E-01	1.00E+01	7.54E-01	2.00E+02	5.00E+00
Toluene	1.40E+02	2.80E-01	6.00E-02	2.72E-01	5.26E+02	1.00E+03
Trichloroethylene	1.66E+02	3.32E-01	1.00E+01	4.22E-01	1.10E+03	5.00E+00
m-Xylene	1.96E+02	3.92E-01	7.69E-02	3.01E-01	1.61E+02	1.90E+02
o-Xylene	2.41E+02	4.82E-01	7.69E-02	2.13E-01	1.78E+02	1.90E+02
p-Xylene	3.11E+02	6.22E-01	7.69E-02	3.14E-01	1.85E+02	1.90E+02

Table B-1. Chemical Parameters Used for Screening *(continued)*

Analyte	K_{OC} *[L/kg]*	K_d *[L/kg]*	$T_{1/2}$ *[yr]*	H' *[-]*	S *[mg/L]*	Action Level[A] *[µg/L or pCi/L]*
Semi-Volatile Analytes						
2-Methylnaphthalene	7.94E+03	1.59E+01	1.32E-01	1.36E-02	2.54E+01	3.60E+01
Acenaphthene	4.90E+03	9.80E+00	2.79E-01	6.36E-03	4.24E+00	5.30E+02
Anthracene	2.35E+04	4.70E+01	1.26E+00	2.67E-03	4.34E-02	1.80E+03
Benzo(a)anthracene	3.58E+05	7.16E+02	1.86E+00	1.37E-04	9.40E-03	3.00E-02
Benzo(a)pyrene	9.69E+05	1.94E+03	1.45E+00	4.63E-05	1.62E-03	2.00E-01
Benzo(b)fluoranthene	1.23E+06	2.46E+03	1.67E+00	4.55E-03	1.50E-03	2.50E-01
Benzo(g,h,i)perylene	1.60E+06	3.20E+03	1.78E+00	5.13E-06	3.00E-04	NA
Benzo(k)fluoranthene	1.23E+06	2.46E+03	5.86E+00	3.40E-05	8.00E-04	2.50E+00
Bis(2-ethylhexyl) phthalate	1.11E+05	2.22E+02	6.30E-02	4.18E-06	3.40E-01	6.00E+00
Butylbenzyl phthalate	1.37E+04	2.74E+01	1.90E-02	5.17E-05	2.69E+00	1.60E+01
Carbazole	3.39E+03	6.78E+00	8.22E-02	6.26E-07	1.80E+00	NA
Chrysene	3.98E+05	7.96E+02	2.72E+00	3.88E-03	1.60E-03	2.50E+01
Dibenz(a,h)anthracene	1.79E+06	3.58E+03	2.58E+00	6.03E-07	2.49E-03	2.50E-02
Dibenzofuran	9.12E+03	1.82E+01	7.70E-02	3.05E-05	1.00E+01	7.90E+00
Dimethyl phthalate	4.60E+01	9.20E-02	1.90E-02	2.07E-05	2.12E+03	NA
Di-n-butyl phthalate	1.57E+03	3.14E+00	6.30E-02	3.85E-08	1.12E+01	9.00E+02
Di-n-octyl phthalate	8.32E+07	1.66E+05	7.70E-02	2.74E-03	3.40E-01	2.00E+02
Fluoranthene	4.90E+04	9.80E+01	1.21E+00	6.60E-04	2.06E-01	8.00E+02
Fluorene	7.71E+03	1.54E+01	1.64E-01	2.61E-03	1.98E+00	2.90E+02
Indeno(1,2,3-c,d)pyrene	3.74E+06	7.48E+03	2.00E+00	6.56E-05	2.20E-05	2.50E-01
Naphthalene	1.19E+03	2.38E+00	1.32E-01	1.98E-02	3.10E+01	1.20E-01
Pentachlorophenol	9.06E+03	1.81E+01	4.88E-01	1.00E-06	1.95E+03	1.00E+00
Phenanthrene	1.40E+04	2.80E+01	5.48E-01	1.60E-03	1.29E+00	NA
Pyrene	6.80E+04	1.36E+02	5.20E+00	4.51E-04	1.35E-01	1.20E+02

Table B-1. Chemical Parameters Used for Screening *(continued)*

Analyte	K_{OC} *[L/kg]*	K_d *[L/kg]*	$T_{1/2}$ *[yr]*	H' *[-]*	S *[mg/L]*	Action Level[A] *[µg/L or pCi/L]*
Pesticides/PCBs						
Aldrin	4.87E+04	9.74E+01	1.60E+00	6.97E-03	1.80E-01	9.20E-04
alpha-Chlordane	5.13E+04	1.03E+02	3.80E+00	1.99E-03	5.60E-02	2.00E+00
Dieldrin	2.55E+04	5.10E+01	3.00E+00	6.19E-04	1.95E-01	1.80E-03
gamma-Chlordane	5.13E+04	1.03E+02	3.80E+00	3.22E-04	5.60E-02	2.00E+00
Lindane (gamma-BHC)	2.00E+04	4.00E+01	6.58E-01	3.22E-04	6.80E+00	2.00E-01
p,p'-DDD	4.58E+04	9.16E+01	1.56E+01	1.64E-04	9.00E-02	3.20E-02
p,p'-DDE	8.64E+04	1.73E+02	1.56E+01	8.61E-04	1.20E-01	4.60E-02
p,p'-DDT	6.78E+05	1.36E+03	1.56E+01	3.32E-04	2.50E-02	2.30E-01
PCB 1248	3.09E+05	6.18E+02	3.42E+04	1.80E-02	2.00E-01	7.80E-03
PCB 1254	3.09E+05	6.18E+02	3.42E+04	8.20E-03	4.10E-02	7.80E-03
PCB 1260	3.09E+05	6.18E+02	3.42E+04	1.03E-02	1.44E-02	7.80E-03
Metal Analytes						
Aluminum	NA	1.50E+03	Infinite	NA	NA	2.00E+04
Antimony (metallic)	NA	4.00E+03	Infinite	NA	NA	6.00E+00
Arsenic, Inorganic[B]	NA	3.90E+01	Infinite	NA	NA	1.00E+01
Barium[B]	NA	4.10E+01	Infinite	NA	NA	2.00E+03
Beryllium and compounds	NA	7.90E+02	Infinite	NA	NA	4.00E+00
Cadmium[B]	NA	7.50E+01	Infinite	NA	NA	5.00E+00
Calcium	NA	5.00E+00	Infinite	NA	NA	NA
Chromium, Total	NA	1.80E+06	Infinite	NA	NA	1.00E+02
Cobalt[B]	NA	1.00E+01	Infinite	NA	NA	6.00E+00
Copper, Total[B]	NA	2.50E+01	Infinite	NA	NA	1.30E+03
Cyanide (CN-)	NA	9.90E+00	Infinite	NA	NA	2.00E+02

Table B-1. Chemical Parameters Used for Screening *(continued)*

Analyte	K_{OC} *[L/kg]*	K_d *[L/kg]*	$T_{1/2}$ *[yr]*	H' *[-]*	S *[mg/L]*	Action Level[A] *[µg/L or pCi/L]*
Iron[B]	NA	2.20E+02	Infinite	NA	NA	1.40E+04
Lead and compounds[B]	NA	2.70E+02	Infinite	NA	NA	1.50E+01
Magnesium	NA	NA	Infinite	NA	NA	NA
Manganese[B]	NA	5.00E+01	Infinite	NA	NA	4.30E+02
Mercury (elemental)[B]	NA	5.20E+01	Infinite	NA	NA	2.00E+00
Nickel Soluble Salts[B]	NA	6.50E+01	Infinite	NA	NA	3.90E+02
Potassium	NA	5.50E+01	Infinite	NA	NA	NA
Selenium[B]	NA	5.50E+01	Infinite	NA	NA	5.00E+01
Silver	NA	9.00E+01	Infinite	NA	NA	9.40E+01
Sodium, total recoverable	NA	NA	Infinite	NA	NA	NA
Thallium Soluble Salts	NA	7.10E+01	Infinite	NA	NA	2.00E+00
Vanadium, total recoverable	NA	1.00E+03	Infinite	NA	NA	8.60E+01
Zinc (metallic)	NA	6.20E+01	Infinite	NA	NA	6.00E+03
Radiological Analytes						
Actinium-228	NA	4.50E+02	7.00E-04	NA	NA	2.66E+01
Cesium-137	NA	5.00E+02	3.02E+01	NA	NA	2.00E+02
Cobalt-60	NA	1.00E+01	5.27E+00	NA	NA	1.00E+02
Lead-212	NA	2.70E+02	1.20E-03	NA	NA	2.12E+00
Potassium-40	NA	7.50E+01	1.28E+09	NA	NA	2.14E+00
Thorium-228	NA	1.00E+02	1.91E+00	NA	NA	1.50E+01
Thorium-230	NA	1.00E+02	7.70E+04	NA	NA	1.50E+01
Thorium-232	NA	1.00E+02	1.41E+10	NA	NA	1.50E+01
Uranium-233/234	NA	4.00E+01	2.45E+05	NA	NA	1.00E+01
Uranium-238	NA	4.00E+01	4.47E+09	NA	NA	1.00E+01

A Action Level – The USEPA Regional Screening Level (RSL) was used when a MCL was not available.
NA = Not Available; Red = MCL; Black = RSL Table on **www.epa.gov** website used

Table B-2. Vadose Zone Layers for the Four ECODS N-1, CSSLP, and Ford Building OU Subunits

Subsurface Layer	Layer Type	Texture Classification[A]	Layer Thickness
ECODS N-1 Subunit			
1	Source	Clay Loam	6.1 m (20 ft)
2	Soil	Clay	1.5 m (5 ft)
3	Soil	Sandy Clay	2.7 m (9 ft)
4	Soil	Sandy Loam	4.0 m (13 ft)
CSSLP Subunit Upland Soil			
1	Source	Sandy Clay	3.7 m (12 ft)
2	Soil	Sandy Loam	0.61 m (2 ft)
CSSLP Subunit Surface Water Impoundment Area			
1	Source	Silty Clay Loam	1.2 m (4 ft)
2	Soil	Sandy Loam	0.91 m (3 ft)
3	Soil	Sandy Clay	1.2 m (4 ft)
Surrounding Soils of the Ford Building Subunit			
1	Source	Sandy Clay Loam	9.1 m (30 ft)
2	Soil	Sandy Loam	4.6 m (15 ft)

A Texture classifications based on United States Department of Agriculture soil triangle and texture classifications.

Table B-3. Physical Parameters Used for Screening

Parameter	Symbol	Value	Units	Reference
Infiltration rate	I	1.25[A]	ft/yr	SRS Default (WSRC 1996)
Aquifer saturated horizontal hydraulic conductivity	K_a	245[B]	ft/yr	Aadland et al 1995
Aquifer thickness	d_a	10	ft	VZCOMML© Default
Mixing zone depth	*d*	10	ft	Calculated
Exposure duration	*ED*	70	yr	USEPA 2000
Evaluation time	T_e	1,000	yr	WSRC 1998
Dry bulk density	ρ_b	1.7	kg/L	Rucker 2011
Fraction organic carbon	f_{oc}	0.002	Decimal fraction	Rucker 2011

A For the CSSLP subunit surface water impoundment area, 1.875 ft/yr used, which bounds runoff from the higher elevation area of the CSSLP subunit upland soil and for evapotranspiration within the basin.
B For the surrounding soils of the Ford Building subunit, 131 ft/yr used.

Table B-4. Subunit-Specific Model Parameters

Subunit	Depth of Contamination [A] *[ft bgs]*	Surface Depth to Water [B] *[ft bgs]*	Depth from Source to Water Table [C] *[ft]*	Source Length [D] *[ft]*	Horizontal Hydraulic Gradient [B] *[ft/ft]*	Dilution Attenuation Factor [E] *[-]*	Total Porosity [E] *[-]*	Table(s)
ECODS N-1	20	47	27	304	0.005	1.06	0.40	5,6
CSSLP Upland Soil	12	14	2	548	0.006	1.02	0.38	7,8
CSSLP Surface Water Impoundment Area	4	11	7	305	0.006	1.01	0.41	9,10
Surrounding Soils of the Ford Building	30	45	15	522	0.005	1.02	0.40	11,12

bgs – below ground surface

[A] Depth of contamination based on the deepest detection from 2020 soil sampling

[B] Determined conservatively based on potentiometric surface generated using 2003 synchronous water level data (most recent)

[C] Calculated from depth to water and depth of contamination measurements

[D] Estimated conservatively based on aerial extent of contamination and length parallel to 2003 regional groundwater flow direction

[E] Calculated within the VZCOMML©

Table B-5. Tier I Screening Results for the ECODS N-1 Subunit

Analyte	Source Zone Concentration	Tier I Source-Specific SSL	Tier I Mass Limit SSL	Failing Analytes
	[mg/kg]			
1,1,2,2-Tetrachloroethane	1.62E-03	2.68E-05	2.02E-04	1,1,2,2-Tetrachloroethane
Acetone	1.92E-01	2.71E+00	3.72E+01	
Carbon disulfide	1.25E-02	2.98E-01	2.15E+00	
Methyl ethyl ketone (2-Butanone)	6.93E-03	1.11E+00	1.49E+01	
2-Methylnaphthalene	2.37E-02	5.97E-01	9.56E-02	
Benzo(a)anthracene	9.85E-02	2.22E-02	7.97E-05	Benzo(a)anthracene
Benzo(a)pyrene	1.03E-01	4.00E-01	5.31E-04	
Benzo(b)fluoranthene	1.27E-01	6.35E-01	6.64E-04	
Benzo(g,h,i)perylene	5.65E-02	NA	NA	NA
Benzo(k)fluoranthene	5.92E-02	6.35E+00	6.64E-03	
Bis(2-ethylhexyl) phthalate	1.90E+00	1.38E+00	1.59E-02	Bis(2-ethylhexyl) phthalate
Chrysene	1.34E-01	2.05E+01	6.64E-02	
Dibenz(a,h)anthracene	2.82E-02	9.24E-02	6.64E-05	
Di-n-butyl phthalate	1.20E-01	3.09E+00	2.39E+00	
Fluoranthene	1.03E-01	8.11E+01	2.13E+00	
Indeno(1,2,3-c,d)pyrene	5.30E-02	1.93E+00	6.64E-04	
Phenanthrene	4.43E-02	NA	NA	NA
Pyrene	8.47E-02	1.69E+01	3.19E-01	
p,p'-DDE	1.71E-03	8.21E-03	1.22E-04	
p,p'-DDT	2.25E-03	3.22E-01	6.11E-04	
PCB 1254	4.69E-02	4.98E-03	2.07E-05	PCB 1254
PCB 1260	4.80E-02	4.98E-03	2.07E-05	PCB 1260

Table B-5. Tier I Screening Results for the ECODS N-1 Subunit *(continued)*

Analyte	Source Zone Concentration	Tier I Source-Specific SSL	Tier I Mass Limit SSL	Failing Analytes
	[mg/kg]			
Aluminum	2.30E+04	3.10E+04	5.31E+01	
Antimony (metallic)	5.89E+01	2.48E+01	1.59E-02	Antimony (metallic)
Arsenic, Inorganic	1.91E+01	4.04E-01	2.66E-02	Arsenic, Inorganic
Barium	6.16E+01	8.50E+01	5.31E+00	
Beryllium and compounds	5.01E-01	3.26E+00	1.06E-02	
Cadmium	4.05E+01	3.88E-01	1.33E-02	Cadmium
Calcium	2.01E+03	NA	NA	NA
Chromium, Total	4.75E+02	1.86E+05	2.66E-01	
Cobalt	3.67E+00	6.31E-02	1.59E-02	Cobalt
Copper, Total	1.77E+04	3.38E+01	3.45E+00	Copper, Total
Cyanide (CN-)	8.43E+00	2.08E+00	5.31E-01	Cyanide (CN-)
Iron	9.01E+04	3.18E+03	3.72E+01	Iron
Lead and compounds	1.47E+03	4.18E+00	3.98E-02	Lead and compounds
Magnesium	5.11E+02	NA	NA	NA
Manganese	4.88E+02	2.23E+01	1.14E+00	Manganese
Mercury (elemental)	1.23E-01	1.08E-01	5.31E-03	Mercury (elemental)
Nickel Soluble Salts	2.54E+01	2.62E+01	1.04E+00	
Selenium	2.94E+02	2.85E+00	1.33E-01	Selenium
Sodium, total recoverable	1.26E+02	NA	NA	NA
Thallium Soluble Salts	6.05E+01	1.47E-01	5.31E-03	Thallium Soluble Salts
Vanadium, total recoverable	1.76E+02	8.88E+01	2.28E-01	Vanadium, total recoverable
Zinc (metallic)	1.40E+03	3.85E+02	1.59E+01	Zinc (metallic)

Table B-6. Tier II Simulation Results for the ECODS N-1 Subunit

Analyte	Retardation	Mean Travel Time	Predicted Concentration in Aquifer	Action Level	Failing Analytes	Tier II $SSL_{T1/2}$	Tier II $MLSSL_{T1/2}$
	[unitless]	*[years]*	*[µg/L]*			*[mg/kg]*	
1,1,2,2-Tetrachloroethane	2.10E+00	1.41E+01		7.60E-02		Infinite	Infinite
Benzo(a)anthracene	4.99E+03	3.35E+04		3.00E-02		Infinite	Infinite
Bis(2-ethylhexyl) phthalate	1.55E+03	1.04E+04		6.00E+00		Infinite	Infinite
PCB 1254	4.31E+03	2.89E+04	1.74E-02	7.80E-03		2.10E-02	2.08E-05
PCB 1260	4.31E+03	2.89E+04	1.78E-02	7.80E-03		2.10E-02	2.08E-05
Antimony (metallic)	2.79E+04	1.87E+05	6.07E+00	6.00E+00		5.82E+01	
Arsenic, Inorganic	2.73E+02	1.83E+03	2.01E+02	1.00E+01		9.50E-01	
Cadmium	5.24E+02	3.51E+03	2.22E+02	5.00E+00		9.12E-01	
Cobalt	7.07E+01	4.74E+02	1.49E+02	6.00E+00	Cobalt	1.48E-01	
Copper, Total	1.75E+02	1.18E+03	2.90E+05	1.30E+03		7.94E+01	
Cyanide (CN-)	7.00E+01	4.70E+02	3.45E+02	2.00E+02	Cyanide (CN-)	4.89E+00	
Iron	1.53E+03	1.03E+04	1.69E+05	1.40E+04		7.48E+03	
Lead and compounds	1.88E+03	1.26E+04	2.24E+03	1.50E+01		9.83E+00	
Manganese	3.49E+02	2.34E+03	4.01E+03	4.30E+02		5.23E+01	
Mercury (elemental)	3.63E+02	2.44E+03	9.72E-01	2.00E+00		2.53E-01	
Selenium	3.84E+02	2.58E+03	2.20E+03	5.00E+01		6.69E+00	
Thallium Soluble Salts	4.96E+02	3.33E+03	3.50E+02	2.00E+00		3.45E-01	
Vanadium, total recoverable	6.97E+03	4.68E+04	7.25E+01	8.60E+01		2.09E+02	
Zinc (metallic)	4.33E+02	2.91E+03	9.28E+03	6.00E+03		9.05E+02	

Table B-7. Tier I Screening Results for the CSSLP Subunit Upland Soil

Analyte	Source Zone Concentration	Tier I Source-Specific SSL	Tier I Mass Limit SSL	Failing Analytes
	[mg/kg]			
1,2,3-Trichlorobenzene	3.87E-04	1.18E-02	3.07E-02	
Acetone	5.79E-01	2.72E+00	6.13E+01	
Benzene	4.67E-04	1.63E-03	2.19E-02	
Chloroethane	2.69E-03	4.70E+00	9.20E+01	
Chloroethene (Vinyl chloride)	4.22E-04	5.04E-04	8.76E-03	
Chloromethane (Methyl chloride)	8.67E-04	4.14E-02	8.32E-01	
Cyclohexane	4.48E-03	1.95E+01	5.70E+01	
Dichloromethane (Methylene chloride)	1.23E-02	1.07E-03	2.19E-02	
Ethylbenzene	6.69E-01	4.34E-01	3.07E+00	
Isopropylbenzene (Cumene)	5.24E-01	1.42E+00	1.97E+00	
Methyl Acetate	2.14E-01	3.88E+00	8.76E+01	
Methyl ethyl ketone (2-Butanone)	2.59E-02	1.11E+00	2.45E+01	
Methyl tert-butyly ether (MTBE)	4.59E-03	3.02E-03	6.13E-02	
Methylcyclohexane	2.17E-03	NA	NA	NA
m-Xylene	1.47E-01	1.14E-01	8.32E-01	
o-Xylene	1.75E-01	1.31E-01	8.32E-01	
p-Xylene	1.47E-01	1.59E-01	8.32E-01	
2-Methylnaphthalene	5.18E-02	5.91E-01	1.58E-01	
Acenaphthene	1.29E-01	5.41E+00	2.32E+00	
Anthracene	4.44E-01	8.68E+01	7.89E+00	
Benzo(a)anthracene	4.74E-01	2.19E-02	1.31E-04	Benzo(a)anthracene
Benzo(a)pyrene	4.00E-01	3.96E-01	8.76E-04	Benzo(a)pyrene
Benzo(b)fluoranthene	7.19E-01	6.28E-01	1.10E-03	Benzo(b)fluoranthene
Benzo(g,h,i)perylene	8.40E-02	NA	NA	NA
Benzo(k)fluoranthene	2.68E-01	6.28E+00	1.10E-02	
Bis(2-ethylhexyl) phthalate	1.45E+00	1.36E+00	2.63E-02	Bis(2-ethylhexyl) phthalate
Carbazole	8.93E-02	NA	NA	NA

Table B-7. Tier I Screening Results for the CSSLP Subunit Upland Soil *(continued)*

Analyte	Source Zone Concentration	Tier I Source-Specific SSL	Tier I Mass Limit SSL	Failing Analytes
	[mg/kg]			
Chrysene	4.74E-01	2.03E+01	1.10E-01	
Dibenz(a,h)anthracene	2.74E-02	9.14E-02	1.10E-04	
Dibenzofuran	1.26E-01	1.49E-01	3.46E-02	
Di-n-butyl phthalate	8.23E-02	3.06E+00	3.94E+00	
Fluoranthene	1.76E+00	8.02E+01	3.51E+00	
Fluorene	1.81E-01	4.62E+00	1.27E+00	
Indeno(1,2,3-c,d)pyrene	1.02E-01	1.91E+00	1.10E-03	
Naphthalene	7.73E-02	3.15E-04	5.26E-04	Naphthalene
Pentachlorophenol	2.09E-01	1.87E-02	4.38E-03	Pentachlorophenol
Phenanthrene	1.52E+00	NA	NA	NA
Pyrene	1.11E+00	1.67E+01	5.26E-01	
Aldrin	3.24E-03	9.17E-05	4.03E-06	Aldrin
alpha-Chlordane	8.10E-03	NA	NA	NA
Dieldrin	2.05E-02	9.41E-05	7.89E-06	Dieldrin
gamma-Chlordane	8.72E-03	NA	NA	NA
Lindane	2.82E-02	8.21E-03	8.76E-04	Lindane
p,p'-DDD	5.91E-03	3.00E-03	1.40E-04	p,p'-DDD
p,p'-DDE	5.43E-03	8.13E-03	2.02E-04	
p,p'-DDT	6.11E-04	3.19E-01	1.01E-03	
PCB 1248	2.30E-01	4.93E-03	3.42E-05	PCB 1248
PCB 1254	4.28E-01	4.93E-03	3.42E-05	PCB 1254
PCB 1260	1.01E-01	4.93E-03	3.42E-05	PCB 1260
Aluminum	2.12E+04	3.06E+04	8.76E+01	
Antimony (metallic)	2.37E+01	2.45E+01	2.63E-02	
Arsenic, Inorganic	6.31E+01	4.00E-01	4.38E-02	Arsenic, Inorganic
Barium	1.91E+02	8.41E+01	8.76E+00	Barium
Beryllium and compounds	5.24E-01	3.23E+00	1.75E-02	

Table B-7. Tier I Screening Results for the CSSLP Subunit Upland Soil *(continued)*

Analyte	Source Zone Concentration	Tier I Source-Specific SSL	Tier I Mass Limit SSL	Failing Analytes
	[mg/kg]			
Cadmium	2.08E+00	3.84E-01	2.19E-02	Cadmium
Calcium	1.21E+04	NA	NA	NA
Chromium, Total	6.66E+01	1.84E+05	4.38E-01	
Cobalt	4.26E+00	6.24E-02	2.63E-02	Cobalt
Copper, Total	1.19E+02	3.34E+01	5.70E+00	Copper, Total
Iron	5.69E+04	3.15E+03	6.13E+01	Iron
Lead and compounds	2.41E+02	4.14E+00	6.57E-02	Lead and compounds
Magnesium	2.48E+03	NA	NA	NA
Manganese	2.64E+02	2.20E+01	1.88E+00	Manganese
Mercury (elemental)	8.84E-01	1.07E-01	8.76E-03	Mercury (elemental)
Nickel Soluble Salts	1.08E+02	2.60E+01	1.71E+00	Nickel Soluble Salts
Potassium	7.57E+02	NA	NA	NA
Selenium	3.95E+00	2.82E+00	2.19E-01	Selenium
Sodium, total recoverable	1.65E+02	NA	NA	NA
Vanadium, total recoverable	1.41E+02	8.79E+01	3.77E-01	Vanadium, total recoverable
Zinc (metallic)	2.42E+02	3.81E+02	2.63E+01	

Table B-8. Tier II Simulation Results for the CSSLP Subunit Upland Soil

Analyte	Retardation	Mean Travel Time	Predicted Concentration in Aquifer	Action Level	Failing Analytes	Tier II $SSL_{T1/2}$	Tier II $MLSSL_{T1/2}$
	[unitless]	*[years]*	*[µg/L]*			*[mg/kg]*	
Benzo(a)anthracene	5.13E+03	2.59E+03		3.00E-02		Infinite	Infinite
Benzo(a)pyrene	1.39E+04	7.02E+03		2.00E-01		Infinite	Infinite
Benzo(b)fluoranthene	1.76E+04	8.91E+03		2.50E-01		Infinite	Infinite
Bis(2-ethylhexyl) phthalate	1.59E+03	8.04E+02		6.00E+00		Infinite	Infinite
Naphthalene	1.81E+01	9.12E+00		1.20E-01		Infinite	Infinite
Pentachlorophenol	1.31E+02	6.61E+01		1.00E+00		Infinite	Infinite
Aldrin	6.99E+02	3.53E+02		9.20E-04		Infinite	Infinite
Dieldrin	3.66E+02	1.85E+02		1.80E-03		Infinite	8.31E+01
Lindane	2.88E+02	1.45E+02		2.00E-01		Infinite	Infinite
p,p'-DDD	6.57E+02	3.32E+02		3.20E-02		8.93E+03	3.14E-03
PCB 1248	4.43E+03	2.24E+03	2.98E-01	7.80E-03		6.01E-03	3.42E-05
PCB 1254	4.43E+03	2.24E+03	5.55E-01	7.80E-03		6.01E-03	3.42E-05
PCB 1260	4.43E+03	2.24E+03	1.31E-01	7.80E-03		6.01E-03	3.42E-05
Arsenic, Inorganic	2.80E+02	1.42E+02	1.35E+03	1.00E+01	Arsenic, Inorganic	4.67E-01	
Barium	2.95E+02	1.49E+02	3.89E+03	2.00E+03	Barium	9.82E+01	
Cadmium	5.38E+02	2.72E+02	2.32E+01	5.00E+00	Cadmium	4.48E-01	
Cobalt	7.27E+01	3.67E+01	3.51E+02	6.00E+00	Cobalt	7.28E-02	
Copper, Total	1.80E+02	9.10E+01	3.96E+03	1.30E+03	Copper, Total	3.90E+01	
Iron	1.58E+03	7.97E+02	2.17E+05	1.40E+04	Iron	3.67E+03	
Lead and compounds	1.94E+03	9.78E+02	7.48E+02	1.50E+01	Lead and compounds	4.83E+00	
Manganese	3.59E+02	1.81E+02	4.41E+03	4.30E+02	Manganese	2.57E+01	
Mercury (elemental)	3.74E+02	1.89E+02	1.42E+01	2.00E+00	Mercury (elemental)	1.24E-01	
Nickel Soluble Salts	4.67E+02	2.36E+02	1.39E+03	3.90E+02	Nickel Soluble Salts	3.03E+01	
Selenium	3.95E+02	2.00E+02	6.01E+01	5.00E+01	Selenium	3.29E+00	
Vanadium, total recoverable	7.17E+03	3.62E+03	1.18E+02	8.60E+01		1.03E+02	

Table B-9. Tier I Screening Results for the CSSLP Subunit Surface Water Impoundment Area

Analyte	Source Zone Concentration	Tier I Source-Specific SSL	Tier I Mass Limit SSL	Failing Analytes
	[mg/kg or pCi/g]			
Acetone	6.00E-02	2.82E+00	2.77E+02	
Methyl ethyl ketone (2-Butanone)	8.25E-03	1.15E+00	1.11E+02	
Toluene	4.03E-03	4.97E-01	1.98E+01	
Anthracene	1.31E-02	8.71E+01	3.56E+01	
Benzo(a)anthracene	4.24E-02	2.20E-02	5.94E-04	Benzo(a)anthracene
Benzo(a)pyrene	2.53E-02	3.98E-01	3.96E-03	
Benzo(b)fluoranthene	3.75E-02	6.31E-01	4.95E-03	
Bis(2-ethylhexyl) phthalate	6.16E-02	1.37E+00	1.19E-01	
Chrysene	3.43E-02	2.04E+01	4.95E-01	
Dimethyl phthalate	1.89E-02	NA	NA	NA
Fluoranthene	1.26E-01	8.06E+01	1.58E+01	
Phenanthrene	5.10E-02	NA	NA	NA
Pyrene	8.65E-02	1.68E+01	2.38E+00	
Arsenic, Inorganic	1.84E+01	4.02E-01	1.98E-01	Arsenic, Inorganic
Barium	3.34E+01	8.45E+01	3.96E+01	
Calcium	1.21E+03	NA	NA	NA
Copper, Total	1.59E+01	3.36E+01	2.57E+01	
Magnesium	2.54E+02	NA	NA	NA
Manganese	8.10E+01	2.21E+01	8.51E+00	Manganese
Potassium	2.74E+02	NA	NA	NA
Sodium, total recoverable	7.26E+01	NA	NA	NA
Zinc (metallic)	5.33E+01	3.83E+02	1.19E+02	
Thorium-228	4.16E+00	1.68E+01	3.23E+00	
Thorium-230	1.44E+00	1.54E+00	2.97E-01	
Thorium-232	3.31E+00	1.54E+00	2.97E-01	Thorium-232
Uranium-238	1.19E+00	4.12E-01	1.98E-01	Uranium-238

Table B-10. Tier II Simulation Results for the CSSLP Subunit Surface Water Impoundment Area

Analyte	Retardation	Mean Travel Time	Predicted Concentration in Aquifer	Action Level	Failing Analytes	Tier II $SSL_{T1/2}$	Tier II $MLSSL_{T1/2}$
	[unitless]	*[years]*	*[µg/L or pCi/L]*			*[mg/kg or pCi/g]*	
Benzo(a)anthracene	4.75E+03	5.79E+03		3.00E-02		Infinite	Infinite
Arsenic, Inorganic	2.60E+02	3.16E+02	1.66E+02	1.00E+01	Arsenic, Inorganic	1.11E+00	
Manganese	3.33E+02	4.05E+02	5.72E+02	4.30E+02	Manganese	6.09E+01	
Thorium-232	6.65E+02	8.09E+02	1.17E+01	1.50E+01		4.24E+00	2.97E-01
Uranium-238	2.66E+02	3.25E+02	1.05E+01	1.00E+01	Uranium-238	1.13E+00	1.98E-01

Table B-11. Tier I Screening Results for the Surrounding Soils of the Ford Building Subunit

Analyte	Source Zone Concentration	Tier I Source-Specific SSL	Tier I Mass Limit SSL	Failing Analytes
	[mg/kg or pCi/g]			
Acetone	8.53E-02	2.42E+00	2.43E+01	
Cyclohexane	5.73E-04	2.19E+01	2.25E+01	
Dichloromethane (Methylene chloride)	1.78E-02	9.71E-04	8.66E-03	Dichloromethane (Methylene chloride)
Isopropylbenzene (Cumene)	4.73E-02	1.99E+00	7.80E-01	
Methyl ethyl ketone (2-Butanone)	7.27E-03	9.93E-01	9.70E+00	
Methyl tert-butyly ether (MTBE)	6.93E-03	2.72E-03	2.43E-02	
Styrene	4.54E-04	2.02E-01	1.73E-01	
Tetrachloroethylene	7.20E-04	2.66E-03	8.66E-03	
Toluene	9.02E-04	4.69E-01	1.73E+00	
Trichloroethylene	1.45E-03	2.66E-03	8.66E-03	
Anthracene	1.34E-01	8.58E+01	3.12E+00	
Benzo(a)anthracene	6.84E-02	2.17E-02	5.20E-05	Benzo(a)anthracene
Benzo(a)pyrene	6.14E-02	3.92E-01	3.47E-04	
Benzo(b)fluoranthene	1.63E-01	6.21E-01	4.33E-04	
Benzo(g,h,i)perylene	7.16E-02	NA	NA	NA
Benzo(k)fluoranthene	6.58E-02	6.21E+00	4.33E-03	
Bis(2-ethylhexyl) phthalate	8.58E-02	1.35E+00	1.04E-02	
Butylbenzyl phthalate	2.10E-02	4.45E-01	2.77E-02	
Carbazole	1.73E-02	NA	NA	NA
Chrysene	1.14E-01	2.01E+01	4.33E-02	
Di-n-butyl phthalate	3.38E-02	3.01E+00	1.56E+00	
Di-n-octyl phthalate	1.46E-02	NA	NA	NA
Fluoranthene	4.21E-01	7.93E+01	1.39E+00	
Indeno(1,2,3-c,d)pyrene	7.67E-02	1.89E+00	4.33E-04	
Pentachlorophenol	2.29E-01	1.85E-02	1.73E-03	Pentachlorophenol
Phenanthrene	2.38E-01	NA	NA	NA
Pyrene	3.09E-01	1.65E+01	2.08E-01	

Table B-11. Tier I Screening Results for the Surrounding Soils of the Ford Building Subunit *(continued)*

Analyte	Source Zone Concentration	Tier I Source-Specific SSL	Tier I Mass Limit SSL	Failing Analytes
	[mg/kg or pCi/g]			
PCB 1254	1.19E-01	4.87E-03	1.35E-05	PCB 1254
PCB 1260	7.13E-02	4.87E-03	1.35E-05	PCB 1260
Aluminum	3.57E+04	3.03E+04	3.47E+01	Aluminum
Arsenic, Inorganic	1.45E+01	3.96E-01	1.73E-02	Arsenic, Inorganic
Barium	6.21E+01	8.32E+01	3.47E+00	
Beryllium and compounds	4.55E+00	3.19E+00	6.93E-03	Beryllium and compounds
Cadmium	1.03E+00	3.80E-01	8.66E-03	Cadmium
Calcium	5.15E+03	NA	NA	NA
Chromium, Total	2.30E+02	1.82E+05	1.73E-01	
Cobalt	9.45E+00	6.16E-02	1.04E-02	Cobalt
Copper, Total	4.68E+02	3.30E+01	2.25E+00	Copper, Total
Iron	4.72E+04	3.11E+03	2.43E+01	Iron
Lead and compounds	2.17E+01	4.09E+00	2.60E-02	Lead and compounds
Magnesium	2.88E+03	NA	NA	NA
Manganese	5.40E+02	2.18E+01	7.45E-01	Manganese
Mercury (elemental)	1.44E-01	1.05E-01	3.47E-03	Mercury (elemental)
Nickel Soluble Salts	1.72E+01	2.57E+01	6.76E-01	
Potassium	2.17E+03	NA	NA	NA
Selenium	2.62E+01	2.79E+00	8.66E-02	Selenium
Silver	7.43E-01	8.56E+00	1.63E-01	
Thallium Soluble Salts	5.51E+01	1.44E-01	3.47E-03	Thallium Soluble Salts
Vanadium, total recoverable	1.87E+02	8.69E+01	1.49E-01	Vanadium, total recoverable
Zinc (metallic)	4.26E+02	3.77E+02	1.04E+01	Zinc (metallic)
Actinium-228	1.55E+01	3.59E+05	1.37E+03	
Cesium-137	1.53E-01	1.40E+02	4.79E-01	
Cobalt-60	5.45E-01	4.13E+00	6.97E-01	
Lead-212	1.62E+01	1.00E+04	6.36E+01	

Table B-11. Tier I Screening Results for the Surrounding Soils of the Ford Building Subunit *(continued)*

Analyte	Source Zone Concentration	Tier I Source-Specific SSL	Tier I Mass Limit SSL	Failing Analytes
	[mg/kg or pCi/g]			
Potassium-40	2.48E+01	1.62E-01	3.71E-03	Potassium-40
Thorium-228	3.33E+00	1.65E+01	2.83E-01	
Thorium-230	2.60E+00	1.52E+00	2.60E-02	Thorium-230
Thorium-232	3.97E+00	1.52E+00	2.60E-02	Thorium-232
Uranium-233/234	1.89E+00	4.06E-01	1.73E-02	Uranium-233/234
Uranium-238	2.57E+00	4.06E-01	1.73E-02	Uranium-238

This page is intentionally left blank.

Table B-12. Tier II Simulation Results for the Surrounding Soils of the Ford Building Subunit

Analyte	Retardation	Mean Travel Time	Predicted Concentration in Aquifer	Action Level	Failing Analytes	Tier II $SSL_{T1/2}$	Tier II $MLSSL_{T1/2}$
	[unitless]	*[years]*	*[µg/L or pCi/L]*			*[mg/kg or pCi/g]*	
Dichloromethane (Methylene chloride)	1.16E+00	3.92E+00	8.68E-03	5.00E+00		1.03E+01	6.10E+01
Benzo(a)anthracene	5.58E+03	1.89E+04		3.00E-02		Infinite	Infinite
Pentachlorophenol	1.42E+02	4.82E+02		1.00E+00		Infinite	Infinite
PCB 1254	4.82E+03	1.63E+04	9.12E-02	7.80E-03		1.02E-02	1.35E-05
PCB 1260	4.82E+03	1.63E+04	5.47E-02	7.80E-03		1.02E-02	1.35E-05
Aluminum	1.17E+04	3.97E+04	1.57E+04	2.00E+04		4.55E+04	
Arsenic, Inorganic	3.05E+02	1.03E+03	2.44E+02	1.00E+01		5.93E-01	
Beryllium and compounds	6.16E+03	2.09E+04	3.80E+00	4.00E+00		4.79E+00	
Cadmium	5.85E+02	1.99E+03	9.04E+00	5.00E+00		5.69E-01	
Cobalt	7.89E+01	2.68E+02	6.14E+02	6.00E+00	Cobalt	9.24E-02	
Copper, Total	1.96E+02	6.64E+02	1.23E+04	1.30E+03	Copper, Total	4.96E+01	
Iron	1.71E+03	5.82E+03	1.42E+05	1.40E+04		4.67E+03	
Lead and compounds	2.10E+03	7.14E+03	5.30E+01	1.50E+01		6.14E+00	
Manganese	3.91E+02	1.33E+03	7.10E+03	4.30E+02		3.27E+01	
Mercury (elemental)	4.06E+02	1.38E+03	1.82E+00	2.00E+00		1.58E-01	
Selenium	4.29E+02	1.46E+03	3.13E+02	5.00E+01		4.18E+00	
Thallium Soluble Salts	5.54E+02	1.88E+03	5.11E+02	2.00E+00		2.16E-01	
Vanadium, total recoverable	7.79E+03	2.64E+04	1.23E+02	8.60E+01		1.30E+02	
Zinc (metallic)	4.84E+02	1.64E+03	4.52E+03	6.00E+03		5.65E+02	
Potassium-40	5.85E+02	1.99E+03	2.18E+02	2.14E+00		2.44E-01	3.71E-03
Thorium-230	7.80E+02	2.65E+03	1.67E+01	1.50E+01		2.33E+00	2.60E-02
Thorium-232	7.80E+02	2.65E+03	2.62E+01	1.50E+01		2.28E+00	2.60E-02
Uranium-233/234	3.13E+02	1.06E+03	3.10E+01	1.00E+01		6.10E-01	1.73E-02
Uranium-238	3.13E+02	1.06E+03	4.22E+01	1.00E+01		6.09E-01	1.73E-02

Table B-13. Summary Table of Tier I and Tier II Screening Results

OU Subunit	# of Tier I COPCs	Tier I COPCs	Tier II COCs	CM RCOCs
ECODS N-1	19	1,1,2,2-tetrachloroethane, Benzo(a)anthracene, Bis(2-ethylhexyl) phthalate, PCB 1254, PCB 1260, Antimony, Arsenic, Cadmium, Cobalt, Copper, Cyanide, Iron, Lead, Manganese, Mercury, Selenium, Thallium Vanadium, Zinc	None	None
CSSLP Upland Soil	25	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Bis(2-ethylhexyl) phthalate, Naphthalene, Pentachlorophenol, Aldrin, Dieldrin, Lindane, p,p'-DDD, PCB 1248, PCB 1254, PCB 1260, Aresenic, Barium, Cadmium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Vanadium	Arsenic, Cadmium, Cobalt, Iron, Manganese	None
CSSLP Surface Water Impoundment Area	5	Benzo(a)anthracene, Arsenic, Manganese, Thorium-232, Uranium-238	Arsenic, Manganese, Uranium-238	None
Surrounding Soils of the Ford Building	24	Dichloromethane (methylene chloride), Benzo(a)anthracene, Pentachlorophenol, PCB 1254, PCB 1260, Aluminum, Arsenic, Beryllium, Cadmium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Selenium, Thallium, Vanadium, Zinc, Potassium-40, Thorium-230, Thorium-232, Uranium-233/234, Uranium-238	None	None

APPENDIX C

HUMAN HEALTH RISK ASSESSMENT

This page was intentionally left blank.

TABLE OF CONTENTS

Section Page

List of Figures **C-4**
List of Tables **C-5**
List of Attachments **C-6**
List of Abbreviations and Acronyms **C-7**
C-1. Introduction **C-9**
C-1.1 Background ***C-10***
C-1.1.1 ECODS N-1 (NBN) C-10
C-1.1.2 Central Shops Scrap Lumber Pile (631-2G) C-11
C-1.1.3 Ford Building C-11
C-1.2 Data ***C-13***
C-1.2.1 ECODS N-1 (NBN) C-14
C-1.2.2 Central Shops Scrap Lumber Pile (631-2G) C-15
C-1.2.3 Ford Building C-16
C-1.3 Receptors ***C-17***
C-1.4 Sources of Risk-Based Threshold Values ***C-18***
C-2. Human Health Risk Assessment Process **C-19**
C-2.1 Soil and Sediment Media ***C-19***
C-2.1.1 Constituents of Potential Concern C-19
C-2.1.2 Risk/Hazard Calculation C-20
C-2.2 Surface Water Media ***C-21***
C-2.2.1 Comparison of MCL or PRG/RSL or AWQC C-21
C-2.3 Refinement of Constituents of Concern/Results ***C-21***
C-2.3.1 ECODS N-1 (NBN) Subunit C-22
C-2.3.2 Central Shops Scrap Lumber Pile (631-2G) Subunit C-25
C-2.3.3 Ford Building Subunit C-34
C-3. Summary/Conclusion of the Human Health Risk Assessment **C-41**
C-4. References **C-42**

LIST OF FIGURES

Figure		Page
Figure C-1.	ECODS N-1 Sample Location Map	C-45
Figure C-2.	Central Shops Scrap Lumber Pile (631-2G) Sample Location Map	C-46
Figure C-3.	Ford Building Sample Location Map	C-47
Figure C-4.	Arsenic Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the ECODS N-1	C-48
Figure C-5.	Chromium VI (Method 7196A) Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the ECODS N-1	C-49
Figure C-6.	Chromium VI (Method 7199) Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the ECODS N-1	C-50
Figure C-7.	Arsenic Data for Soil and Sediment Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP	C-51
Figure C-8.	Arsenic Data for Soil and Sediment Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP	C-52
Figure C-9.	Benzo[a]pyrene Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP	C-53
Figure C-10.	Thorium-232 Data for Sediment Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP	C-54
Figure C-11.	Uranium-238 Data for Sediment Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP	C-55
Figure C-12.	Arsenic Data for Surface Water Media at the CSSLP	C-56
Figure C-13.	Chromium IV (7196A) (filtered) Data for Surface Water Media at the CSSLP	C-57
Figure C-14.	Arsenic Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building	C-58
Figure C-15.	Chromium (total) Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building	C-59
Figure C-16.	Thallium Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building	C-60
Figure C-17.	Cobalt-60 Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building	C-61
Figure C-18.	Potassium-40 Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building	C-62
Figure C-19.	Thorium-232 Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building	C-63
Figure C-20.	Uranium-238 Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building	C-64

LIST OF TABLES

Table		Page
Table C-1.	Human Health COPC Screening for ECODS N-1 (NBN) Subunit Soil Media (0-1 ft)	C-65
Table C-2.	Human Health Risk/Hazard Calculation for ECODS N-1 Subunit Soil Media (0-1 ft) Residential Scenario	C-67
Table C-3.	Human Health Risk/Hazard Calculation for ECODS N-1 Subunit Soil Media (0-1 ft) Industrial Scenario	C-68
Table C-4.	Human Health COPC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Soil Media (0-1 ft)	C-69
Table C-5.	Human Health Risk/Hazard Calculation for Central Shops Scrap Lumber Pile Subunit Soil Media (0-1 ft) Residential Scenario	C-73
Table C-6.	Human Health Risk/Hazard Calculation for Central Shop Scrap Lumber Pile Subunit Soil Media (0-1 ft) Industrial Scenario	C-74
Table C-7.	Human Health COPC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Sediment Media	C-75
Table C-8.	Human Health Risk/Hazard Calculation for Central Shops Scrap Lumber Pile Subunit Sediment Media (0-1 ft) Residential Scenario	C-77
Table C-9.	Human Health Risk/Hazard Calculation for Central Shop Scrap Lumber Pile Subunit Sediment Media (0-1 ft) Industrial Scenario	C-78
Table C-10.	Human Health COC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Surface Water (Unfiltered) Media	C-79
Table C-11.	Human Health COC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Surface Water (Filtered) Media	C-80
Table C-12.	Human Health COPC Screening for Ford Building Subunit Soil Media (0-1 ft)	C-81
Table C-13.	Human Health Risk/Hazard Calculation for Ford Building Subunit Soil Media (0-1 ft) Residential Scenario	C-85
Table C-14.	Human Health Risk/Hazard Calculation for Ford Building Subunit Soil Media (0-1 ft) Industrial Scenario	C-86

LIST OF ATTACHMENTS

Attachment		Page
Attachment C-1	USEPA Regional Screening Levels Table RSLs for Default Resident and Default Industrial Worker Scenarios	C-87
Attachment C-2	USEPA Radionuclide Preliminary Remediation Goals Website *Site-Specific PRGs for Resident Scenario*	C-91
Attachment C-3	USEPA Radionuclide Preliminary Remediation Goals for Superfund Table: *Default PRGs for Industrial Worker Scenario*	C-95
Attachment C-4	MCLs/RSLs/AWQC for Surface Water Data Screening of Nonradiological Constituents	C-99
Attachment C-5	MCLs/PRGs for Surface Water Data Screening of Radiological Constituents	C-103

LIST OF ABBREVIATIONS AND ACRONYMS

AWQC	ambient water quality criteria
bgs	below ground surface
BRA	baseline risk assessment
CM	contaminant migration
CMS	corrective measures study
COC	constituent of concern
COPC	constituent of potential concern
CSM	conceptual site model
CSSLP	Central Shops Scrap Lumber Pile (631-2G)
ECODS	Early Construction and Operational Disposal Site
EPC	exposure point concentration
FS	feasibility study
ft	feet
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
ISM	integrated sampling model
m	meter
MCL	maximum contaminant level
NAOU	N-Area Operable Unit
NBN	no building number
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
PRG	preliminary remediation goal
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RfD	reference dose
RFI	RCRA facility investigation
RI	remedial investigation
RME	reasonable maximum exposure
RSL	regional screening level
SCDHEC	South Carolina Department of Health and Environmental Control
SRS	Savannah River Site
SVOA	semivolatile organic analyte
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TSCA	Toxic Substance Control Act
UCL	upper confidence limit

LIST OF ABBREVIATIONS AND ACRONYMS *(continued)*

USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
VOA	volatile organic analyte
VOC	volatile organic compound

C-1. INTRODUCTION

The human health risk assessment (HHRA) in support of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)/Remedial Investigation (RI) Report with Baseline Risk Assessment (BRA) and Corrective Measures Study (CMS)/Feasibility Study (FS) for the Early Construction and Operational Disposal Site (ECODS) N-1 (South of N Area) (NBN), Central Shops Scrap Lumber Pile (631-2G) (CSSLP), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (OU) is presented in this appendix. The evaluation contained herein assesses the risks of contamination to human receptors to identify the problems warranting action from a human health standpoint to support subsequent remediation as deemed necessary.

The ECODS N-1, CSSLP, and Ford Building OU is located in N Area (Central Shops) in an area currently designated for industrial use. The three subunits are in various stages of assessment, cleanup, and deactivation and decommissioning (D&D) but will receive final disposition as a remedial action under the SRS RCRA/CERCLA program. These subunits were originally part of the N-Area Operable Unit (NAOU) with a field start date of 2033. As per agreement with the U.S. Department of Energy (USDOE), U.S. Environmental Protection Agency (USEPA), and South Carolina Department of Health and Environmental Control (SCDHEC) to support an accelerated cleanup strategy, the ECODS N-1, CSSLP, and Ford Building OU was designated as a stand-alone OU in the FFA to be closed prior to the NAOU field start date of 2033.

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 are evaluated.

The HHRA is conducted and presented for each subunit for the evaluation of risk to human health receptors. Exposure is assessed by screening environmental data from the ECODS N-1, CSSLP, Ford Building OU RI/BRA database and evaluating the potential for exposure. This approach allows for remedial decisions to be made on a smaller scale within the larger OU area. The media type that are evaluated in this section is surface soil, sediment, and surface water.

The basis for this evaluation is the preliminary conceptual site models (CSMs), which are presented in Chapter 2. The CSMs are graphical representations of the ECODS N-1, CSSLP, and Ford Building subunit sources of contamination and potential impacts to human health and the environment. The preliminary CSMs establish the focus for the risk assessment, identifying the sources of contamination, the release mechanisms into exposure media, the exposure routes associated with media, and the potential receptors evaluated in the risk assessment. As depicted in Figure 2-5 through 2-7, the CSMs include the following elements:

- Primary sources of contamination
- Primary environmental release mechanisms
- Secondary sources of contamination
- Secondary release mechanisms
- Exposure media
- Exposure routes
- Human receptors

C-1.1 Background

As discussed, the ECODS N-1, CSSLP, and Ford Building OU consists of three subunits.

C-1.1.1 ECODS N-1 (NBN)

The ECODS N-1 subunit is located just south of N Area in relatively flat terrain, approximately 23 m (75 ft) south of the railroad tracks, which run adjacent to N Area (Figure C-1). The area surrounding the ECODS N-1 subunit is wooded with heavy underbrush. It contains no stressed vegetation or other visual indications of contamination. The ECODS N-1 subunit was used to dispose of materials associated with the construction and operation of N Area. The ECODS N-1 subunit was in use from August 1952 to June 1954. The subunit is approximately107 m (350 ft) long by 15 m (50 ft) wide. Waste disposed of in ECODS N-1 was buried in two trenches, each approximately 46 m (150 ft) long, located end to end.

Figure C-1 shows the sampling locations for the ECODS N-1 subunit.

C-1.1.2 Central Shops Scrap Lumber Pile (631-2G)

The CSSLP subunit was historically used as an equipment laydown and rubble storage area in addition to an area for burning construction related materials. Various unknown amounts and types of wood scrap were burned at the CSSLP subunit which may have included treated lumber and/or creosote-treated wood. The CSSLP subunit surface water impoundment area was constructed between 1992 and 1994 in the southern portion. Surface water runoff from the CSSLP subunit upland soil area flows into the CSSLP subunit surface water impoundment area. The U.S. Department of Energy (USDOE), the U.S. Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC) agreed to address the surface water impoundment area and upland soil together as the CSSLP subunit. The CSSLP subunit, as a whole, measures approximately 91.4 m (300 ft) by 91.4 m (300 ft) and covers about 0.84 ha (2.07 ac).

Figure C-2 shows the sampling locations for the CSSLP subunit.

C-1.1.3 Ford Building

The Ford Building was constructed in the 1950s and performed multiple missions while active until the 1990s. At points in the building's history, it was used to test Ford Company-manufactured motor control packages, and repair/rework of leaking contaminated process water heat exchangers for Savannah River Site's (SRS) reactors. After completion of active missions, the building and surrounding area was used to store excess equipment (in waste containers [e.g., Sealands] and/or bagged/wrapped in plastic) that was chemically and/or radiologically contaminated. The Ford Building is located on the southeastern side of N Area, within the facility boundary.

In 2019, representatives from the Department of Energy, USEPA, and SCDHEC reached agreement that the Ford Building (690-N), excluding the building slab, would undergo D&D using the Integrated Sampling Model (ISM) (SRNS 2019a). As described in the *Characterization Report Building 690-N (Ford Building) and Ancillary Equipment and Facilities* (SRNS 2014) and the *Human Health Risk Screening Evaluation for 690-N Ford Building* (SRNS 2019b) concrete samples were collected in 2014 inside the Ford Building (690-N) at 21 locations at two intervals

(0 to 15.2 cm [0 to 6 in] and 15.2 to 30.5 cm [6 to 12 in]). Soil samples were collected at the same 21 locations beneath the concreate slab at two soil intervals (0 to 15.2 cm [0 to 6 in] and 15.2 to 30.5 cm [6 to 12 in]). All concrete and soil samples were analyzed for the following constituents: Toxicity Characteristic Leaching Procedure (TCLP) Resource Conservation and Recovery Act (RCRA) metals, volatile organic compounds (VOCs), semi-VOCs (SVOCs), polychlorinated biphenyls (PCBs), gross alpha, nonvolatile beta, tritium, and inorganic anions (bromide, chloride, fluoride, nitrate, nitrites, orthophosphate and sulfate). Additionally, some samples were analyzed for alpha spectroscopy radionuclides (americium, curium, neptunium, plutonium, and uranium), gamma spectroscopy radionuclides, and beta-emitting specific radionuclides (carbon-14, nickel-59, nickel-63, plutonium-241, selenium-79, strontium-90, technetium-99). These data were analyzed at approved labs using standard methods, though the data were not validated. The concrete and soils data were used to evaluate contaminant migration risk and conduct a HH risk screening evaluation for the Ford Building (690-N) concrete slab and underlying soils in support of the D&D strategy for the facility (SRNS 2019b).

The HH screening evaluation for the Ford Building (690-N) concrete slab and underlying soils in support of the D&D strategy identified concrete with PCBs (Aroclor 1254, maximum detection in concrete = 15 mg/kg, residential risk = 6.3E-06, industrial worker risk = 1.5E-06; Aroclor 1260 maximum detection in concrete = 5.5 mg/kg, residential risk = 2.3E-06, industrial worker risk < 1E-06) and cesium-137 (maximum detection in concrete = 1.75 pCi/g, residential risk = 2.8E-05, industrial worker risk = 1.7E-05) at levels that warrant concern with respect to human health (SRNS 2019b). For concrete media, maximum detected concentrations were used as the EPC to conservatively calculate risk/hazard. The sources of the threshold values used in the evaluation include the USEPA Surface PRGs (SPRGs) for Outdoor Surfaces (USEPA 2011) for radionuclides and ten times (10x) the soil RSLs (USEPA 2014) for nonradionuclides. No HH COCs were identified for underlying soils. No contaminant migration (CM) COCs were identified as part of the evaluation for the Ford Building (690-N) concrete slab and underlying soils in support of the D&D strategy.

In 2021, the D&D phase of the Ford Building (690-N) was completed and documented in the *Decommissioning Project Final Report Building 690-N, Process Heat Exchanger Repair Facility*

(SRNS 2021). The facility structure was demolished to its slab and an engineered concrete cap was installed over the entire concrete slab area extending out 0.3 m (1 ft) from the building edge. The 6-inch concrete cap breaks the direct exposure pathway to PCBs and Cs-137 for human receptors. There is no human health exposure risk under the current configuration.

Post-decommissioning facility remnants (including the building slab) will be closed as part of the ECODS N-1, CSSLP, and Ford Building OU. Ancillary equipment and other areas that will also be included in the closure process of this OU are the remnants of a: 1) 13.8 kilovolt (kV) Substation (652-44N), 2) a Fuel Oil Tank Containment Dike, 3) Shielding Remnant Area, and 4) the 745-N Excess Equipment Yard (Figure B-3). The fuel oil tank has been removed and only the concrete dike remains. The 13.8 kV substation has been dismantled and only the concrete pad and retention walls remain. The surrounding soils of the Ford Building subunit cover an area that is approximately 145 m by 154 m (475 ft by 505 ft) and is approximately168 ha (416 ac).

Figure C-3 shows the sampling locations for the Ford Building subunit.

C-1.2 Data

Characterization activities for soil, sediment, and surface water media were conducted at the ECODS N-1, CSSLP, and Ford Building OU in 2001, 2014, and 2019. A sampling and analysis plan was developed to address these data gaps and characterization activities were implemented from September 2020 through October 2020 (SRNS 2020).

Groundwater is not part of this OU. Groundwater will be investigated and remediated, as applicable, under the Central Shops Groundwater OU.

All data used in the HHRA for the ECODS N-1 are presented in Appendix A. The ProUCL (USEPA 2015) software package was used to calculate the 95% upper confidence limit (UCL) on the arithmetic mean that are presented in Appendix A. The data distribution and recommended 95%UCL as determined by ProUCL for each constituent are presented as footnotes to the tables in Appendix A. Non-detected constituent concentrations were processed in accordance with the ProUCL User's Guide. The Data Usability Reports (DURs) for the 2019 Pre-Workplan Characterization Samples and the 2020 Workplan Characterization Samples are presented in

Appendix J. The reports provide an assessment of the precision, accuracy, representativeness, comparability, and completeness data quality indicators and measurement performance criteria. The DURs concluded that that the data quality objectives were met, and that the data is considered usable for the purposes of decision-making in the RI/BRA. In addition, the Site Evaluation Report for Early Construction and Operational Disposal Site (ECODS) N-1 (U) presents a Laboratory Quality Discussion (Section IV) and a Site Evaluation Validation Report (Section V) for the samples that were collected in 2001 (WSRC 2001).

C-1.2.1 ECODS N-1 (NBN)

In 2019, a pre-Work Plan characterization effort collected soil samples at the surface (0 to 0.3 m [0 to 1 ft]), shallow subsurface (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface (2.4 to 3 m [8 to 10 ft]) soils at fourteen locations for TAL analysis (Figure C-1). Sample locations were biased to locations that exceeded the screening criteria in the 2001 Site Evaluation report and to vertically and horizontally bound 2001 Site Evaluation locations with elevated metal results. Because of the site history of burning activities at ECODs N-1, hexavalent chromium (Cr+6) analyses were performed on the 2019 samples collected adjacent to the 2001 samples that showed elevated total chromium (Cr) levels at depth (2.4-3.0 m [8-10 ft]).

The 2020 RFI/RI Workplan (SRNS 2020) characterization was also a biased sampling effort focusing on elevated metals sample locations within the ECODS N-1 unit and the need for subunit specific background samples. Twenty-four soil samples were collected from the ECODS N-1 subunit including surface samples (0.0 to 0.3 m [0 to 1 ft]), shallow subsurface samples (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface samples (2.4 to 3.0 m [8 to 10 ft] and 3.0 to 3.6 m [10 to 12 ft]) from three locations inside the subunit and three background locations outside of the unit boundary. The 2020 characterization samples were analyzed for TAL metals (including hexavalent chromium) and visually examined for the presence of asbestos.

C-1.2.2 Central Shops Scrap Lumber Pile (631-2G)

C-1.2.2.1 CSSLP Subunit Upland Area

In 2019, a pre-Work Plan characterization effort collected soil samples at the Scrap Lumber Pile (631-2G) 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 nineteen locations (Figure C-2). Sample locations were selected in a 30.5 m (100 ft) grid pattern to cover the area of the Scrap Lumber Pile (631-2G) subunit. The soil samples were analyzed for TAL, TCL, and radiological indicator parameters (gross alpha and nonvolatile beta) analyses. The CSSLP had not previously received any extensive characterization in the past.

The RFI/RI Workplan (SRNS 2020) characterization further defined the nature and extent of contamination at some 2019 sample locations and identified if elevated metal (including hexavalent chromium) results are due to native soil conditions or related to unit operations. At six (6) locations inside the CSSLP subunit and three (3) background locations outside of the unit boundary, thirty (30) soil samples were collected in 2020. Sample locations within the subunit focused on previously identified locations of elevated metal concentrations. The following four (4) soil intervals were sampled: surface samples (0.0 to 0.3 m [0 to 1 ft]), shallow subsurface samples (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface samples (2.4 to 3.0 m [8 to 10 ft] and 3.0 to 3.6 m [10 to 12 ft]). All soil samples were analyzed for TAL metals analyses, including hexavalent chromium, because of the history of burning material and the elevated 2019 chromium results.

C-1.2.2.2 CSSLP Subunit Surface Water Impoundment Area

In 2020, a Work Plan characterization effort collected sediment at the surface (0 to 0.3 m [0 to 1 ft]) and shallow subsurface (0.3 to 1.2 m [1 to 4 ft]), and surface water (filtered and unfiltered) at the CSSLP Subunit Surface Water Impoundment Area (Figure C-2). The sediment samples were analyzed for TAL and radiological indicator parameters (gross alpha and nonvolatile beta) analyses. Because of the site history of burning activities at ECODs N-1, hexavalent chromium (Cr+6) analyses were performed on the sediment samples.

The surface water samples (unfiltered and filtered) were analyzed for TAL and radiological indicator parameters (gross alpha and nonvolatile beta) analyses. Because of the site history of burning activities at ECODs N-1, hexavalent chromium (Cr+6) analyses were performed on the surface water samples.

C-1.2.3 Ford Building

As part of the 2019 pre-Work Plan characterization effort, 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 locations (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 subunit (Figure C-3):

- At the Excess Equipment Yard (745-N), eleven locations in a 10 to 15 m (30 to 50 ft) grid pattern had soil samples taken from the surface (0 to 0.3 m [0 to 1 ft]) soil and shallow subsurface (0.3 to 1.2 m [1 to 4 ft]) soil intervals. At one of eleven locations, deeper subsurface soils samples (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]) were collected;

- At the Ford Building, sixteen locations around the exterior of the Ford Building, the 13.8 kV Substation, and the Fuel Oil Tank Containment Dike using a biased sampling plan for areas of suspected contamination. Surface (0 to 0.3 m [0 to 1 ft]) soil and shallow subsurface (0.3 to 1.2 m [1 to 4 ft]) soil samples were collected at all sixteen locations;

- At the Ford Building, three of the sixteen locations soil samples were also collected at 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] depth intervals;

- Eleven sample locations around the shielding remnant area using a biased sampling plan for areas of suspected contamination; a deeper subsurface at one location (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]) soil samples were collected.

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 (gross alpha and nonvolatile beta) analyses.

C-1.3 Receptors

The purpose of the HHRA is to evaluate the potential for adverse effects associated with exposure to constituents present in the ECODS N-1, CSSLP, Ford Building OU. The assessment estimates the risk potential in the absence of any remedial action and provides a basis for determining whether or not remedial actions is necessary to reduce or eliminate risks to human health. A streamlined approach that considers both standardized and site-specific receptor scenarios/exposure assumptions has been used for this evaluation.

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

The *future resident* receptor scenario evaluates long-term risks to individuals assumed to have unrestricted use of the area that consists of the ECODS N-1, CSSLP, Ford Building subunits. This scenario considers residents (adults and children) 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. Exposure routes associated with soil include inhalation of particulates and vapors, external exposure to radiation, dermal absorption, and incidental ingestion.

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

The *future industrial worker* scenario is a standard USEPA exposure scenario, 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 include inhalation, external exposure to radiation, dermal absorption, and incidental ingestion to soil.

C-1.4 Sources of Risk-Based Threshold Values

The USEPA publishes regional screening levels (RSLs) for nonradiological 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. Both RSLs and PRGs combine current USEPA toxicity values with standard exposure factors that represent reasonable maximum exposure (RME) 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 is the source of RSLs, as used in this assessment, provide generic exposure scenario tables and a calculator function to derive site-specific RSLs in which user-specific exposure parameters are exchanged for the generic scenario parameters (USEPA 2020b). The generic summary table includes RSLs for the resident and industrial worker that uses all default parameters for both the residential and industrial worker scenarios (Attachment C-1). The RSLs are based on a carcinogenic risk = 1E-06 and/or a hazard quotient (HQ) = 1.0. The RSL website was accessed in February 2021.

The PRGs for a residential scenario are obtained by using the USEPA Superfund Radionuclide Preliminary Goals for Superfund website (USEPA 2020a). These site-specific PRG values are calculated by eliminating the fruit and vegetable consumption pathways as standard input assumptions and using all other default parameters. The residential PRG output from the calculator is provided as Attachment C-2 to this appendix. The PRGs for an industrial worker scenario are obtained using the calculator function that assumes all default parameters. The PRG values are provided in Attachment C-3 to this appendix. The PRG website was accessed in February 2021.

For surface water, maximum contaminant levels (MCLs), tap water RSLs or PRGs, or ambient water quality criteria (AWQC) (SCDHEC 2014) are used. Surface water screening levels for nonradiological and radiological constituents are presented in Attachments C-4 and C-5, respectively.

C-2. HUMAN HEALTH RISK ASSESSMENT PROCESS

C-2.1 Soil and Sediment Media

The primary dataset used for the human health screening and risk/hazard calculations is the 0 to 0.3 m (0 to 1 ft) depth sample interval. Concentrations of detected constituents in the 0 to 0.3 m (0 to 1 ft) depth interval include both the maximum and the 95% upper confidence limit (UCL) on the mean concentration for screening and risk/hazard calculations, respectively. The media of concern at the ECODS N-1 and Ford Building subunits is soil only. At the CSSLP, the upland area soils and surface water impoundment area sediments are evaluated separately, but the process is the same.

A summary of the processes undertaken to evaluate human health associated with the various exposure media is described below.

C-2.1.1 Constituents of Potential Concern

The process used to identify constituents of potential concern (COPCs) in each subunit within the ECODS N-1, CSSLP, Ford Building OU is described below. Maximum detected concentrations of nonradiological constituents were compared to one-tenth (0.1) times the residential soil RSLs. Maximum detected activity concentrations of radiological constituents were compared to residential soil PRGs. For naturally occurring, non-anthropogenic constituents, maximum soil and sediment concentrations from the 0 to 0.3 m (0 to 1ft) sampling interval were also compared to two times the SRS average background concentrations (WSRC 2006). Constituents exceeding both the RSL/PRG residential screening thresholds, and the SRS background values are identified as COPCs. COPCs are carried forward to the risk/hazard calculation (C.2.1.2). Appendix A presents the soil and sediment datasets for each subunit, as appropriate, and the upgradient background data sets for ECODS N-1 soils (Tables A.1.5 and A.1.6) and CSSLP soils, sediments, and surface water (Table A.2.9 through A.2.15). The background data sets were used in the refinement of COCs for each applicable subunit.

Constituents recognized as essential human nutrients (i.e., calcium, magnesium, potassium and sodium) are not subject to further evaluation since these constituents are deemed necessary for health and consumed in normal diets.

Section C.2.4 presents the results of the soil and sediment COPC screening step.

C-2.1.2 Risk/Hazard Calculation

The next step in the HHRA is to calculate risk or hazard for the resident and industrial worker, for ECODS N-1, CSSLP, and Ford Building OU subunits. Risk and hazard estimate calculations are based on a RME exposure point concentration (EPC), which is the lesser of the maximum detected concentration and the 95% UCL on the mean concentration. Appendix A tables indicate the EPCs for each of the COPCs.

For carcinogens, the risk estimates for constituents are calculated using the following equation:

$$risk\ estimate = \left(\frac{[EPC]}{[RSL\ or\ PRG]}\right) \times 1E\text{-}06$$

The risk estimates by constituent grouping (i.e., inorganic, organic, and radionuclide) are then summed to provide the total risk by grouping. The total media risk is the sum of the total groupings. Constituents with an individual cancer risk greater than 1E-06 are identified as COCs and are further evaluated in the refinement of COCs step (Section C.2.4).

For noncarcinogens, hazard estimates are calculated individually for each nonradiological constituent, called hazard quotients (HQs), using the following equation:

$$hazard\ estimate = \frac{[EPC]}{[RSL]}$$

Individual constituent HQs are summed to provide the total hazard index (HI). If the total HI is less than 1, then no COCs are identified. If the total HI is greater than 1, then the constituents are segregated based on relevant target organ or system toxicity and the grouped constituent HQs are summed. Constituents are identified as COCs if the constituent organ/system HQ is greater than

0.1 and the total organ HI is greater than 1. Constituents identified as COCs are further evaluated in the refinement of COCs step (Section C.2.4).

C-2.2 Surface Water Media

For surface water media, maximum detected surface water concentrations within the CSSLP Subunit are compared to threshold levels (Attachments C-4 and C-5).

C-2.2.1 Comparison of MCL or PRG/RSL or AWQC

Maximum detected concentrations of each constituent are conservatively compared to drinking water MCLs. In the absence of a MCL, the lowest value for the tap water RSL/PRG or promulgated AWQC (federal/state) is used as a screening threshold. Constituents that exceed the MCL or PRG/RSL or AWQC thresholds are further evaluated in the refinement of COCs step (Section C.2.4).

C-2.3 Refinement of Constituents of Concern/Results

To identify human health refined COCs (RCOCs) by subunit within the ECODS N-1, CSSLP, Ford Building OU, an uncertainty analysis is performed for each individual COC. This includes an interpretive discussion of the applicable uncertainty factors (lines of evidence) and a recommendation of whether the constituent should or should not be carried forward for further remedial evaluation. The major categories of uncertainty used in this evaluation and the major emphasis include:

- Unit related uncertainty, which includes uncertainties related to the nature and extent of contamination, consistency with history of use, and presence in background
- Data quality uncertainty, which includes uncertainties related to data quality and physical characteristics
- Risk assessment uncertainty, which includes uncertainties related to toxicity data and changes in constituent concentrations due to radioactive decay

For the uncertainty evaluation, subunit concentrations are compared to SRS all-depths background concentrations (WSRC 2006) as one line of evidence to assist in the identification of RCOCs.

In addition, upgradient samples at the ECODS N-1 and CSSLP subunits were collected during the sampling events to determine a site-specific background value for many constituents. These data are used as additional weight-of evidence in the COC refinement step.

Note that for the background comparisons involving a particular decay chain, activities of the parent and its daughter products are considered. For example, the Thorium Series (thorium -232) evaluation includes not only the measured concentration of thorium-232, specifically, but also includes any analytical results from its daughter products (e.g., radium-224, actinium-228, thorium-228, lead-212, bismuth-212, thallium-208, and radium-228) since these isotopes are assumed to be in secular equilibrium. This same approach was applied for the uranium-238 decay series, including its daughter products (e.g., uranium-234, thorium-230, radium-226, lead-214, and bismuth-214). Therefore, background comparisons for the thorium-232 decay series and the uranium-238 decay series includes consideration of the range of concentrations for the entire decay chain (i.e., includes daughter products).

C-2.3.1 ECODS N-1 (NBN) Subunit

C-2.3.1.1 Soil Media

Table C-1 presents the results of soil screening for the ECODS N-1 subunit. Human health COPCs for soil include aluminum, antimony, arsenic, chromium VI (7196A and 7199), cyanide, iron, lead, and vanadium. These constituents had maximum detected concentrations that exceeded human health (residential) risk-based screening levels and exceeded two times SRS mean background concentrations.

Table C-2 presents the total HI (1.16) and total media risk (1.89E-05) for the resident exposure scenario and the associated COCs: arsenic, chromium VI (7196A and 7199).

Table C-3 presents the total HI (0.297) and total media risk (1.83E-06) for the industrial worker exposure scenario and the associated COCs: arsenic.

The refinement/uncertainty evaluation is presented for each of these COCs.

Arsenic is identified as a COC for residential (risk = 5.22E-06) and the industrial worker (risk = 1.18E-06) scenarios. It was detected in 38/41 samples, with 29 results being estimated values (i.e., J-qualified). Concentrations range from nondetect to 5.08 mg/kg, with a mean concentration of 3.22 mg/kg. Sample location ECN1-29 (Figure C-4) had the highest detected concentration. The EPC used in the risk calculations was 3.55 mg/kg.

Arsenic is a naturally occurring constituent that is common in the environment. The maximum detected concentration in the SRS Soil background dataset is 22.9 mg/kg (WSRC 2006). The maximum detected concentration in the ECODS N-1 background dataset is 7.77 mg/kg (Table A.1.6). Both the maximum detected soil concentration and the EPC for this subunit are within the range of concentrations found in background soil at SRS.

Arsenic is widely distributed in the earth's crust, being present in soil and minerals. Organic arsenic compounds are used as pesticides, primarily in cotton fields and in fruit orchards. However, no significant quantities of pressure-treated wood were used in buildings within the ECODS N-1 (NBN) and no arsenic pesticides were used at SRS. Arsenic pesticides were commonly used to combat the boll weevil by local cotton farmers prior to the establishment of SRS.

Arsenic is not recommended for further remedial evaluation as human health RCOC in soil for any receptor scenario based on the following lines of evidence:

- Unit concentrations are within the background soil concentration ranges
- It is a naturally occurring constituent that is common in SRS background soils
- It does not appear to be unit related since it is indistinguishable from background
- Arsenic products were either not used or were of limited use at SRS

Chromium VI is identified as a COC for the resident (risk = 9.67E-06 [7196A] and 4.00E-06 [7199]) scenario. Chromium VI – 7196A was detected in 1/2 samples, with no results being estimated values (i.e., J-qualified). Concentrations range from non-detect to 2.9 mg/kg. Sample

location ECN1-43 (Figure C-5) had the highest detected concentration. The EPC used in the risk calculations was 2.9 mg/kg.

Chromium VI – 7199 was detected in 1/3 samples, with no results being estimated values (i.e., J-qualified). Concentrations range from non-detect to 1.2 mg/kg. Sample location ECN1-42 (Figure C-6) had the highest detected concentration. The EPC used in the risk calculations was 1.2 mg/kg.

Chromium occurs in the environment primarily in two valence states, trivalent chromium (chromium III), and hexavalent chromium (chromium VI). Chromium VI is not a naturally occurring constituent that is common in the environment. It was not analyzed for in the soil samples collected as part of the SRS Background Soil Study (WSRC 2006).

Exposure may occur from natural or industrial sources of chromium. Chromium VI is an environmental concern where burning was used. Chromium III is converted to chromium VI during the burning process (Appendix H). Chromium VI is more toxic and mobile in the environment as compared to chromium III. The USEPA recommends that valence-specific state data for chromium be collected when chromium is likely to be an important contaminant at the site.

Since there is no SRS background value for chromium VI, background soil samples taken near ECODS N-1 were analyzed (Table A.1.6). Background concentrations for chromium VI (7196A) were detected in 6/12 samples with no samples being estimated values (i.e., J-qualified) and ranged from 0.39 to 2.95 mg/kg. Background concentrations for chromium VI (7199) were detected in 4/12 samples with no samples being estimated values (i.e., J-qualified) and ranged from nondetect to 2.6 mg/kg. Both the maximum detected soil concentration and the EPCs for this subunit are within the range of concentrations found in the unit-specific background soil samples. A statistical analysis of unit sample results to site specific background results is presented in Appendix H. The evaluation concluded that the two-sample means are not significantly different.

Chromium VI (7196A and 7199) is not recommended for further remedial evaluation as a human health RCOC in soil for any receptor scenario based on the following lines of evidence:

- Unit concentrations are within the unit-specific background soil concentration range
- Unit concentrations are not significantly different from background concentrations

C-2.3.1.2 HHRA Conclusion for ECODS N-1 (NBN)

Soil media:

No human health RCOCs.

C-2.3.2 Central Shops Scrap Lumber Pile (631-2G) Subunit

C-2.3.2.1 Soil Media

Table C-4 presents the results of soil screening for the Central Shops Scrap Lumber Pile (631-2G) subunit. Human health COPCs for soil include arsenic, chromium VI, cobalt, iron, lead, manganese, vanadium, and benzo[a]pyrene. These constituents had maximum detected concentrations that exceeded human health (residential) risk-based screening levels and exceeded two times SRS mean background concentrations.

Table C-5 presents the total HI (8.9E-01) and total media risk (2.67E-05) for the resident exposure scenario and the associated COCs: arsenic, chromium VI – 7196A, and benzo[a]pyrene.

Table C-6 presents the total HI (8.3E-02) and total media risk (5.46E-06) for the industrial worker exposure scenario and the associated COCs: arsenic.

The refinement/uncertainty evaluation is presented for each of these COCs.

Arsenic is identified as a COC for the resident (risk = 2.41E-05) and the industrial worker (risk = 5.46E-06) scenarios. It was detected in 25/25 samples, with 12 results being estimated values (i.e., J-qualified). Concentrations range from 0.975 mg/kg to 63.1 mg/kg, with a mean concentration of 9.77 mg/kg. Sample location CSSLP-31 (Figure C-7) had the highest detected concentration. The EPC used in the risk calculations was 16.4 mg/kg.

Arsenic is a naturally occurring constituent that is common in the environment. The maximum detected concentration in the SRS Soil background dataset was 22.9 mg/kg. Per the analytical results, 3/25 samples had concentrations of arsenic above the maximum detected concentration in the SRS Soil background dataset. Unit-specific background arsenic concentrations were detected in 10/12 samples and ranged from nondetect to 6.29 mg/kg with eight of the samples being estimated values (i.e., J-qualified).

Arsenic is widely distributed in the earth's crust, being present in soil and minerals. Arsenic pesticides were commonly used to combat the boll weevil by local cotton farmers prior to the establishment of SRS.

Historically, the CSSLP was used to burn various and unknown types of wood. These wood types include arsenate/creosote treated lumber and wood.

Arsenic is recommended for further remedial evaluation as human health RCOC in soil for both the residential and industrial worker receptor scenarios.

Chromium VI is identified as a COC for the resident (risk = 2.41E-05 [7196A]) scenario. Chromium VI – 7196A was detected in 3/6 samples, with no results being estimated values (i.e., J-qualified). Concentrations range from non-detect to 0.99 mg/kg. Sample location CSSLP-5 (Figure C-8) had the highest detected concentration. The EPC used in the risk calculations was 0.79 mg/kg. Chromium VI (7199) was not detected in any of the samples that were analyzed.

Chromium occurs in the environment primarily in two valence states, trivalent chromium (chromium III) and hexavalent chromium (chromium VI). Chromium VI is not a naturally occurring constituent nor is it common in the environment. It was not analyzed for in the soil samples collected as part of the SRS Background Soil Study (WSRC 2006).

Exposure may occur from natural or industrial sources of chromium. Chromium VI is an environmental concern where burning was used. Chromium III is converted to chromium VI during the burning process (Appendix H). Chromium VI is more toxic and mobile in the environment as compared to chromium III. The USEPA recommends that valence-specific state

data for chromium be collected when chromium is likely to be an important contaminant at the site.

Since there is no SRS background value for chromium VI, background soil samples taken near CSSLP soil were analyzed (Table A.2.11). Background concentrations for chromium VI (7196A) were detected in 2/12 samples with no samples being estimated values (i.e., J-qualified) and ranged from nondetect to 2.6 mg/kg. Background concentrations for chromium VI (7199) were detected in 1/12 samples with no samples being estimated values (i.e., J-qualified) and ranged from nondetect to 1.5 mg/kg. Both the maximum detected soil chromium VI concentration and the EPCs for this subunit are within the range of concentrations found in the unit-specific background soil samples. A statistical analysis of unit sample results to site specific background results is presented in Appendix H. The evaluation concluded that the two-sample means are not significantly different.

Chromium VI is not recommended for further remedial evaluation as a human health RCOC in soil for any receptor scenario based on the following lines of evidence:

- Unit concentrations are within the background soil concentration range
- Unit concentrations are not significantly different from background concentrations

Benzo[a]pyrene is a COC for the resident (risk = 1.16E-06) scenario. Benzo[a]pyrene is considered ubiquitous, and is commonly found in soils, particularly surface soils as a result of being a component of crude oil. Thus, combustion of oil and oil products such as gasoline and diesel fuel results in the emission of PAHs into the air, which eventually settle to ground surface. PAHs also are produced from the combustion of organic materials and are found in smoke from forest fires. These PAHs are present in the SRS background soil data set with maximum detected concentration for benzo[a]pyrene of 0.052 mg/kg.

Benzo[a]pyrene was detected in 7/18 samples, with 4 results being estimated values (i.e., J-qualified). The maximum concentration for benzo[a]pyrene is from sample CSSLP-5 (Figure C-9). The EPCs used in the risk calculation is 0.128 mg/kg. The mean concentrations for benzo[a]pyrene is 0.039 mg/kg. The mean concentration for benzo[a]pyrene is below the

maximum detected SRS background value (0.052 mg/kg). The residential risk calculated for benzo[a]pyrene is based on the 2020 RSL of 0.11 mg/kg.

Benzo(a)pyrene is not recommended for further remedial evaluation as a human health RCOCs in based on the following lines of-evidence:

- It is ubiquitous with multiple man-made and natural sources
- The risk estimate for the residential scenario is just slightly above 1E-06.

C-2.3.2.2 Sediment Media

Table C-7 presents the results of the sediment screening for CSSLP. Human health COPCs for sediment include arsenic, chromium VI, iron, vanadium, thorium-232, and uranium-238. These constituents had maximum detected concentrations or activity concentrations that exceeded human health (residential) risk-based screening levels and exceeded two times mean SRS background concentrations.

Table C-8 presents the total HI (6.05E-01) and total media risk (5.38E-04) for the resident exposure scenario and associated COCs, including arsenic, chromium VI, thorium-232, and uranium-238.

Table C-9 presents the total HI (4.2E-02) and total media risk (3.47E-04) for the industrial worker exposure scenario and the associated COCs, including arsenic, thorium-232, and uranium-238.

The refinement/uncertainty evaluation is presented for each of these COCs.

Arsenic is identified as a COC for the resident (risk = 1.22E-05) and the industrial worker (risk = 2.76E-06) scenarios. It was detected in 4/4 samples, with no results being estimated values (i.e., J-qualified). Concentrations range from 4.12 mg/kg to 8.59 mg/kg, with a mean concentration of 5.94 mg/kg. Sample location CSSLP-20 (Figure C-7) had the highest detected concentration. The EPC used in the risk calculations was 8.27 mg/kg.

Arsenic is a naturally occurring constituent that is common in the environment. The maximum detected concentration in the SRS Soil background dataset was 22.9 mg/kg. Per the analytical results, only 1/4 samples had concentrations of arsenic above the maximum detected concentration

in the SRS Soil background dataset. Both the maximum detected sediment concentration (8.59 mg/kg) and the EPC (8.27 mg/kg) for this subunit are within the range of concentrations found in background soil at SRS. Unit-specific arsenic concentrations were detected in 6/6 samples and ranged from 0.93 to 7.95 mg/kg with four of the samples being estimated values (i.e., J-qualifier). Only one (8.59 mg/kg) out of the 4 samples with arsenic concentrations at the CSSLP were above the site-specific maximum background concentration for arsenic.

Arsenic is widely distributed in the earth's crust, being present in soil and minerals. Arsenic pesticides were commonly used to combat the boll weevil by local cotton farmers prior to the establishment of SRS.

Historically, the CSSLP was used to burn various and unknown types of wood. These wood types include arsenate/creosote treated lumber and wood. This area served as a settling basin for the upgradient disturbed areas.

Arsenic is recommended for further remedial evaluation as human health RCOC in soil for residential and industrial worker receptor scenarios

Chromium VI is identified as a COC for the resident (risk = 1.22E-05 [7196A]) scenario. Chromium VI – 7196A was detected in 1/4 samples, with one result being estimated values (i.e., J-qualified). Concentrations range from non-detect to 1.36 mg/kg. Sample location CSSLP-22 (Figure C-8) had the highest detected concentration. The EPC used in the risk calculations was 1.36 mg/kg. Chromium VI (7199) was not detected in any of the samples that were analyzed.

Chromium occurs in the environment primarily in two valence states, trivalent chromium (chromium III) and hexavalent chromium (chromium IV). Chromium VI is not a naturally occurring constituent nor is it common in the environment. It was not analyzed for in the soil samples collected as part of the SRS Background Soil Study (WSRC 2006) or the site-specific background activities (Table A.2.14).

Since there is no SRS background value for chromium VI, background soil samples taken near CSSLP soil were analyzed (Table A.2.11). Background concentrations for chromium VI (7196A)

were detected in 2/12 samples with no samples being estimated values (i.e., J-qualified) and ranged from nondetect to 2.6 mg/kg. Both the maximum detected soil chromium VI concentration and the EPCs for this subunit are within the range of concentrations found in the unit-specific background soil samples. A statistical analysis of unit sample results to site specific background results is presented in Appendix H. The evaluation concluded that the two-sample means are not significantly different.

Chromium VI is not recommended for further remedial evaluation as a human health RCOC in sediment for any receptor scenario based on the following lines of evidence:

- Unit concentrations are within the background soil concentration range
- Unit concentrations are not significantly different from background concentrations

Thorium-232 is a COC for the resident (risk = 4.22E-04) and the industrial worker (risk = 2.72E-04) scenarios. The Thorium Series (thorium-232) evaluation includes not only the measured activity concentration of thorium-232 specifically, but also considers any analytical results from its daughter products (e.g., thorium-228) since these isotopes are assumed to be present in secular equilibrium. Data screening performed using the highest detected activity concentration in the entire series and the risk calculation is performed using the highest EPC of the entire series.

For this dataset, thorium-228 had the maximum activity concentration (4.16 pCi/g, which is also the EPC). It was detected in 2/2 samples, with no results being estimated values (i.e., J-qualified). Concentrations range from 3.05 to 4.16 pCi/g with a mean concentration of 3.61 pCi/g. Sample location CSSLP-20 had the highest detected concentration (Figure C-10). The daughter products are not evaluated separately since they are considered in the thorium-232 secular equilibrium PRG.

Background comparisons for the thorium-232 series includes consideration of the range of activity concentrations for the entire decay chain (i.e., includes daughter products). The SRS Soil background maximum detected activity concentration is 6.75 pCi/g (based on the radium-228 result). Soil activity concentrations from this subunit are within the range of activity concentrations found in background soil.

Thorium-232 is a naturally occurring constituent of primordial origin with a half-life of 14 billion years. As previously discussed, primordial nuclides are those that are long lived and have existed in the earth's crust throughout history. The main contributors to external exposure from primordial nuclides are potassium-40, uranium-238, and thorium-232 (and their daughter products). Thorium series concentrations are typical of natural thorium.

Thorium-232 is not recommended for further remedial evaluation as a human health RCOC in soil for any of the receptor scenarios based on the following lines of evidence:

- Unit activity concentrations are within the SRS soil background activity range
- It is a naturally occurring constituent that is common in SRS background soils
- It does not appear to be unit related since it is indistinguishable from background

Uranium-238 is a COC for the resident (risk = 1.15E-04) and industrial worker (risk = 7.20E-05) scenarios. The Uranium Series (uranium-238) evaluation includes not only the measured activity concentration of uranium-238 specifically, but also considers any analytical results from its daughter products (e.g., thorium-230 and uranium-233/234) since these isotopes are assumed to be present in secular equilibrium. Data screening performed using the highest detected activity concentration in the entire series and the risk calculation is performed using the highest EPC of the entire series.

For this dataset, thorium-230 had the maximum activity concentration (1.44 pCi/g), which is also the EPC. It was detected in 2/2 samples, with one result being an estimated value (i.e., J-qualified). Concentrations range from 1.22 to 1.44 pCi/g with a mean concentration of 1.33 pCi/g. Sample location CSSLP-23 had the highest detected concentration (Figure C-11). The daughter products are not evaluated separately since they are considered in the uranium-238 secular equilibrium PRG.

Uranium is a naturally occurring constituent that is common in the environment. The maximum detected concentration of a daughter of uranium-238, thorium-230 in the SRS background dataset, is 2.78 pCi/g.

Uranium-238 is naturally occurring constituent of primordial origin with a half- life of 4.5 billion years. The main contributors to external exposure from primordial nuclides are potassium-40, uranium-238, and thorium-232 (and their daughter products).

Uranium-238 is not recommended for further remedial evaluation as a human health RCOC in sediment for either the resident or industrial worker receptor scenarios based on the following lines of evidence:

- Unit activities are within the SRS soil background activity range
- It is a naturally occurring constituent that is common in SRS background soils
- It does not appear to be unit related since it is indistinguishable from background

C-2.3.2.3 Surface Water

Table C-10 identifies arsenic (unfiltered and filtered) and chromium VI (filtered only) as human health surface water COCs because the maximum-detected concentration from Tables A.2.7 and A.2.8, respectively in Appendix A exceeded surface water comparison values. The refinement/ uncertainty evaluation is presented for these COCs.

Arsenic (unfiltered and filtered) is initially identified as a surface water COC based on the maximum detected concentration 23.3 µg/L and exceeding the MCL of 10 µg/L. It was detected in 3/3 unfiltered samples and 3/3 filtered samples, with all six being estimated (i.e., J-qualified). The maximum detected concentration is from sample location CSSLP-20 (Figure C-12). The unfiltered samples have a mean of 17.3 µg/L and the filtered samples have a mean of 15.5 µg/L.

The arsenic surface water results were screened against the MCL. MCL thresholds assume an ingestion rate of 2 liters per day under a residential scenario. The surface water in this area is transient in nature (i.e., ephemeral) and is not a viable source of drinking water. In addition, other receptor scenarios (e.g., trespasser, sampler, recreational) are not appropriate given the physical and environmental setting of the area. Therefore, a complete exposure pathway does not exist for human receptors for surface water media.

Arsenic is not recommended for further remedial evaluation as a human health RCOC in surface water based on the following lines of evidence:

- MCL threshold screen is overly conservative.
- Not a viable source of drinking water.
- Water is only present on a transient, temporary basis.
- Not a complete exposure pathway for human receptors.

Chromium VI (filtered, 7196A) is initially identified as a surface water COC based on the maximum detected concentration of 4.21µg/L for Method 7196A, exceeding the tap water RSL 0.035 µg/L. It was detected in 1/3 samples, with one being estimated (i.e., J-qualified). The maximum detected concentration is from sample location CSSLP-21 (Figure C-13). It had a mean concentration of 2.40 µg/L. All unfiltered Method 7199 results were nondetect. In addition, the results for chromium VI in all unfiltered samples (i.e., Method 7196A and 7199) were nondetect. Thus, the filtered results indicate lab contamination (or filter) or problems associated with the analytical method (7196A) at the low detection limits.

Chromium occurs in the environment primarily in two valence states, trivalent chromium (chromium III) and hexavalent chromium (chromium VI). Chromium VI is not a naturally occurring constituent nor is it common in the environment. It was not analyzed for in the soil samples collected as part of the SRS Background Soil Study (WSRC 2006).

A statistical analysis of unit sample results to site specific background results is presented in Appendix H. The evaluation concluded that the two-sample means are not significantly different.

Chromium VI is not recommended for further remedial evaluation as a human health RCOC in surface water based on the following lines of evidence:

- The unfiltered samples resulted in non-detects.
- Detected results likely due to lab contamination.

C-2.3.2.4 HHRA Conclusion for CSSLP Subunit

Soil media:

Resident scenario: Human health RCOCs include arsenic (risk = 2.41E-05).

Industrial Worker scenario: Human health RCOCs include arsenic (risk = 5.46E-06).

Sediment media:

Resident scenario: Human health RCOCs include arsenic (risk = 1.22E-05).

Industrial Worker scenario: Human health RCOCs include arsenic (risk = 2.76E-06).

Surface water media:

No human health RCOCs.

C-2.3.3 Ford Building Subunit

C-2.3.3.1 Soil Media

Table C-12 presents the results of the soil screening for the Ford Building subunit. Human health COPCs for soil for include aluminum, arsenic, chromium, cobalt, iron, manganese, thallium, vanadium, cobalt-60, potassium-40, thorium-232, and uranium-238. These constituents had maximum detected concentrations or activity concentrations that exceeded human health (residential) risk-based screening levels and exceeded two times SRS mean background concentrations.

Table C-13 presents the total HI (5.72E+00) and total media risk (7.93E-04) for the resident exposure scenario and the associated COCs arsenic, chromium, thallium, cobalt-60, potassium-40, thorium-232, and uranium-238.

Table C-14 presents the total HI (3.84E-01) and total media risk (4.58E-04) for the industrial worker exposure scenario and associated COCs arsenic, chromium, cobalt-60, potassium-40, thorium-232, and uranium-238.

The refinement/uncertainty evaluation is presented below for each COC.

Arsenic is identified as a COC for the resident (risk = 6.69E-06) and industrial worker (risk = 1.51E-06) scenarios. It was detected in 38/38 samples, with nineteen of the results being estimated values (i.e., J-qualified). Concentrations range from 0.59 to 14.5 mg/kg, with the mean concentration at 3.68 mg/kg. Sample location FBFA 11 (Figure C-14) had the highest detected concentration. The EPC used in the risk calculations was 4.53 mg/kg.

Arsenic is a naturally occurring constituent that is common in the environment. The maximum detected concentration in the SRS Soil background dataset is 22.9 mg/kg (WSRC 2006). Soil concentrations from this subunit are within the range of concentrations found in background soil at SRS.

Arsenic is widely distributed in the earth's crust, being present in soil and minerals. Organic arsenic compounds are used as pesticides, primarily in cotton fields and fruit orchards. However, no significant quantities of pressure treated wood were used in Ford Building subunit and no arsenic pesticides were used at SRS. Arsenic pesticides were commonly used to combat the boll weevil by local cotton farmers prior to the establishment of SRS.

Arsenic is not recommended for further remedial evaluation as human health RCOC in soil for any receptor scenario based on the following lines of evidence:

- Unit concentrations are within the background soil concentration range
- It is a naturally occurring constituent that is common in SRS background soils
- It does not appear to be unit related since it is indistinguishable from background
- Arsenic products were either not used or were of limited use at SRS

Chromium is identified as a COC for the resident (risk = 8.24E-05) and the industrial worker (3.92E-06) scenarios. It was detected in 38/38 samples, with three results being estimated values (i.e., J-qualified). Concentrations range from 3.05 mg/kg to 230 mg/kg. Sample location FBFA-11 had the highest detected concentration (Figure C-15). The EPC used in the risk calculations was 2.48E+01 mg/kg.

Upon reviewing the analytical results for chromium, it was noted that one of the chromium samples (230 mg/kg in FBFA-11) had a significantly higher concentration of chromium than the other samples. All other samples had chromium concentrations less than 15 mg/kg). Based on the data and the historical knowledge for the area, the sample in question was reanalyzed. The reanalyzed results for location FBFA-11 resulted in a chromium concentration of 3.48 mg/kg. Chromium would not have been considered a COPC if the reanalyzed result was used (i.e., less than two times average background).

Chromium is a naturally occurring constituent that is common in the environment. The maximum concentration in the SRS Soil Background dataset is 54.3 mg/kg (WSRC 2006). Soil concentrations from this subunit are within the range of concentrations found in background soil. Per the analytical results, only 1/37 samples (230 mg/kg at FBFA-11) had concentrations of arsenic above the maximum detected concentration in the SRS Soil background dataset. However, the reanalyzed result for location FBFA-11 was 3.48 mg/kg, which is below the maximum detected chromium concentration in SRS Soil Background study (WSRC 2006).

Since chromium is not considered an important source contaminant at the Ford Building (i.e., chromium is not a significant contaminant or risk driver), the valence state of chromium was not determined during the chemical analyses; only results for total chromium were provided.

The risk estimate used the hexavalent chromium RSL (residential RSL = 0.30 mg/kg and industrial worker RSL = 6.3 mg/kg) to perform the data screening. This overly conservative approach tends to bias the calculation high. Based on unit history and the environmental conditions, it is likely the trivalent form of chromium is most prevalent at Ford Building. In addition, the RSLs for trivalent chromium are 1.2E+05 mg/kg for the residential exposure scenario and 1.8E+06 mg/kg for the industrial worker exposure scenario.

Chromium is not recommended for further remedial evaluation as a human health RCOC in soil for any receptor scenario based on the following lines of evidence:

- Unit concentrations are within the background soil concentration range

- If the reanalyzed value (3.48 mg/kg) for FBFA-11 has been used instead of the original value (230 mg/kg), chromium would not have been considered a COPC.
- It is a naturally occurring constituent that is common in SRS background soils
- It does not appear to be unit related since it is indistinguishable from background

Thallium is a COC for the resident (HQ = 4.83). It was detected in 4/38 surface soil samples with none being estimated (i.e., J-qualified). Concentrations range from nondetect to 23.6 mg/kg. The highest detected concentration in the 0 to 0.3 m (0 to 1 ft) interval was at sample location FBFA-26 (Figure C-16). The EPC used in the risk calculation was 3.78 mg/kg. The risk estimate used the residential PRG of 0.78 mg/kg to perform the screening.

Thallium is naturally occurring in trace amounts in the earth's crust. It was produced in the United States up until 1985, and then was obtained from imports or reserves. Thallium is used in the manufacturing of electronic devices, switches, and closures in the semiconductor industry. It was also used as a rat poison, although this use was banned in the early 1970s. There is no history of use of thallium at the Ford Building.

The SRS soil background maximum concentration is 8.1 mg/kg (WSRC 2006). The three detected samples are above the maximum background concentration.

The distribution of the higher thallium results does not suggest that it is unit related. Instead, it is more likely to be associated with the geologic formation with high clay/mineral content (USGS 2013). Anthropogenic sources of thallium are primarily from coal combustion and heavy-metal smelting and refining (Kaplan and Mattigod 1998), and there was no history of thallium use at the Ford Building subunit. The highest concentrations (55.1 mg/kg and 43.3 mg/kg) are at 2.4 to 3 m (8 to10 ft), and elevated concentrations (i.e. above SRS background maximum detection) occur at 5.4 to 6 m (18 to 20 ft) and 8.4 to 9 m (28 to 30 ft) (12.8 mg/kg and 10.4 mg/kg, respectively). Elevated thallium concentrations are also observed at the ECODS N-1 in the 2.4 to 3 m (8 to 10 ft), 3 to 3.6 m (10 to 12 ft) and 5.4 to 6 m (18-20 ft) (53.1 mg/kg, 47.8 mg/kg and 117 mg/kg, respectively) sample intervals associated with a clay layer. Elevated concentrations

would not be expected at these deeper soil intervals if it were unit related associated with a surface release to the environment.

Its presence at SRS is not likely due to any site uses or process and, therefore, may be present in trace quantities. However, at trace quantities, thallium can contribute to excessive HIs for certain receptor scenarios because the toxicity value for thallium (i.e., reference dose [RfD]) is low, resulting in low RSL values. The RfD is determined using a large uncertainty factor (i.e., 3,000) given the varied responses to doses from various animal models and information from human exposures. While alopecia is what leads to diagnosis of thallium poisoning, effects on the nervous system as a target organ is supported by observation rather than mode of action, which further leads to uncertainty in thallium toxicity.

Thallium is not recommended for further remedial evaluation as a human health RCOC in soil for the residential scenario based on the following lines-of-evidence:

- It is a naturally occurring constituent that is common in SRS background soils.
- Elevated results are likely associated with the geologic formation.
- There is no history of use.
- There is uncertainty in the toxicity value used in the risk assessment for thallium

Cobalt-60 is a COC for the resident (risk = 1.65E-05) and the industrial worker (risk = 1.13E-05) scenarios. It was detected in 1/7 samples with none being estimated (i.e., J-qualified). Concentrations range from non-detect to 0.545 pCi/g. Sample location FBFA-21 (Figure C-17) had the highest detected concentration. The EPC used in the risk calculations was 0.545 pCi/g. The risk estimate used the residential PRGs of 0.033 pCi/g (residential) and 0.048 pCi/g (industrial worker) to perform the data screening.

Cobalt-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 operational history of Ford Building.

Cobalt-60 is recommended for further remedial evaluation as a human health RCOC in soil for the residential and industrial worker scenarios.

Potassium-40 is a COC for the resident (risk = 1.72E-04) and the industrial worker (risk = 1.13E-04) scenarios. It was detected in 7/7 samples with four being estimated (i.e., J-qualified). Concentrations range from 1.07 to 24.8 pCi/g. Sample location FBFA-21 (Figure C-18) had the highest detected concentration. The EPC used in the risk calculations was 24.8 pCi/g. The risk estimate used the residential PRG of 0.144 pCi/g and the industrial worker PRG of 0.219 pCi/g to perform the data screening.

Potassium-40 is a naturally occurring constituent that is common in the environment. The SRS background maximum activity concentration is 8.53 pCi/g. Only one of the seven detected potassium-40 values (24.8 pCi/g) exceeds the SRS background maximum activity concentration; all other results are below.

Potassium-40 is a naturally occurring constituent of primordial origin with a half-life of 1.2 billion years. Primordial nuclides are those that are long-lived and have existed in the earth's crust throughout history. The main contributors to external exposure from primordial nuclides are potassium-40, uranium-238, and thorium-232 (and their daughter products).

Potassium-40 is not associated with any of the reactor processes at SRS. Potassium-40 is not recommended for further remedial evaluation as a human health RCOC in soil for the residential and industrial worker scenarios based on the following lines of evidence.

- It is a naturally occurring constituent that is common is SRS background soils
- Potassium-40 is not associated with any of the reactor processes and is not considered a DOE-added constituent.

Thorium-232 is a COC for the resident (risk = 1.98E-04) and the industrial worker (risk = 1.30E-04) scenarios. The Thorium Series (thorium-232) evaluation includes not only the measured activity concentration of thorium-232 specifically, but also considers any analytical results from its daughter products (e.g., actinium-228, bismuth-212, lead-212, thallium-208, and thorium-228) since these isotopes are assumed to be present in secular equilibrium.

Data screening performed using the highest detected activity concentration (3.03 pCi/g for bismuth-212) in the entire series and the risk calculation is performed using the highest EPC (3.03 pCi/g for bismuth-212) of the entire series. Sample location FBFA-17 had the highest detected concentration (Figure C-19). The daughter products are not evaluated separately since they are considered in the thorium-232 secular equilibrium PRG.

Background comparisons for the thorium-232 series includes consideration of the range of activity concentrations for the entire decay chain (i.e., includes daughter products). The SRS Soil background maximum detected activity concentration is 6.75 pCi/g, based on the radium-228 result (WSRC 2006). Soil activity concentrations from this subunit are within SRS background concentrations.

Thorium-232 is a naturally occurring constituent of primordial origin with a half-life of 14 billion years. As previously discussed, primordial nuclides are those that are long lived and have existed in the earth's crust throughout history. The main contributors to external exposure from primordial nuclides are potassium-40, uranium-238, and thorium-232 (and their daughter products). Thorium series concentrations are typical of natural thorium.

Thorium-232 is not recommended for further remedial evaluation as human health RCOC in soils for any of the receptor scenarios based on the following lines of evidence:

- Unit activity concentrations are within the SRS soil background activity concentration range
- It is a naturally occurring constituent that is common is SRS background soils
- It does not appear to be unit related since it is indistinguishable from background

Uranium-238 is a COC for the resident (risk = 2.08E-04) and the industrial worker (risk = 1.30E-04) scenarios. The Uranium Series (uranium-238) evaluation includes not only the measured activity concentration of uranium-238, but also considers any analytical results from its daughter products (e.g., bismuth-214, lead-214, and uranium-233/234, and thorium-230) since these isotopes are assumed to be in secular equilibrium.

Data screening performed using the highest detected activity concentration (2.60 mg/kg for thorium-230) in the entire series and the risk calculations were performed using the highest EPC (2.60 mg/kg for thorium-230) for the entire series. Thorium-230 was detected in 2/4 samples, with one result being an estimated value (i.e., J-qualified). Sample location FBFA-21 (Figure C-20) had the highest detected activity concentration (i.e., 2.6 pCi/g). The daughter products are not evaluated separately since they are considered in the uranium-238 secular equilibrium PRG.

Uranium is a naturally occurring constituent that is common in the environment. The maximum detected activity concentration for uranium-238 in the SRS Soil background data set is 2.78 pCi/g. The maximum detected activity concentration for any daughter in the uranium decay series collected in the Ford Building is less than background.

Uranium-238 is a naturally occurring constituent of primordial origin with a half-life of 4.5 billion years. The main contributors to external exposure from primordial nuclides are potassium-40, uranium-238, and thorium-232 (and their daughter products).

Uranium-238 is not recommended for further remedial evaluation as a human health RCOC in soil for any receptor scenario based on the following lines of evidence:

- Unit activity concentrations are consistent with the SRS soil background activity concentration range
- It is a naturally occurring constituent that is common in SRS background soils

C-2.3.3.2 HHRA Conclusion for Ford Building

Soil media:

Resident scenario: Human health RCOCs include cobalt-60 (risk = 1.65E-05).

Industrial Worker scenario: Human health RCOCs include cobalt-60 (risk = 1.13E-05).

C-3. SUMMARY/CONCLUSION OF THE HUMAN HEALTH RISK ASSESSMENT

The table presented below shows the overall summary of the HHRA by subunit. The revised CSMs are presented in Chapter 3 (Figures 3-4 through 3-6.

Summary of the ECODS N-1, Central Shops Scrap Lumber Pile, and Ford Building OU Human Health Risk Assessment

Subunit	Human Health Residential RCOCs	Human Health Industrial Worker RCOCs
ECODS N-1 (NBN)	Soil (0-1 ft) None	Soil (0-1 ft) None
Central Shop Scrap Lumber Pile (631-2G)	Soil (0-1 ft) Arsenic (risk = 2.41E-05) Sediment Arsenic (risk = 1.22E-05) Surface Water None	Soil (0-1 ft) Arsenic (risk = 5.46E-06) Sediment Arsenic (risk = 2.76E-06) Surface Water None
Ford Building	Soil (0-1 ft) Cobalt-60 (risk = 1.65E-05)	Soil (0-1 ft) Cobalt-60 (risk = 1.13E-05)

TCR = total cumulative risk
THI = total hazard index

C-4. REFERENCES

Kaplan, Daniel J and Mattigod, Shas V.,1998. "Aqueous Geochemistry of Thallium", https://www.researchgate.net/publication/311627787

SCDHEC, 2014. *Water Classification & Standards,* R.61-68, South Carolina Department of Health and Environmental Control, Bureau of Water, Columbia, 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, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

SRNS, 2020. *RFI/RI Work Plan for Early Construction and Operational Disposal Site N-1, 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 0, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

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

USGS, 2013. *Metal prices in the United States through 2010: U.S. Geological Survey Scientific Investigations Report 2012–5188*, 204 p., United States Geological Society, available only at http://pubs.usgs.gov/sir/2012/5188

USEPA, 2011. *USEPA Surface Preliminary Remediation Goals for Radionuclides* website, United States Environmental Protection Agency, http://epa-prg-ornl.gov/radionuclides/, Website accessed June 9, 2014

USEPA, 2014. *USEPA Regional Screening Levels* website, United States Environmental Protection Agency, (May) http://epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm, Website accessed June 9, 2014.

USEPA, 2015. *Statistical Software ProUCL v5.1 for Environmental Applications for Data Sets With and Without Nondetect Observations*, United States Environmental Protection Agency

USEPA, 2020a. *USEPA Regional Screening Levels*, U.S. Environmental Protection Agency, National Center for Environmental Assessment, Arlington, VA, 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, accessed February 2021, https://epa-prgs.ornl.gov/radionuclides

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

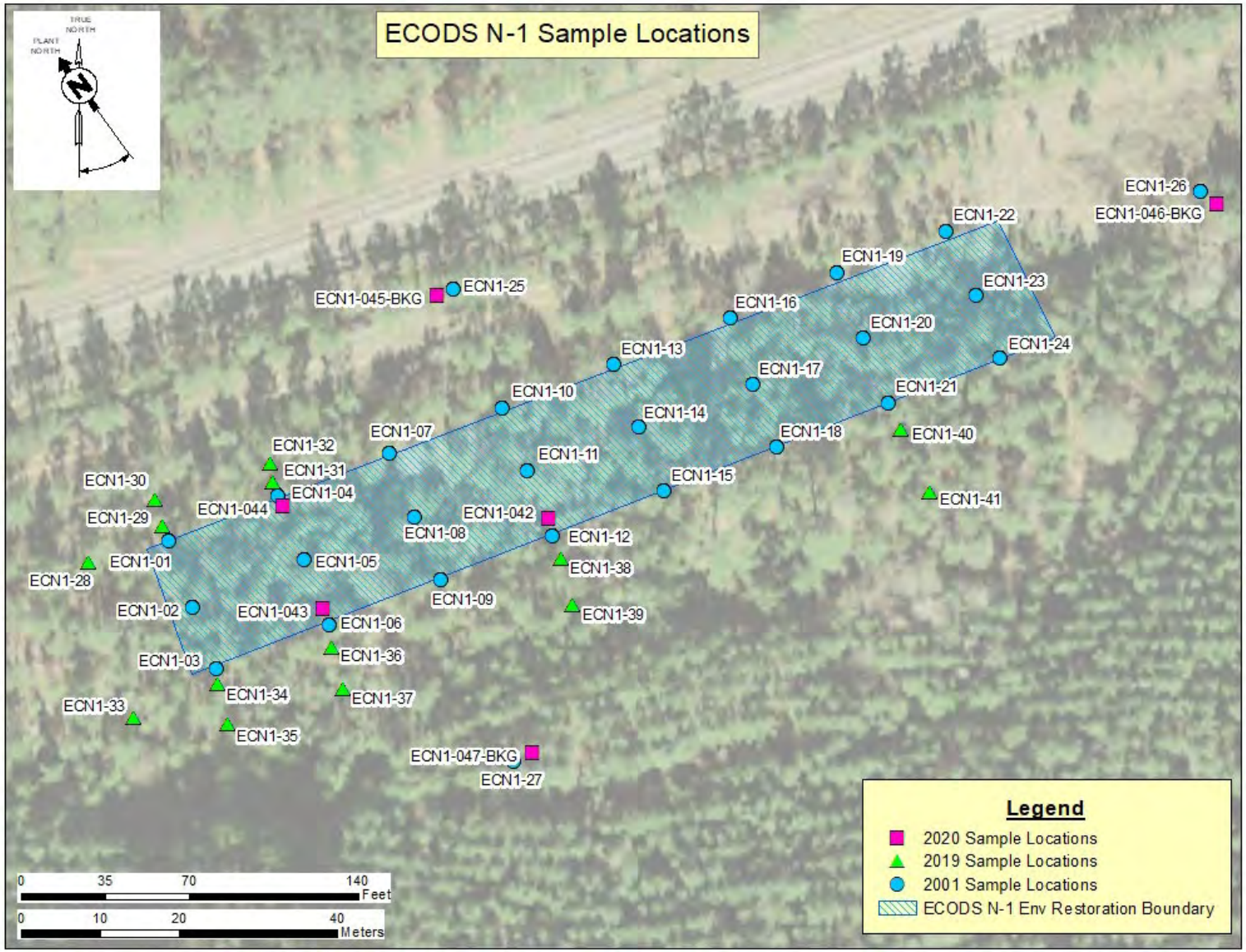


Figure C-1. ECODS N-1 Sample Location Map

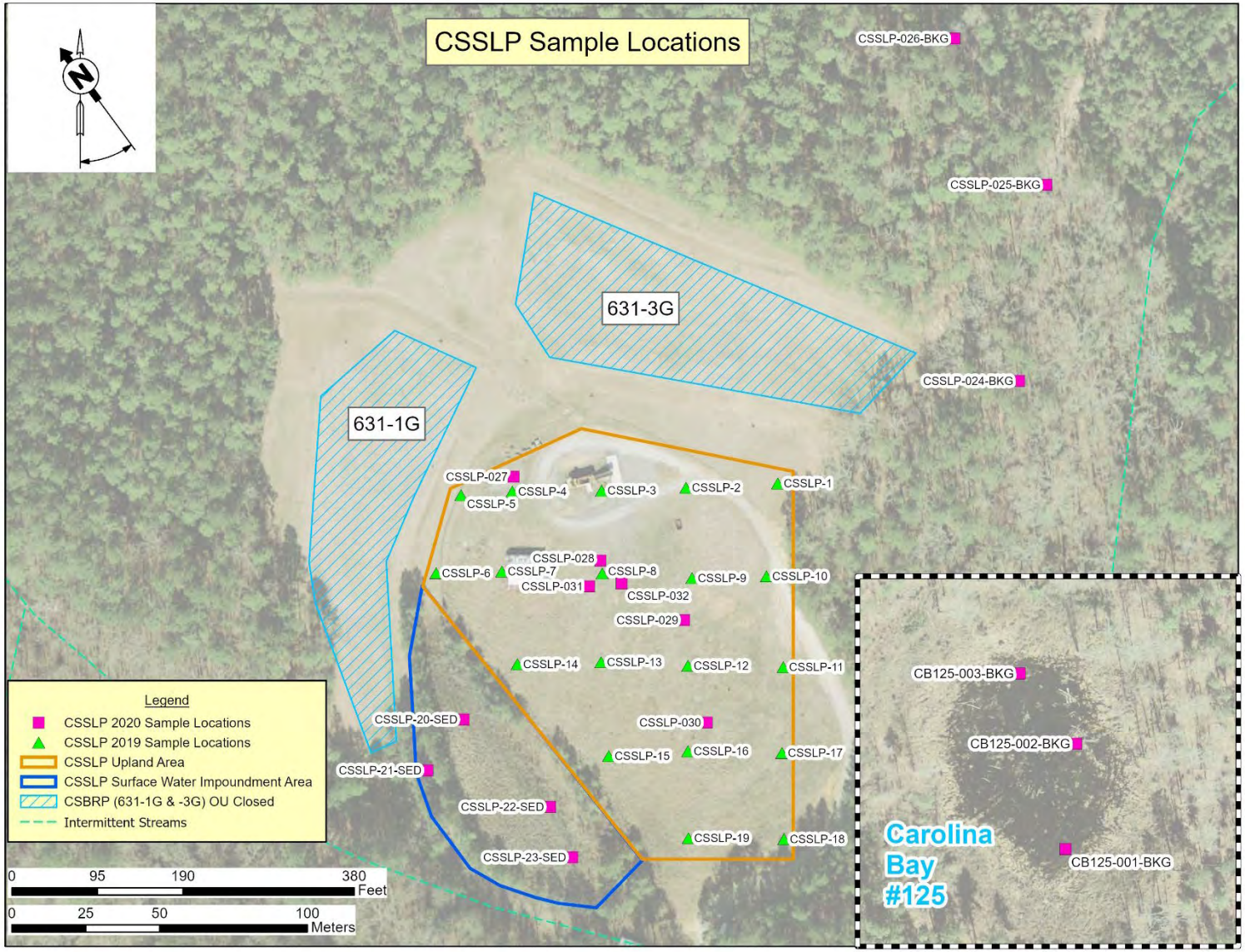


Figure C-2. Central Shops Scrap Lumber Pile (631-2G) Sample Location Map



Figure C-3. Ford Building Sample Location Map

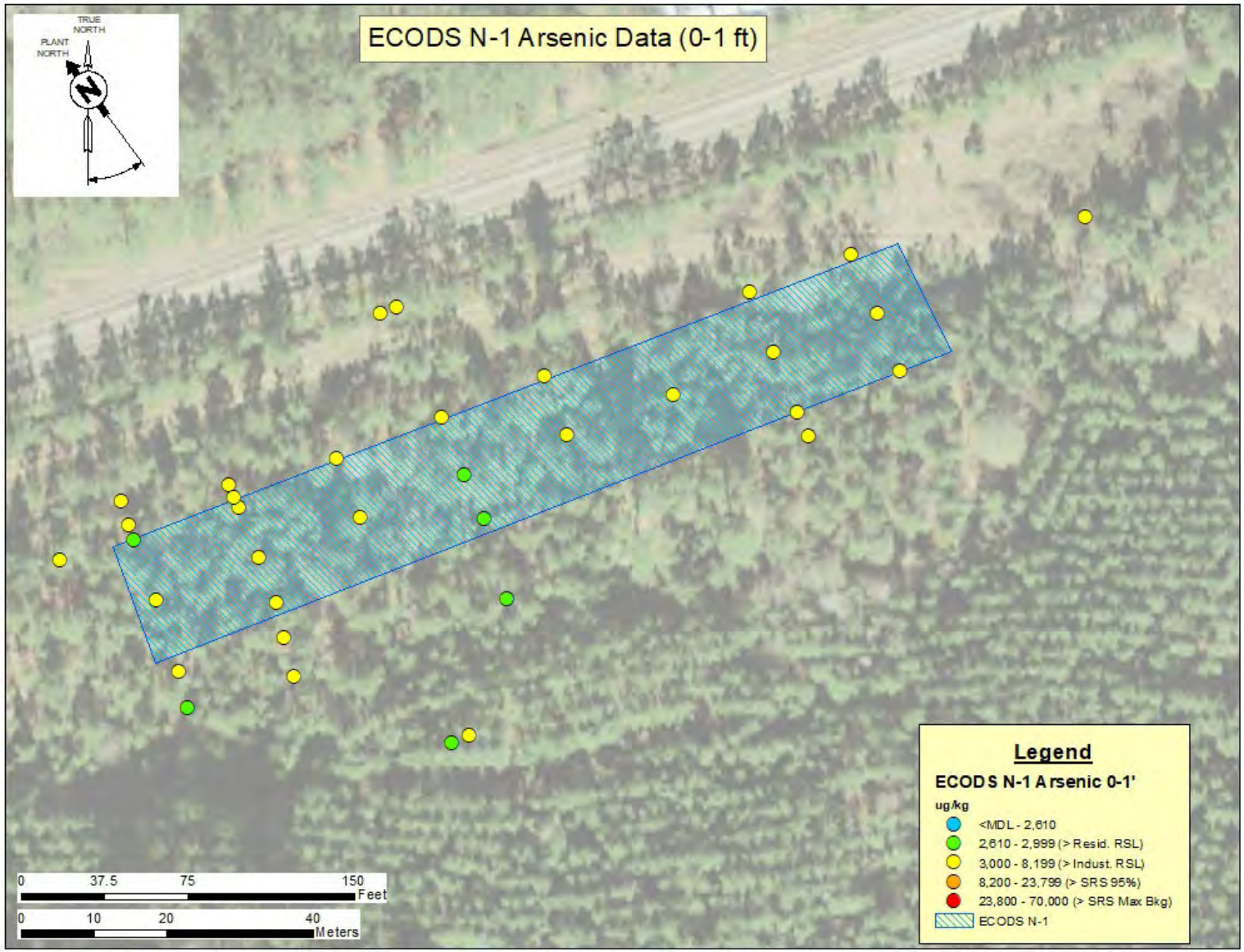


Figure C-4. Arsenic Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the ECODS N-1

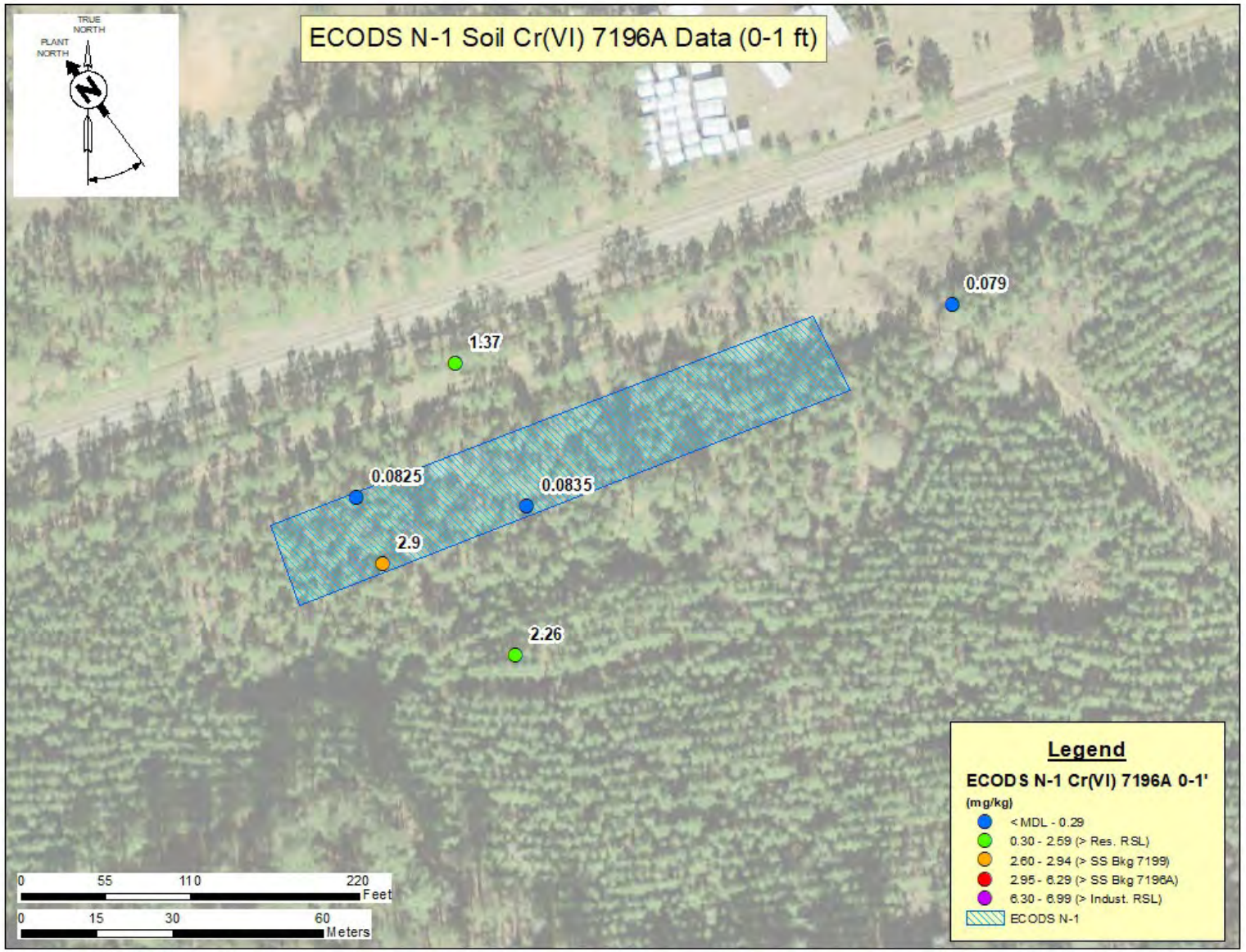


Figure C-5. Chromium VI (Method 7196A) Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the ECODS N-1

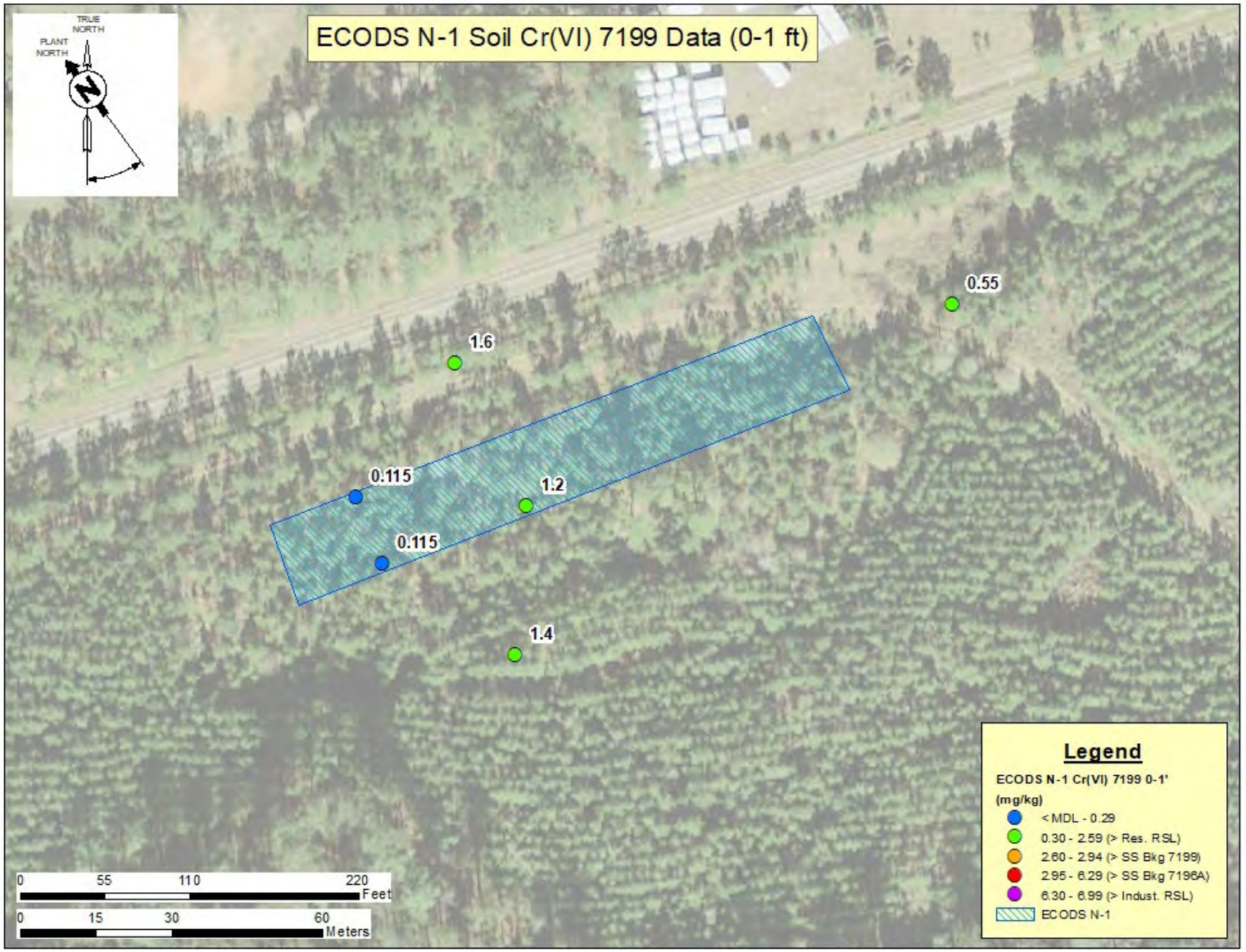


Figure C-6. Chromium VI (Method 7199) Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the ECODS N-1

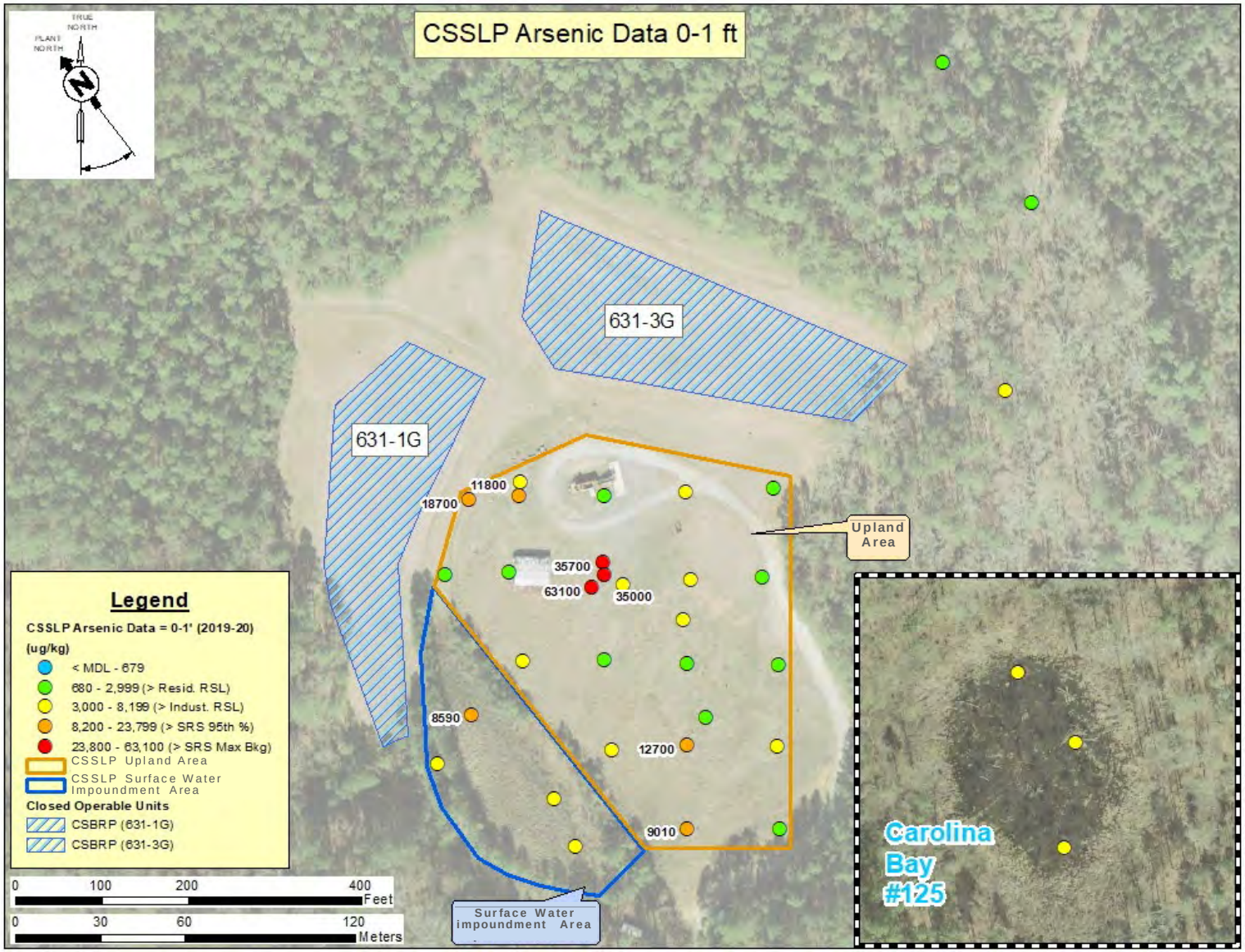


Figure C-7. Arsenic Data for Soil and Sediment Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP

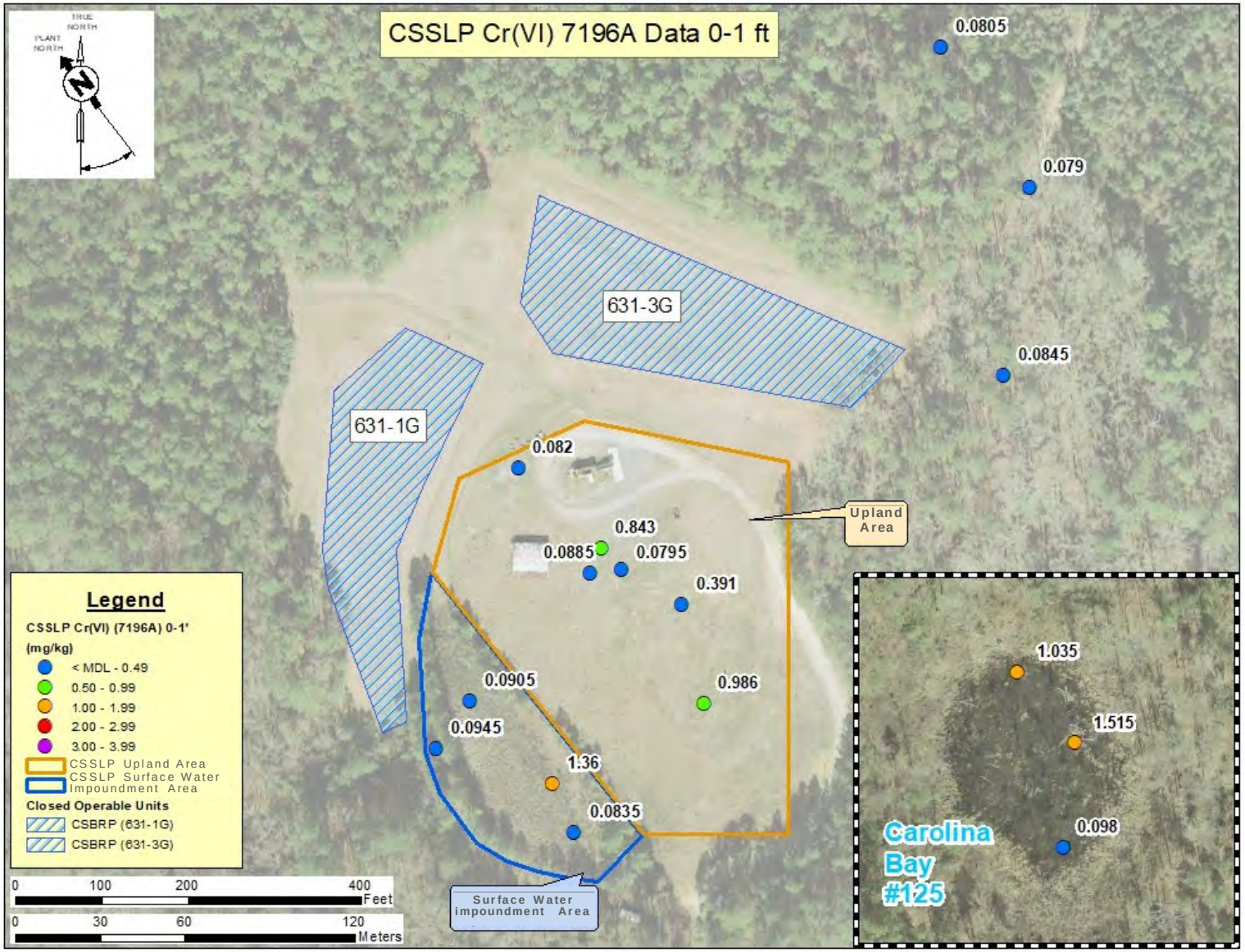


Figure C-8. Arsenic Data for Soil and Sediment Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP

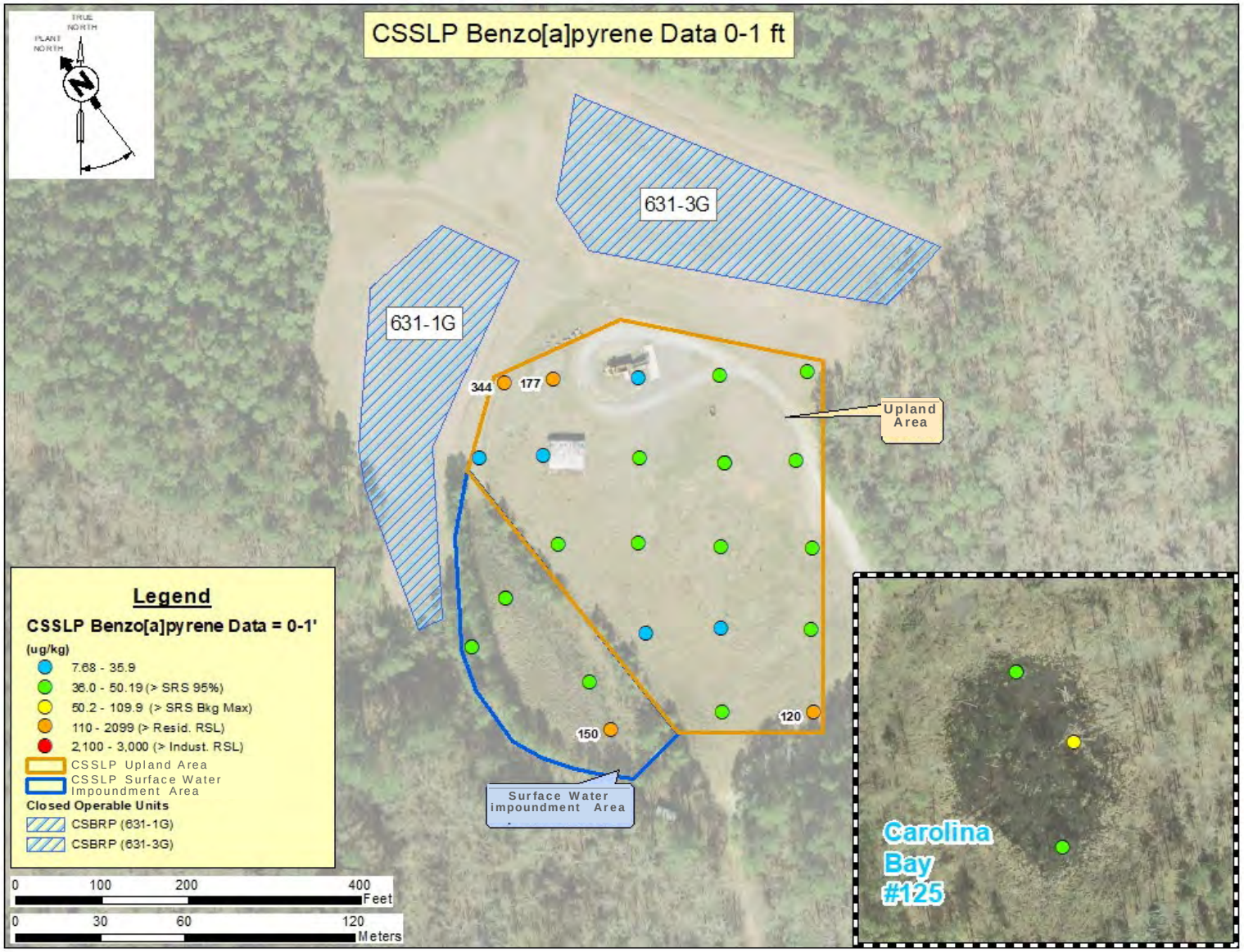


Figure C-9. Benzo[a]pyrene Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP

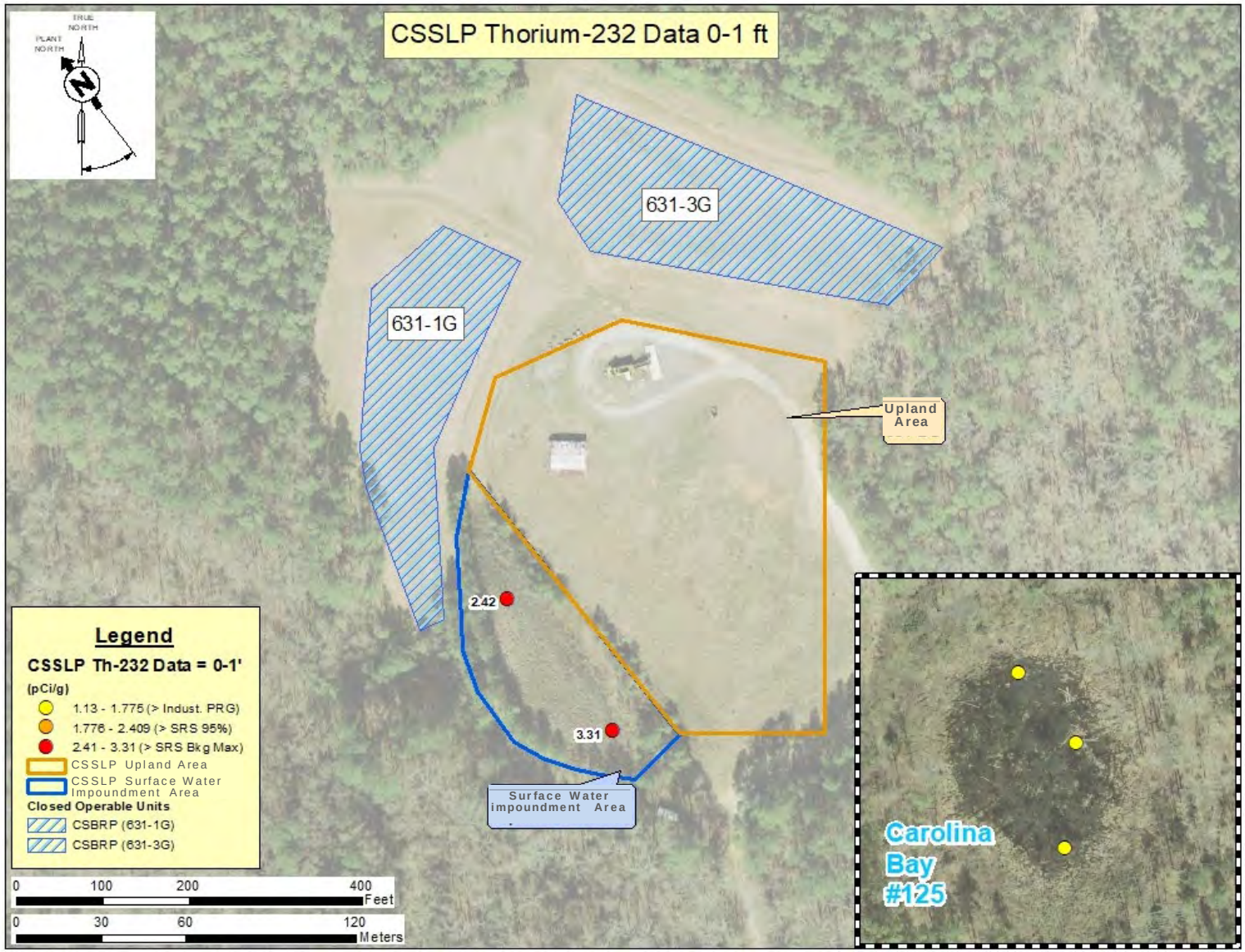


Figure C-10. Thorium-232 Data for Sediment Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP

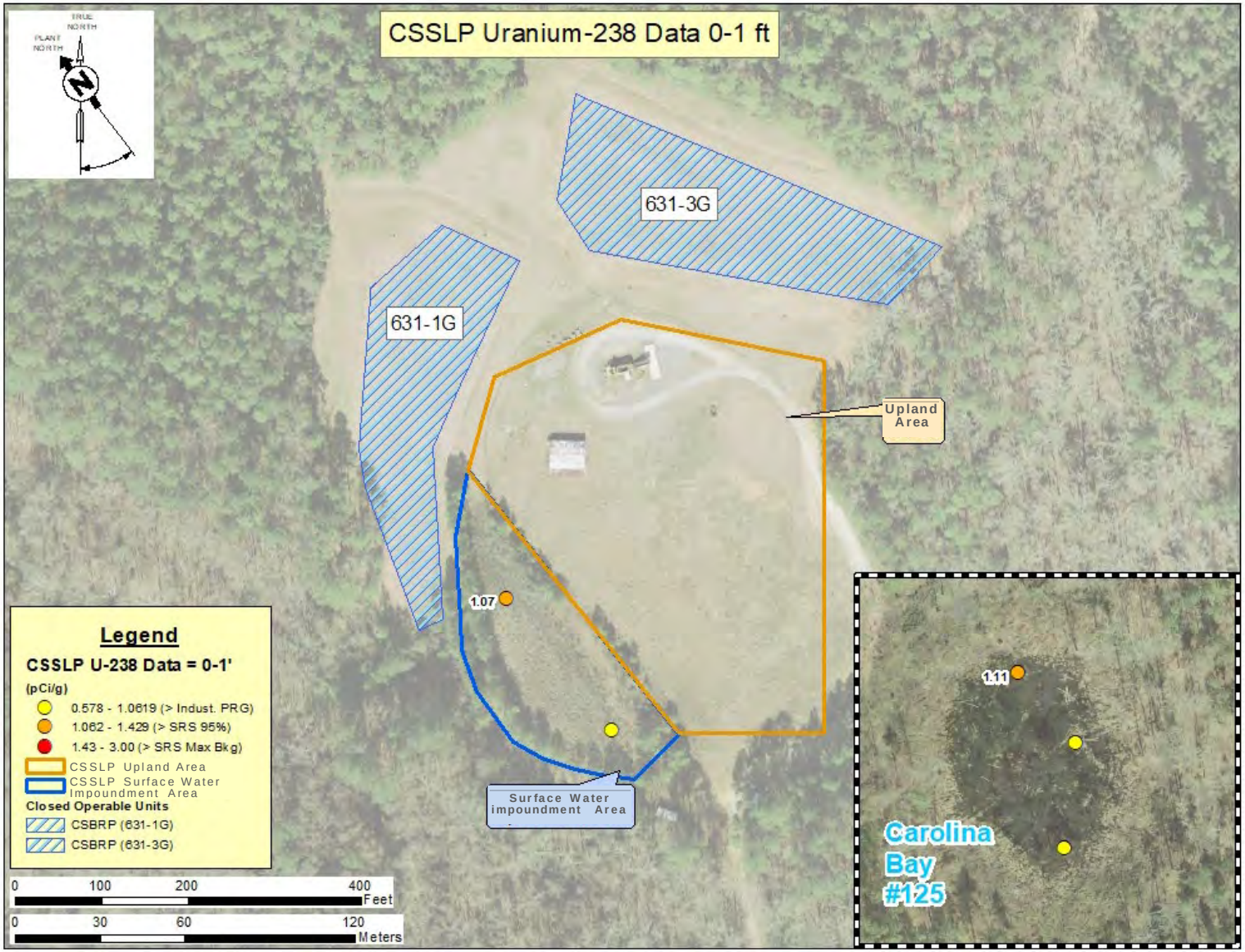


Figure C-11. Uranium-238 Data for Sediment Media (0 to 0.3 m [0 to 1 ft]) at the CSSLP

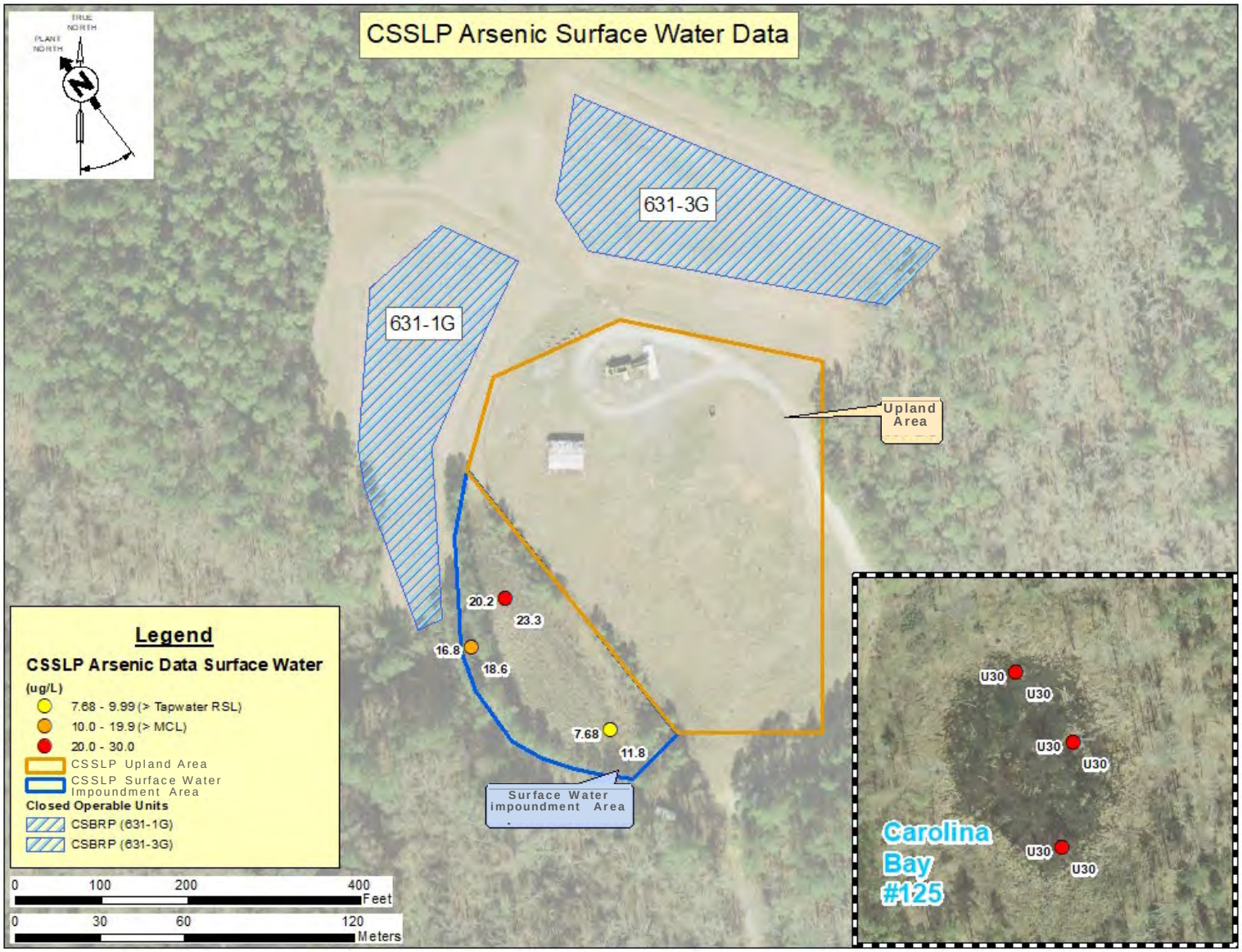


Figure C-12. Arsenic Data for Surface Water Media at the CSSLP

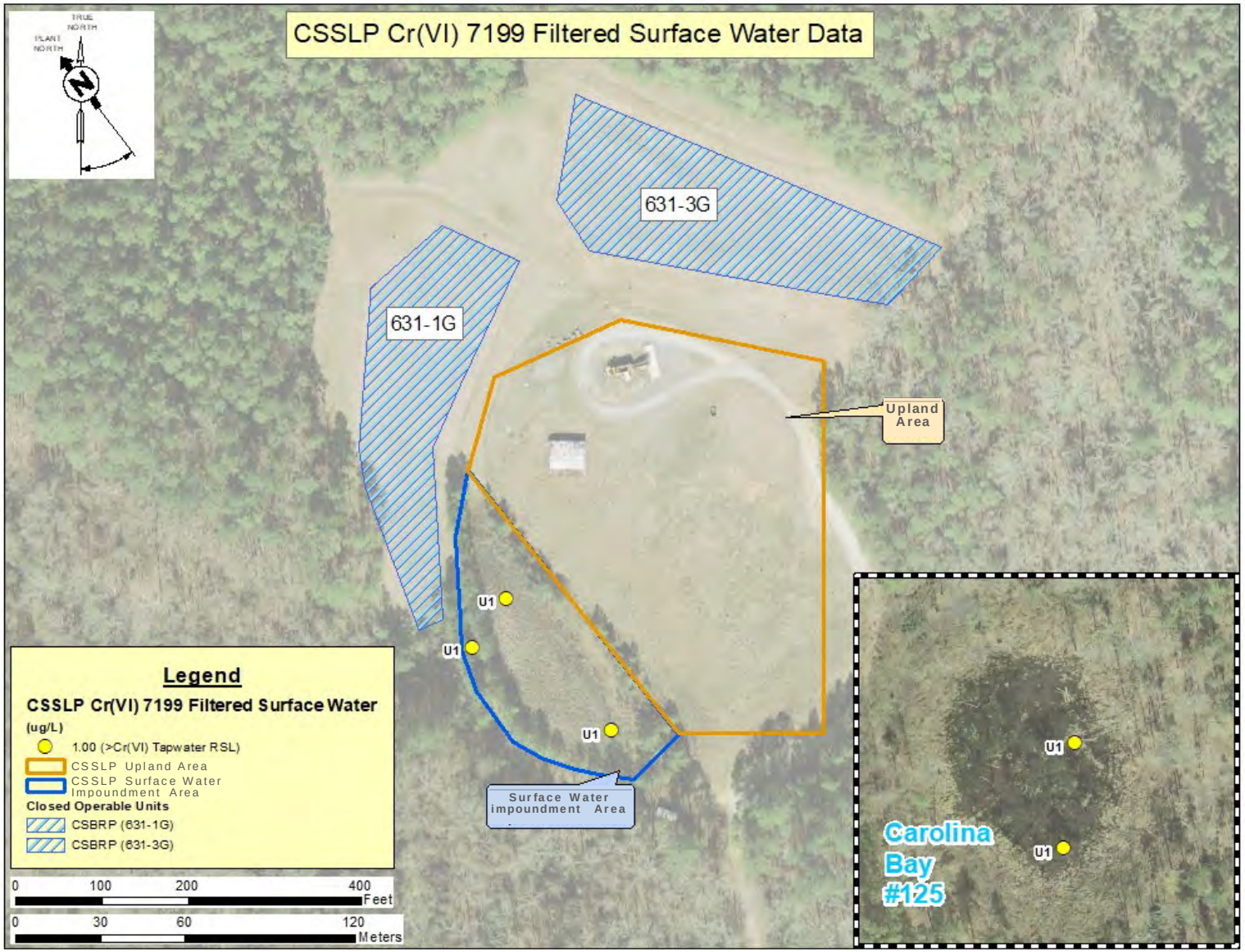


Figure C-13. Chromium IV (7196A) (filtered) Data for Surface Water Media at the CSSLP

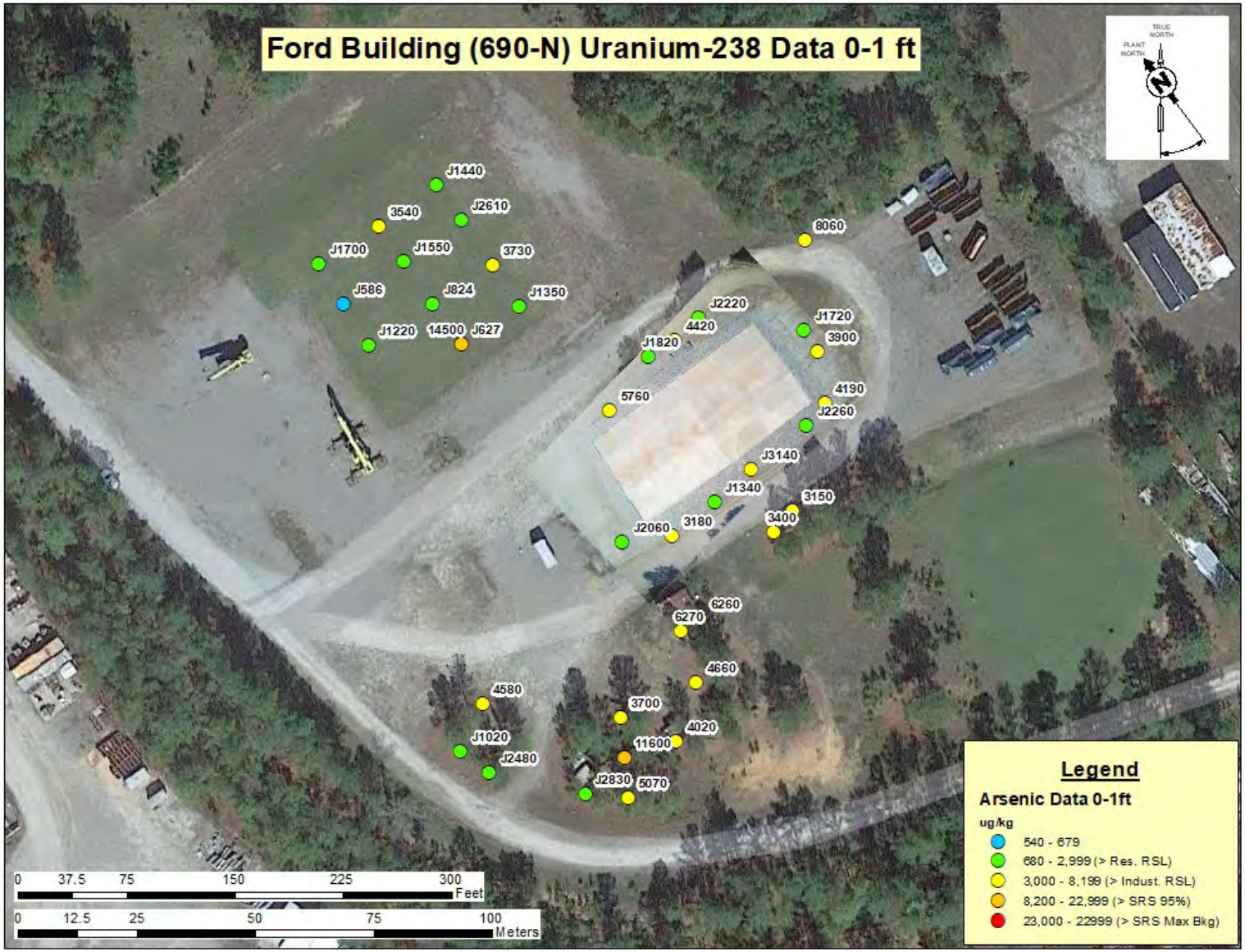


Figure C-14. Arsenic Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building

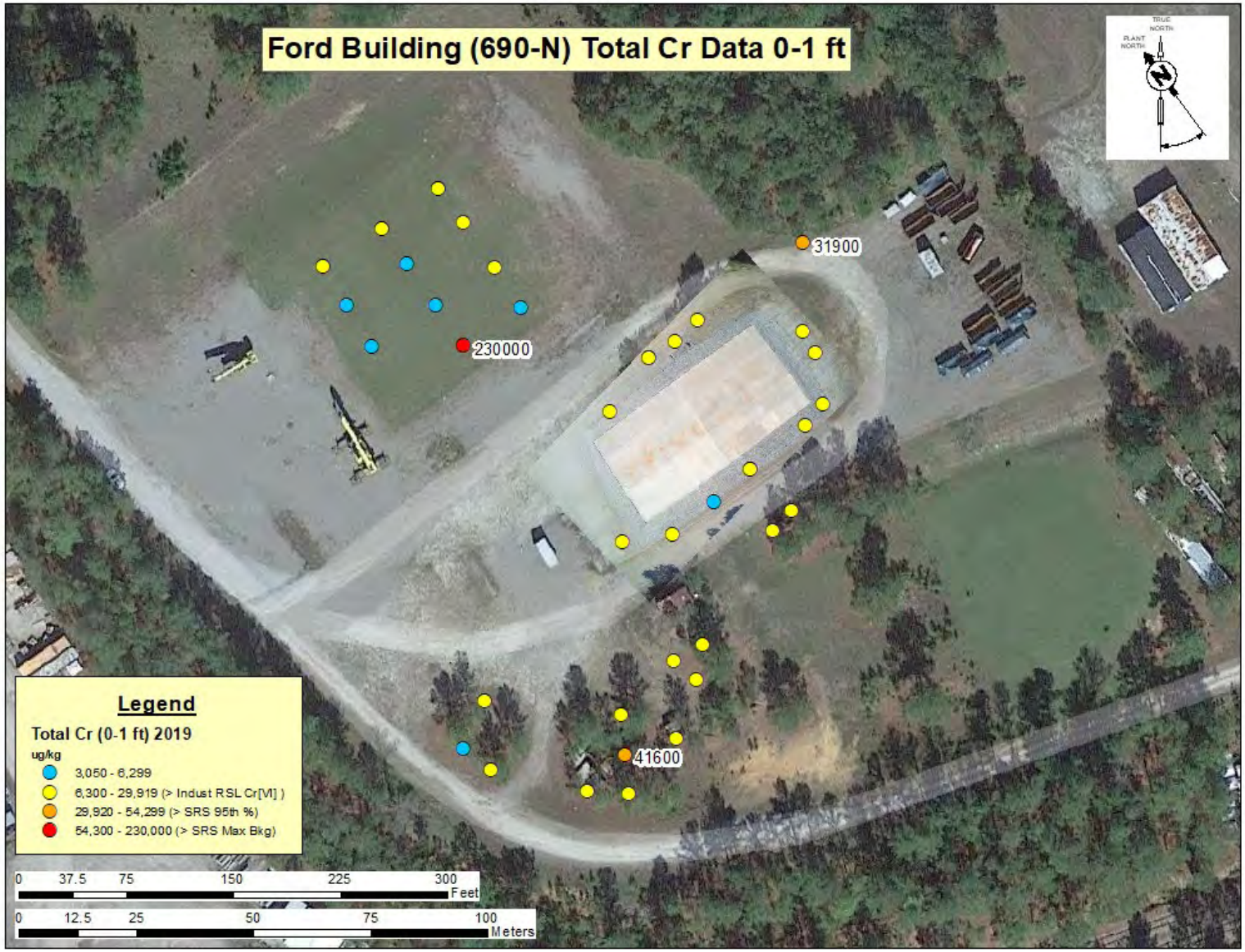


Figure C-15. Chromium (total) Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building

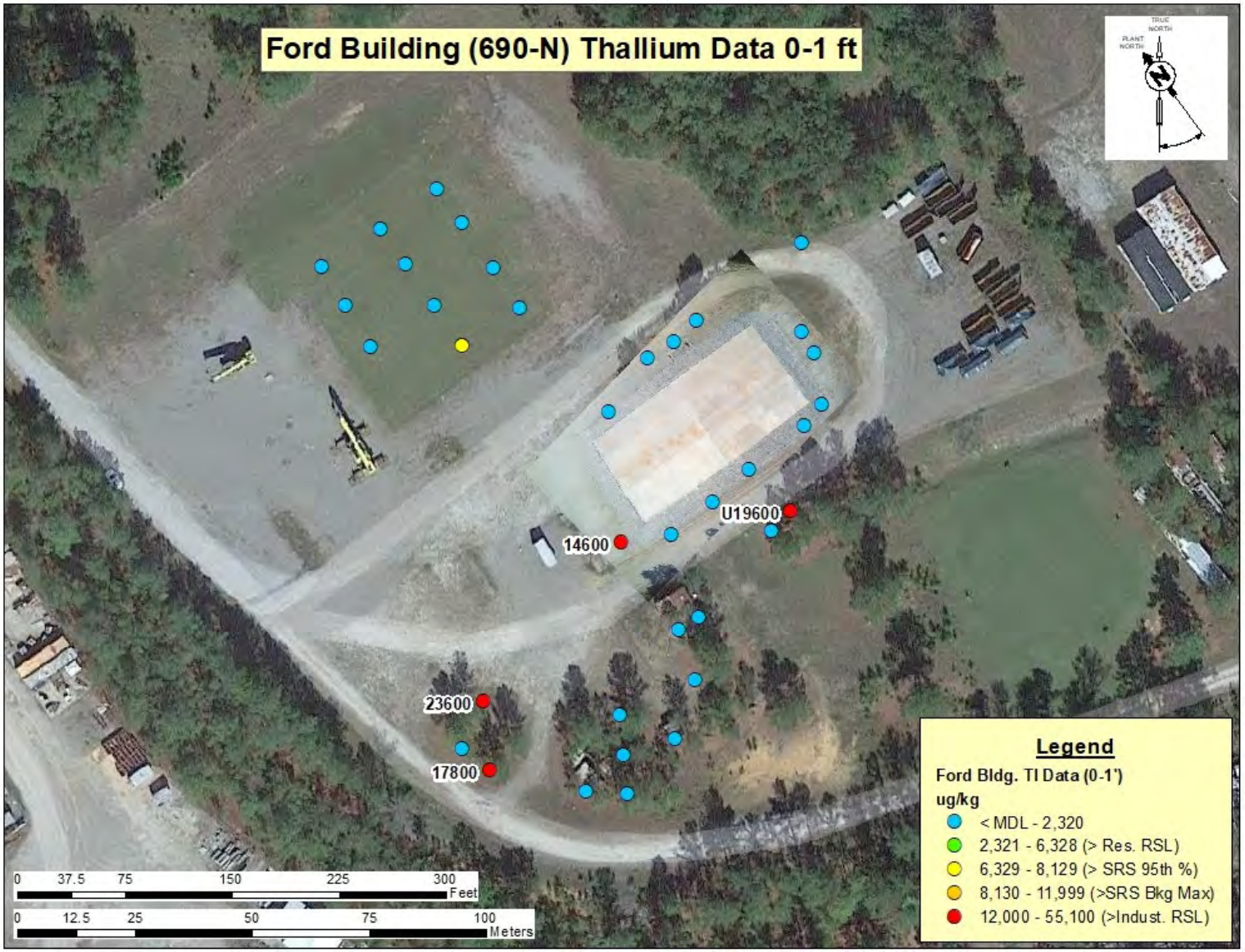


Figure C-16. Thallium Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building

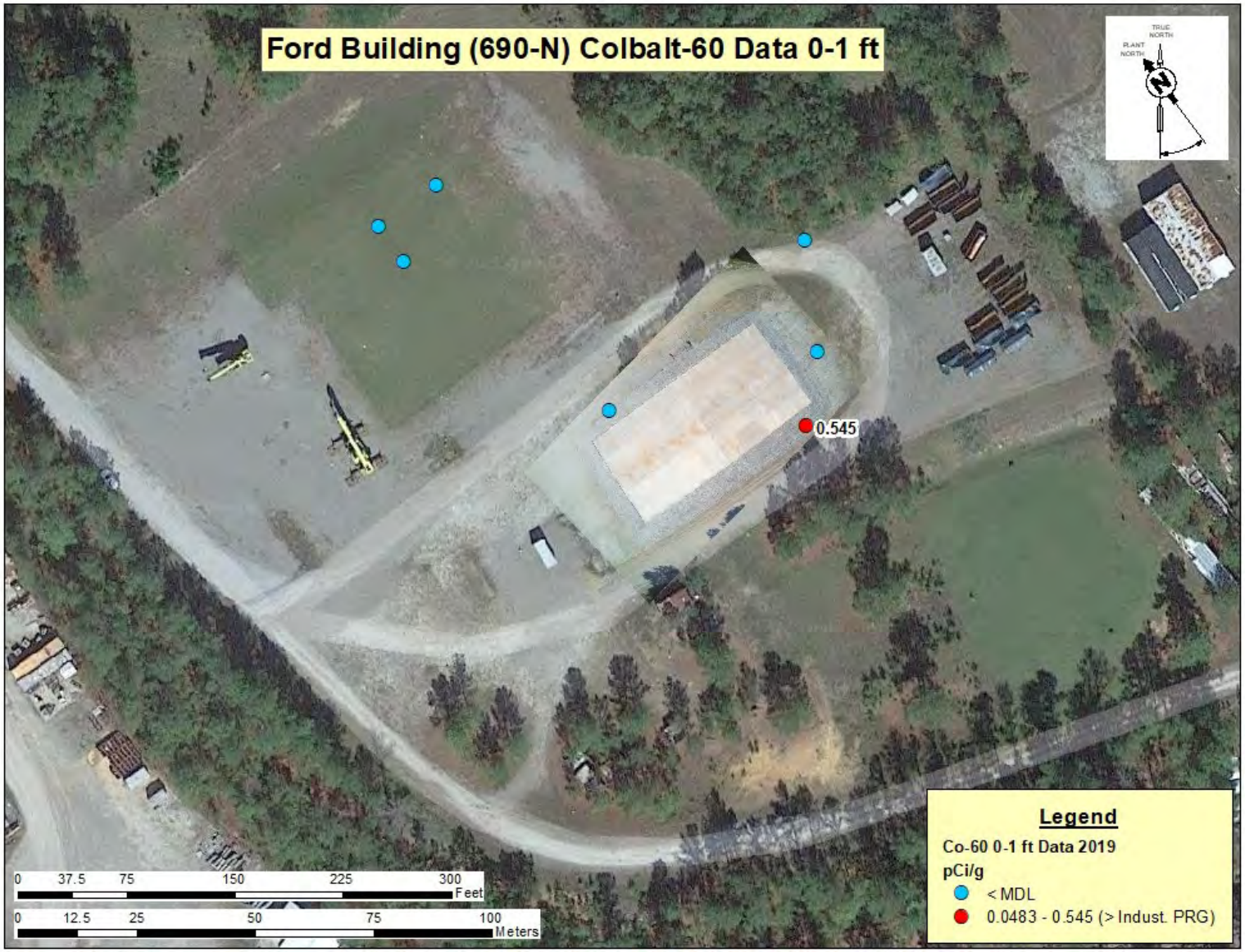


Figure C-17. Cobalt-60 Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building

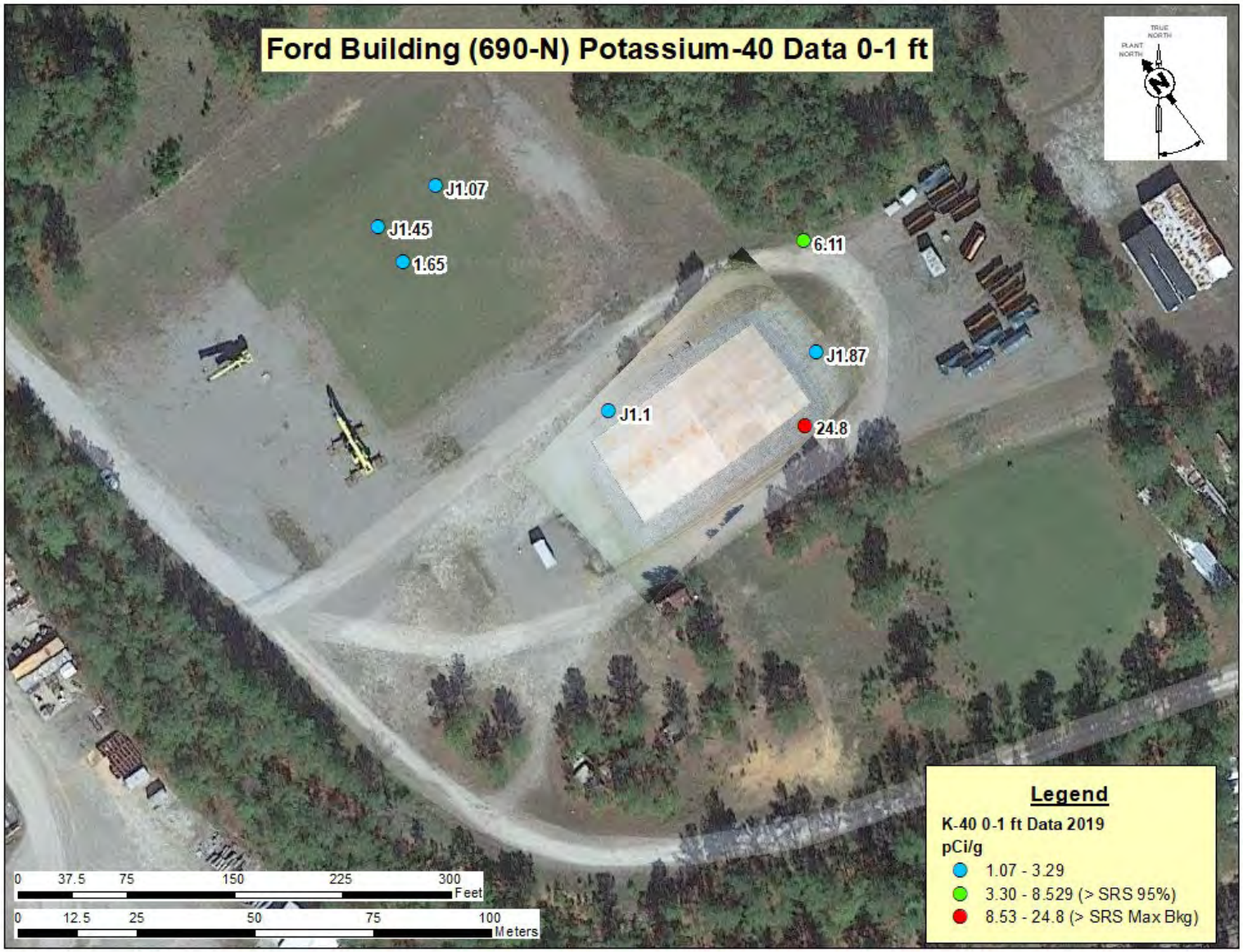


Figure C-18. Potassium-40 Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building



Figure C-19. Thorium-232 Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building



Figure C-20. Uranium-238 Data for Soil Media (0 to 0.3 m [0 to 1 ft]) at the Ford Building

Table C-1. Human Health COPC Screening for ECODS N-1 (NBN) Subunit Soil Media (0-1 ft)

Analyte	Detected Maximum Concentration[1]	Qualifier	Human Health Screening Value[2,6,8]	Human Health Screening Value Source	Exceeds Human Health Screening Value?	2X Average Background Concentration[3,10]	Exceeds 2X Average Background?[4]	COPC?[5]
Inorganics (mg/kg)								
Aluminum	1.12E+04		7.70E+03	0.1xRSL	YES	1.05E+04	YES	**YES**
Antimony	1.26E+01	J	3.10E+00	0.1xRSL	YES	2.69E+00	YES	**YES**
Arsenic	5.08E+00	J	6.80E-01	RSL	YES	4.28E+00	YES	**YES**
Barium	3.30E+01		1.50E+03	0.1xRSL	no	3.91E+01	no	no
Beryllium	2.70E-01	J	1.60E+01	0.1xRSL	no	2.88E-01	no	no
Calcium	3.20E+02	J	EN	--	--	4.76E+02	no	no
Chromium	5.02E+01		1.20E+04	0.1xRSL	no	1.54E+01	YES	no
Chromium VI - 7196A	2.90E+00		3.00E-01	RSL	YES	NA	--	**YES**
Chromium VI - 7199	1.20E+00		3.00E-01	RSL	YES	NA	--	**YES**
Cobalt	9.98E-01		2.30E+00	0.1xRSL	no	1.55E+00	no	no
Copper	2.56E+02		3.10E+02	0.1xRSL	no	4.34E+00	YES	no
Cyanide	8.43E+00		2.30E+00	0.1xRSL	YES	NA	--	**YES**
Iron	3.06E+04		5.50E+03	0.1xRSL	YES	1.27E+04	YES	**YES**
Lead	1.47E+03		4.00E+01	0.1xRSL	YES	1.03E+01	YES	**YES**
Magnesium	1.48E+02		EN	--	--	2.75E+02	no	no
Manganese	7.35E+01		1.80E+02	0.1xRSL	no	1.53E+02	no	no
Mercury	1.23E-01		1.10E+00	0.1xRSL	no	7.10E-02	YES	no
Nickel	2.54E+01		1.50E+02	0.1xRSL	no	3.48E+00	YES	no
Potassium	9.75E+01		EN	--	--	2.16E+02	no	no
Selenium	2.42E+00	J	3.90E+01	0.1xRSL	no	2.99E+00	no	no
Thallium	1.18E+00	J	7.80E-02	0.1xRSL	YES	3.12E+00	no	no
Vanadium	7.89E+01		3.90E+01	0.1xRSL	YES	3.91E+01	YES	**YES**
Zinc	6.72E+01	J	2.30E+03	0.1xRSL	no	9.47E+00	YES	no

Table C-1. Human Health COPC Screening for ECODS N-1 (NBN) Subunit Soil Media (0-1 ft) *(continued/end)*

Analyte	Detected Maximum Concentration[1]	Qualifier	Human Health Screening Value[2,6,8]	Human Health Screening Value Source	Exceeds Human Health Screening Value?	2X Average Background Concentration[3,10]	Exceeds 2X Average Background?[4]	COPC?[5]
Organics (mg/kg)								
2-Methylnaphthalene	2.37E-02	J	2.40E+01	0.1xRSL	no	NA	--	no
Acetone	6.19E-02		6.10E+03	0.1xRSL	no	NA	--	no
Benzo[g,h,i]perylene	2.72E-02	J	NA	--	--	--	--	--
Benzo[a]anthracene	3.22E-02	J	1.10E+00	RSL	no	NA	--	no
Benzo[a]pyrene	3.10E-02	J	1.10E-01	RSL	no	NA	--	no
Benzo[b]fluoranthene	5.97E-02	J	1.10E+00	RSL	no	NA	--	no
Bis(2-ethylhexyl)phthalate (DEHP)	8.57E-01		3.90E+01	RSL	no	NA	--	no
Carbon disulfide	3.80E-03	J	7.70E+01	0.1xRSL	no	NA	--	no
Chrysene	7.31E-02	J	1.10E+02	RSL	no	NA	--	no
Fluoranthene	2.83E-02	J	2.40E+02	0.1xRSL	no	NA	--	no
Methyl ethyl ketone	6.90E-03		2.70E+03	0.1xRSL	no	NA	--	no
Phenanthrene	3.18E-02	J	NA	--	--	--	--	--
Pyrene	3.29E-02	J	1.80E+02	0.1xRSL	no	NA	--	no
Pesticides/PCBs (mg/kg)								
Aroclor 1254	4.69E-02	J	2.40E-01	RSL	no	NA	--	no
Aroclor 1260	4.80E-02	J	2.40E-01	RSL	no	NA	--	no
DDE	1.70E-03	J	2.00E+00	RSL	no	NA	--	no
DDT	2.30E-03		1.90E+00	RSL	no	NA	--	no

1 - Maximum detected concentration from surface soil interval (0-1ft) from Table A.1.1.
2 - Nonradiological RSLs are residential soil values from the generic USEPA Regional Screening Levels (RSLs) table, dated November 2020. Website accessed February 2021.
3 - Background screening values obtained from *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006), Table B-1(0-1 ft interval).
4 - For screening purposes, maximum concentration of the naturally-occuring (nonanthopogenic) constituents are compared to 2X average background concentration.
5 - Constituents are identified as COPCs if the maximum detected concentration exceeds the human health screening value and the 2X average backgroun concentration.
EN - essential nutrient. RSL not available.
NA - not available

Table C-2. Human Health Risk/Hazard Calculation for ECODS N-1 Subunit Soil Media (0-1 ft) Residential Scenario

Analyte[1]	EPC[2]	Residential RSL[3]	Residential Hazard Estimate[4]	Residential Risk Estimate[5]	Target Organ	COC?[6]
Noncarcinogenic Hazard Estimate						
Aluminum	6.91E+03	7.74E+04	8.92E-02		Neurological	no
Antimony	3.26E+00	3.13E+01	1.04E-01		Hematological	no
Arsenic	3.55E+00	3.49E+01	1.02E-01		Dermal	no
Chromium VI - 7196A	2.90E+00	2.34E+02	1.24E-02		Other	no
Chromium VI - 7199	1.20E+00	2.34E+02	5.13E-03		Other	no
Cyanide	1.55E+00	2.28E+01	6.78E-02		Reproductive	no
Iron	1.36E+04	5.48E+04	2.48E-01		Hepatic	no
Lead	2.02E+02	4.00E+02	5.05E-01		Neurological	no
Vanadium	3.56E+01	3.93E+02	9.07E-02		Dermal	no
	Total Hazard Index =		**1.16E+00**			
Carcinogenic Risk Estimate						
Arsenic	3.55E+00	6.80E-01		5.22E-06		**YES**
Chromium VI - 7196A	2.90E+00	3.00E-01		9.67E-06		**YES**
Chromium VI - 7199	1.20E+00	3.00E-01		4.00E-06		**YES**
			Total Inorganic Risk =	**1.89E-05**		
			Total Media Risk =	**1.89E-05**		

1 - Analytes from Table C-1 that were identified as COPCs.
2 - EPC - reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration (see Table A.1.1).
3 - Nonradiological RSLs are residential soil values from the generic USEPA Regional Screening Levels (RSLs) Table, dated November 2020 (see Attachment C-1).
4 - Residential Hazard Estimate = EPC/RSL.
5 - Residential Risk Estimate = (EPC/[RSL])x1E-06
6 - For noncarcinogens, no constituents are identified as COCs if the total media HI<1. If the total media HI≥1, then the constituents are segregated based on relevant target organs. Hazard quotients (HQs) are summed according to target organs (see table below). Constituents are identified as COCs if the total organ HH>1. For carcinogens, constituents are identified as COCs if the individual cancer risk≥1E-06.

Neurological	Aluminum	8.92E-02
	Lead	5.05E-01
	Total Neurological	5.94E-01

Dermal	Arsenic	1.02E-01
	Vanadium	9.07E-02
	Total Dermal	1.92E-01

Hematological	Antimony	1.04E-01
	Total Hematological	1.04E-01

Hepatic	Iron	2.48E-01
	Total Hepatic	2.48E-01

Other	Chromium VI - 7196A	1.24E-02
	Chromium VI - 7199	5.13E-03
	Total Other	1.75E-02

Reproductive	Iron	6.78E-02
	Total Reproductive	6.78E-02

Table C-3. Human Health Risk/Hazard Calculation for ECODS N-1 Subunit Soil Media (0-1 ft) Industrial Scenario

Analyte[1]	EPC[2]	Industrial RSL[3]	Industrial Hazard Estimate[4]	Industrial Risk Estimate[5]	Target Organ	COC?[6]
Noncarcinogenic Hazard Estimate						
Aluminum	6.91E+03	1.12E+06	6.17E-03		Neurological	no
Antimony	3.26E+00	4.67E+02	6.97E-03		Hematological	no
Arsenic	3.55E+00	4.79E+02	7.42E-03		Dermal	no
Chromium VI - 7196A	2.90E+00	3.48E+03	8.33E-04		Other	no
Chromium VI - 7199	1.20E+00	3.48E+03	3.45E-04		Other	no
Cyanide	1.55E+00	1.47E-02	1.05E-02		Reproductive	no
Iron	1.36E+04	8.18E+05	1.66E-02		Hepatic	no
Lead	2.02E+02	8.00E+02	2.53E-01		Neurological	no
Vanadium	3.56E+01	5.83E+03	6.11E-03		Dermal	no
	Total Hazard Index =		**2.97E-01**			
Carcinogenic Risk Estimate						
Arsenic	3.55E+00	3.00E+00		1.18E-06		**YES**
Chromium VI - 7196A	2.90E+00	6.33E+00		4.58E-07		no
Chromium VI - 7199	1.20E+00	6.33E+00		1.90E-07		no
			Total Inorganic Risk =	**1.83E-06**		
			Total Media Risk =	**1.83E-06**		

1 - Analytes from Table C-1 that were identified as COPCs.
2 - EPC - reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration (see Table A.1.1).
3 - Nonradiological RSLs are industrial soil values from the generic USEPA Regional Screening Levels (RSLs) Table, dated November 2020 (see Attachment C-1).
4 - Industrial Hazard Estimate = EPC/RSL.
5 - Industrial Risk Estimate = (EPC/[RSL])x1E-06
6 - For noncarcinogens, no constituents are identified as COCs if the total media HI<1. If the total media HI≥1, then the constituents are segregated based on relevant target organs. Hazard quotients (HQs) are summed according to target organs (see table below). Constituents are identified as COCs if the total organ HH>1. For carcinogens, constituents are identified as COCs if the individual cancer risk≥1E-06.

Table C-4. Human Health COPC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Soil Media (0-1 ft)

Analyte	Detected Maximum Concentration[1]	Qualifier	Human Health Screening Value[2]	Human Health Screening Value Source	Exceeds Human Health Screening Value?	2X Average Background Concentration[3]	Exceeds 2X Average Background?[4]	COPC?[5]
Inorganics (mg/kg)								
Aluminum	9.33E+03		7.70E+03	0.1xRSL	YES	1.05E+04	no	no
Antimony	1.57E+00	J	3.10E+00	0.1xRSL	no	2.69E+00	no	no
Arsenic	6.31E+01		6.80E-01	RSL	YES	4.28E+00	YES	**YES**
Barium	1.08E+02		1.50E+03	0.1xRSL	no	3.91E+01	YES	no
Beryllium	5.24E-01		1.60E+01	0.1xRSL	no	2.88E-01	YES	no
Cadmium	3.31E-01	J	7.10E+00	0.1xRSL	no	4.83E-01	no	no
Calcium	5.32E+03		EN	--	--	4.76E+02	no	no
Chromium	3.26E+01		1.20E+04	0.1xRSL	no	1.54E+01	YES	no
Chromium VI - 7196A	9.86E-01		3.00E-01	RSL	YES	NA	--	**YES**
Cobalt	4.26E+00		2.30E+00	0.1xRSL	YES	1.55E+00	YES	**YES**
Copper	6.78E+01		3.10E+02	0.1xRSL	no	4.34E+00	YES	no
Cyanide	2.03E-01	J	2.30E+00	0.1xRSL	no	NA	--	no
Iron	2.13E+04		5.50E+03	0.1xRSL	YES	1.27E+04	YES	**YES**
Lead	5.03E+01		4.00E+01	0.1xRSL	YES	1.03E+01	YES	**YES**
Magnesium	2.48E+03		EN	--	--	2.755E+02	no	no
Manganese	2.64E+02		1.80E+02	0.1xRSL	YES	1.53E+02	YES	**YES**
Mercury	5.15E-02		1.10E+00	0.1xRSL	no	7.10E-02	no	no
Nickel	1.38E+01		1.50E+02	0.1xRSL	no	3.48E+00	YES	no
Potassium	7.22E+02	J	EN	--	--	2.16E+02–	no	no
Selenium	3.13E+00	J	3.90E+01	0.1xRSL	no	2.99E+00	YES	no
Silver	4.79E-01	J	3.90E+01	0.1xRSL	no	7.28E-01	no	no
Sodium	1.62E+02		EN	--	--	4.02E+01	YES	no
Thallium	6.81E-01	J	7.80E-02	0.1xRSL	YES	3.12E+00	no	no
Vanadium	4.70E+01		3.90E+01	0.1xRSL	YES	3.91E+01	YES	**YES**
Zinc	1.62E+02		2.30E+03	0.1xRSL	no	9.47E+00	YES	no

Table C-4. Human Health COPC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Soil Media (0-1 ft) *(continued)*

Analyte	Detected Maximum Concentration[1]	Qualifier	Human Health Screening Value[2]	Human Health Screening Value Source	Exceeds Human Health Screening Value?	2X Average Background Concentration[3]	Exceeds 2X Average Background?[4]	COPC?[5]
Organics (mg/kg)								
2-Methylnaphthalene	1.60E-02	J	2.40E+01	0.1xRSL	no	NA	--	no
Acetone	5.79E-01	J	6.10E+03	0.1xRSL	no	NA	--	no
Anthracene	4.44E-01		1.80E+03	0.1xRSL	no	NA	--	no
Benzo[a]Anthracene	3.89E-01		1.10E+00	RSL	no	NA	--	no
Benzo[a]pyrene	3.44E-01		1.10E-01	RSL	YES	NA	--	**YES**
Benzo[b]fluoranthene	5.63E-01		1.10E+00	RSL	no	NA	--	no
Benzo[g,h,i]perylene	7.63E-02		NA	--	--	--	--	--
Benzo[k]fluoranthene	2.26E-01		1.10E+01	RSL	no	NA	--	no
Bis(2-ethylhexyl)phthalate (DEHP)	2.90E-01		3.90E+01	RSL	no	NA	--	no
Carbazole	6.02E-02	J	NA	--	--	--	--	--
Chrysene	4.67E-01		1.10E+02	RSL	no	NA	--	no
Cumene (Isopropylbenzene)	5.00E-04	J	1.90E+02	0.1xRSL	no	NA	--	no
Dibenzo[a,h]anthracene	2.22E-02	J	1.10E-01	RSL	no	NA	--	no
Di-N-butyl phthalate	4.24E-02	J	6.30E+02	0.1xRSL	no	NA	--	no
Fluoranthene	7.98E-01		2.40E+02	0.1xRSL	no	NA	--	no
Indeno[1,2,3-cd]pyrene	7.56E-02		1.10E+00	RSL	no	NA	--	no
Methyl ethyl ketone	3.80E-03	J	2.70E+03	0.1xRSL	no	NA	--	no
Naphthalene	1.96E-02	J	2.00E+00	RSL	no	NA	--	no
Phenanthrene	4.53E-01		NA	--	--	--	--	--
Pyrene	6.10E-01		1.80E+02	0.1xRSL	no	NA	--	no

Table C-4. Human Health COPC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Soil Media (0-1 ft) *(continued/end)*

Analyte	Detected Maximum Concentration[1]	Qualifier	Human Health Screening Value[2]	Human Health Screening Value Source	Exceeds Human Health Screening Value?	2X Average Background Concentration[3]	Exceeds 2X Average Background?[4]	COPC?[5]
Pesticides/PCBs (mg/kg)								
Aldrin	8.00E-04		3.90E-02	RSL	no	NA	--	no
alpha-Chlordane	5.00E-04	J	1.70E+00	RSL	no	NA	--	no
Aroclor 1254	6.60E-03		2.40E-01	RSL	no	NA	--	no
Aroclor 1260	1.53E-02		2.40E-01	RSL	no	NA	--	no
DDE	1.10E-03	J	2.00E+00	RSL	no	NA	--	no
DDT	6.00E-04	J	1.90E+00	RSL	no	NA	--	no
gamma-Chlordane	8.00E-04		1.70E+00	RSL	no	NA	--	no

1 - Maximum detected concentration from surface soil interval (0-1ft) from Table A.2.1.
2 - Nonradiological RSLs are residential soil values from the generic USEPA Regional Screening Levels (RSLs) table, dated November 2020.
3 - Background screening values obtained from *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006), Table B-1 (0-1 ft interval).
4 - For screening purposes, maximum concentration of the naturally-occuring (nonanthopogenic) constituents are compared to 2X average background concentration.
5 - Constituents are identified as COPCs if the maximum detected concentration exceeds the human health screening value and the 2X average backgroun concentration.

EN = essential nutrient. RSL not available.
NA - not available

This page is intentionally left blank.

Table C-5. Human Health Risk/Hazard Calculation for Central Shops Scrap Lumber Pile Subunit Soil Media (0-1 ft) Residential Scenario

Analyte[1]	EPC[2]	Residential RSL[3]	Residential Hazard Estimate[4]	Residential Risk Estimate[5]	Target Organ	COC?[6]
Noncarcinogenic Hazard Estimate						
Arsenic	1.64E+01	3.49E+01	4.69E-01		Dermal	no
Cobalt	1.24E+00	2.34E+01	5.31E-02		Endocrine	no
Chromium VI - 7196A	7.93E-01	2.34E+02	3.39E-03		Other	no
Iron	1.07E+04	5.48E+04	1.96E-01		Hepatic	no
Lead	1.93E+01	4.00E+02	4.84E-02		Neurological	no
Manganese	9.89E+01	1.83E+03	5.41E-02		Neurological	no
Vanadium	2.68E+01	3.93E+02	6.81E-02		Dermal	no
	Total Hazard Index =		**8.92E-01**			
Carcinogenic Risk Estimate						
Arsenic	1.64E+01	6.80E-01		2.41E-05		**YES**
Chromium VI - 7196A	7.93E-01	3.00E-01		2.64E-06		**YES**
			Total Inorganic Risk =	**2.67E-05**		
Benzo[a]pyrene	1.28E-01	1.10E-01		1.16E-06		**YES**
			Total Organic Risk =	**1.16E-06**		
			Total Media Risk =	**2.79E-05**		

1 - Analytes from Table C-4 that were identified as COPCs.
2 - EPC - reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration (see Table A.2.1).
3 - Nonradiological RSLS are residential soil values from the generic USEPA Regional Screening Levels (RSLs) Table, dated November 2020 (see Attachment C-1).
4 - Residential Hazard Estimate = EPC/RSL.
5 - Residential Risk Estimate = (EPC/[RSL])x1E-06
6 - For noncarcinogens, no constituents are identified as COCs if the total media HI<1. If the total media HI≥1, then the constituents are segregated based on relevant target organs. Hazard quotients (HQs) are summed according to target organs (see table below). Constituents are identified as COCs if the total organ HH>1. For carcinogens, constituents are identified as COCs if the individual cancer risk≥1E-06.

Table C-6. Human Health Risk/Hazard Calculation for Central Shop Scrap Lumber Pile Subunit Soil Media (0-1 ft) Industrial Scenario

Analyte[1]	EPC[2]	Industrial RSL/PRG[3]	Industrial Hazard Estimate[4]	Industrial Risk Estimate[5]	Target Organ	COC?[6]
Noncarcinogenic Hazard Estimate						
Arsenic	1.64E+01	4.79E+02	3.42E-02		Dermal	no
Cobalt	1.24E+00	3.47E+02	3.58E-03		Endocrine	no
Chromium VI - 7196A	7.93E-01	3.48E+03	2.28E-04		Other	no
Iron	1.07E+04	8.18E+05	1.31E-02		Hepatic	no
Lead	1.93E+01	8.00E+02	2.42E-02		Neurological	no
Manganese	9.89E+01	2.56E+04	3.86E-03		Neurological	no
Vanadium	2.68E+01	5.83E+03	4.59E-03		Dermal	no
	Total Hazard Index =		**8.38E-02**			
Carcinogenic Risk Estimate						
Arsenic	1.64E+01	3.00E+00		5.46E-06		**YES**
Chromium VI - 7196A	7.93E-01	6.30E+00		1.26E-07		no
			Total Inorganic Risk =	**5.59E-06**		
Benzo[a]pyrene	1.28E-01	2.10E+00		6.10E-08		no
			Total Organic Risk =	**6.10E-08**		
			Total Media Risk =	**5.65E-06**		

1 - Analytes from Table C-4 that were identified as COPCs.
2 - EPC - reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration (see Table A.2.1).
3 - Nonradiological RSLS are residential from the generic USEPA Regional Screening Levels (RSLs) Table, dated November 2020 (see Attachment C-1).
4 - Industrial Hazard Estimate = EPC/RSL.
5 - Industrial Risk Estimate = (EPC/[RSL])x1E-06
6 - For noncarcinogens, no constituents are identified as COCs if the total media HI<1. If the total media HI≥1, then the constituents are segregated based on relevant target organs. Hazard quotients (HQs) are summed according to target organs (see table below). Constituents are identified as COCs if the total organ HH>1. For carcinogens, constituents are identified as COCs if the individual cancer risk≥1E-06.

Table C-7. Human Health COPC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Sediment Media

Analyte	Detected Maximum Concentration[1]	Qualifier	Human Health Screening Value[2]	Human Health Screening Value Source	Exceeds Human Health Screening Value?	2X Average Background Concentration[3]	Exceeds 2X Average Background?[4]	COPC?[5]
Inorganics (mg/kg)								
Aluminum	8.96E+03		7.70E+03	0.1xRSL	YES	1.05E+04	no	no
Arsenic	8.59E+00		6.80E-01	RSL	YES	4.28E+00	YES	**YES**
Barium	3.34E+01		1.50E+03	0.1xRSL	no	3.91E+01	no	no
Beryllium	1.83E-01	J	1.60E+01	0.1xRSL	no	2.88E-01	no	no
Calcium	5.68E+02		EN	--	--	4.76E+02	no	no
Chromium	1.50E+01		1.20E+04	0.1xRSL	no	1.54E+01	no	no
Chromium VI - 7196A	1.36E+00	J	3.00E-01	RSL	YES	NA	--	**YES**
Cobalt	7.78E-01		2.30E+00	0.1xRSL	no	1.55E+00	no	no
Copper	4.13E+00		3.10E+02	0.1xRSL	no	4.34E+00	no	no
Iron	1.44E+04		5.50E+03	0.1xRSL	YES	1.27E+04	YES	**YES**
Lead	8.33E+00		4.00E+01	0.1xRSL	no	1.03E+01	no	no
Magnesium	2.11E+02		EN	--	--	2.75E+02	no	no
Manganese	8.10E+01		1.80E+02	0.1xRSL	no	1.53E+02	no	no
Mercury[6]	2.66E-02		7.80E-01	0.1xRSL	no	7.10E-02	no	no
Nickel	2.18E+00		1.50E+02	0.1xRSL	no	3.48E+00	no	no
Potassium	2.00E+02		EN	--	--	2.16E+02	no	no
Sodium	1.06E+01	J	EN	--	--	4.02E+01	no	no
Thallium	6.19E-01	J	7.80E-02	0.1xRSL	YES	3.12E+00	no	no
Vanadium	3.92E+01		3.90E+01	0.1xRSL	YES	3.91E+01	YES	**YES**
Zinc	8.81E+00	J	2.30E+03	0.1xRSL	no	9.47E+00	no	no
Organics (mg/kg)								
Acetone	6.00E-02		6.10E+03	0.1xRSL	no	NA	--	no
Benzo[a]anthracene	1.21E-02	J	1.10E+00	RSL	no	NA	--	no
Benzo[b]fluoranthene	1.33E-02	J	1.10E+00	RSL	no	NA	--	no

Table C-7. Human Health COPC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Sediment Media *(continued/end)*

Analyte	Detected Maximum Concentration[1]	Qualifier	Human Health Screening Value[2]	Human Health Screening Value Source	Exceeds Human Health Screening Value?	2X Average Background Concentration[3]	Exceeds 2X Average Background?[4]	COPC?[5]
Organics (mg/kg) (continued)								
Bis(2-ethylhexyl)phthalate (DEHP)	2.16E-02	J	3.90E+01	RSL	no	NA	--	no
Dimethyl phthalate	1.89E-02	J	NA	--	--	--	--	--
Methyl ethyl ketone	8.30E-03		2.70E+03	0.1xRSL	no	NA	--	no
Toluene	4.00E-03		4.90E+02	0.1xRSL	no	NA	--	no
Radionuclides (pCi/g)								
Thorium-232	3.31E+00		9.85E-03	PRG	YES	1.80E+00	YES	**YES**
Thorium-228	4.16E+00		na	+D-Th[7]	--	1.97E+00	--	no
Uranium-238	1.07E+00		1.25E-02	PRG	YES	1.01E+00	YES	**YES**
Uranium-233/234	1.27E+00		na	+D-U[8]	--	1.15E+00	--	no
Thorium-230	1.44E+00		na	+D-U8	--	1.13E+00	--	no

1 - Maximum detected concentration from sediment from Table A.2.4.
2 - Nonradiological RSLs are residential soil values from the generic USEPA Regional Screening Levels (RSLs) table, dated November 2020. Radiological PRGs are residential soil-specific values derived using USEPA Radionuclide Toxicity and Preliminary Goals (PRG) for Superfund website calculator (dated October 2020) and eliminating the fruit and vegetable consumption pathways. All other inputs are default values. Both websites were accessed February 2021.
3 - Background screening values obtained from *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006), Table B-1 (0-1 ft interval).
4 - For screening purposes, maximum concentration of the naturally-occurring (nonanthopogenic) constituents are compared to 2X average background concentration.
5 - Constituents are identified as COPCs if the maximum detected concentration exceeds the human health screening value and the 2X average background concentration.
6 - RSL for methyl mercury (most conservative) used.
7 - +D-Th – Thorium-228 is a daughter product of thorium-232 and can be used to estimate its activity since these constituents are in secular equilibrium. The highest activity (most conservative) was used to estimate the activity of thorium-232 (thorium-228 [4.16 pCi/g]). The daughter products are not screened separately since they are considered in the thorium-232 peak PRG.
8 - +D-U - Thorium-230 and uranium-233/234 are daughter products of uranium-238 and can be used to estimate its activity since the constituents are in secular equilibrium. The highest activity (most conservative) was used to estimate the activity of uranium-238 (thorium-230 [1.44 pCi/g]). The daughter products are not screened separately since they are considered in the uranium-238 peak PRG.

EN = essential nutrient. RSL not available.
NA - not available - RSL or PRG not available for constituent.
na - not appliable per footnotes 7 and 8 above.
PRG – preliminary remediation goal
RSL – regional screening level

Table C-8. Human Health Risk/Hazard Calculation for Central Shops Scrap Lumber Pile Subunit Sediment Media (0-1 ft) Residential Scenario

Analyte[1]	EPC[2]	Residential RSL/PRG[3]	Residential Hazard Estimate[4]	Residential Risk Estimate[5]	Target Organ	COC?[6]
Noncarcinogenic Hazard Estimate						
Arsenic	8.27E+00	3.49E+01	2.37E-01		Dermal	no
Chromium VI - 7196A	1.36E+00	2.34E+02	5.81E-03		Other	no
Iron	1.44E+04	5.48E+04	2.63E-01		Hepatic	no
Vanadium	3.92E+01	3.93E+02	9.97E-02		Dermal	no
	Total Hazard Index =		**6.05E-01**			
Carcinogenic Risk Estimate						
Arsenic	8.27E+00	6.77E-01		1.22E-05		**YES**
Chromium VI - 7196A	1.36E+00	3.01E-01		4.52E-06		**YES**
	Total Inorganic Risk =			**1.67E-05**		
Thorium-232	4.16E+00	9.85E-03		4.22E-04		**YES**
Uranium-238	1.44E+00	1.25E-02		1.15E-04		**YES**
	Total Radiological Risk =			**5.38E-04**		
	Total Media Risk =			**5.54E-04**		

1 - Analytes from Table C-5 that were identified as COPCs.
2 - EPC - reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration (see Table A.2.4).
3 - Nonradiological RSLS are residential soil site-specific values from the generic USEPA Regional Screening Levels (RSLs) Table, dated November 2020 (see Attachment C-1). Radiological PRGs are residential soil values derived using the USEPA Radionuclide Preliminary Remediation Goals (PRGs) for Superfund website calculator (dated October 2020). All other inputs are default parameters; both websites were accessed February 2021 (see Attachment C-2).
4 - Residential Hazard Estimate = EPC/RSL.
5 - Residential Risk Estimate = (EPC/[RSL or PRG])x1E-06
6 - For noncarcinogens, no constituents are identified as COCs if the total media HI<1. If the total media HI≥1, then the constituents are segregated based on relevant target organs. Hazard quotients (HQs) are summed according to target organs (see table below). Constituents are identified as COCs if the total organ HH>1. For carcinogens, constituents are identified as COCs if the individual cancer risk≥1E-06.

Table C-9. Human Health Risk/Hazard Calculation for Central Shop Scrap Lumber Pile Subunit Sediment Media (0-1 ft) Industrial Scenario

Analyte[1]	EPC[2]	Industrial RSL/PRG[3]	Industrial Hazard Estimate[4]	Industrial Risk Estimate[5]	Target Organ	COC?[6]
Noncarcinogenic Hazard Estimate						
Arsenic	8.27E+00	4.79E+02	1.73E-02		Dermal	no
Chromium VI - 7196A	1.36E+00	3.48E+03	3.91E-04		Other	no
Iron	1.44E+04	8.18E+05	1.76E-02		Hepatic	no
Vanadium	3.92E+01	5.83E+03	6.72E-03		Dermal	no
	Total Hazard Index =		**4.2E-02**			
Carcinogenic Risk Estimate						
Arsenic	8.27E+00	3.00E+00		2.76E-06		**YES**
Chromium VI - 7196A	1.36E+00	6.33E+00		2.15E-07		No
			Total Inorganic Risk =	**2.97E-06**		
Thorium-232	4.16E+00	1.53E-02		2.72E-04		**YES**
Uranium-238	1.44E+00	2.00E-02		7.20E-05		**YES**
			Total Radiological Risk =	**3.44E-04**		
			Total Media Risk =	**3.47E-04**		

1 - Analytes from Table C-5 that were identified as COPCs.
2 - EPC - reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration (see Table A.2.4).
3 - Nonradiological RSLS are residential soil site-specific values from the generic USEPA Regional Screening Levels (RSLs) Table, dated November 2020 (see Attachment C-1). Radiological PRGs are industrial soil values derived using the USEPA Radionuclide Preliminary Remediation Goals (PRGs) for Superfund website calculator (dated October 2020). All other inputs are default parameters; both websites were accessed February 2021 (see Attachment C-2).
4 - Industrial Hazard Estimate = EPC/RSL.
5 - Industrial Risk Estimate = (EPC/[RSL or PRG])x1E-06
6 - For noncarcinogens, no constituents are identified as COCs if the total media HI<1. If the total media HI≥1, then the constituents are segregated based on relevant target organs. Hazard quotients (HQs) are summed according to target organs (see table below). Constituents are identified as COCs if the total organ HH>1. For carcinogens, constituents are identified as COCs if the individual cancer risk≥1E-06.

Table C-10. Human Health COC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Surface Water (Unfiltered) Media

Analyte	Detected Maximum Concentration[1]	MCL[2]	Maximum Result > MCL?	Tap Water RSL[2]	AWQC[2]	Maximum Result > RSL or AWQC?
Inorganics (µg/L)						
Aluminum	4.03E+02	NA	--	2.00E+04	NA	no
Antimony	3.58E+00	6.00E+00	no	--	--	--
Arsenic	2.33E+01	1.00E+01	**YES**	--	--	--
Barium	2.01E+01	2.00E+03	no	--	--	--
Calcium	6.96E+03	EN	--	EN	EN	--
Chromium	3.65E+00	1.00E+02	no	--	--	--
Copper	3.26E+01	1.30E+03	no	--	--	--
Iron	2.66E+03	NA	--	1.40E+04	NA	no
Lead	4.50E+00	1.50E+01	no	--	--	--
Magnesium	1.87E+03	EN	--	EN	EN	--
Manganese	4.00E+02	NA	--	4.30E+02	NA	no
Potassium	5.44E+03	EN	--	EN	EN	--
Sodium	9.86E+02	EN	--	EN	EN	--
Vanadium	6.13E+00	NA	--	8.60E+01	NA	no
Zinc	4.17E+01	NA	--	6.00E+03	7.40E+03	no
Organics (µg/L)						
Acetone	1.67E+01	NA	--	1.40E+04	NA	no
Radionuclides (pCi/L)						
Gross Alpha	1.47E+00	1.5E+01	No	--	--	--

1 - Maximum detected concentrations from surface water samples (see Table A.2.7).
2 - Nonradiological constituent values from Attachment C-4; radiological constiuent values from Attachment C-5.

AWQC = ambient water quality criteria
EN = essential nutrient. Calcium, magnesium, potassium, and sodium are essential nutrients that do not have a MCL, RSL, or AWQC.
MCL = maximum contaminant level
NA =not available
RSL = regional screening level

Table C-11. Human Health COC Screening for Central Shops Scrap Lumber Pile (631-2G) Subunit Surface Water (Filtered) Media

Analyte	Detected Maximum Concentration[1]	MCL[2]	Maximum Result > MCL?	Tap Water RSL[2]	AWQC[2] (µg/L)	Maximum Result > RSL or AWQC?
Inorganics (µg/L)						
Aluminum	3.95E+02		--	2.00E+04	NA	no
Arsenic	2.02E+01	1.00E+01	**YES**			--
Barium	1.96E+01	2.00E+03	no			--
Calcium	6.76E+03	EN	--	EN	EN	--
Chromium	4.89E+00	1.00E+02	no			--
Chromium VI - 7196A	4.21E+00		--	3.50E-02	--	**YES**
Copper	3.96E+01	1.30E+03	no			--
Iron	2.19E+03		--	1.40E+04	NA	no
Lead	5.41E+00	1.50E+01	no			--
Magnesium	1.81E+03	EN	--	EN	EN	--
Manganese	2.88E+02		--	4.30E+02	NA	no
Potassium	5.23E+03	EN	--	EN	EN	--
Sodium	1.93E+03	EN	--	EN	EN	--
Vanadium	5.87E+00		--	8.60E+01	NA	no
Zinc	4.06E+01		--	6.00E+03	7.40E+03	no

1 - Maximum detected concentrations from surface water samples (see Table A.2.8.
2 - Nonradiological constituent values from Attachment C-4; radiological constituent values from Attachment C-5.

AWQC = ambient water quality criteria
EN = essential nutrient. Calcium, magnesium, potassium, and sodium are essential nutrients that do not have a MCL, RSL, or AWQC.
MCL = maximum contaminant level
NA = not available
RSL = regional screening level

Table C-12. Human Health COPC Screening for Ford Building Subunit Soil Media (0-1 ft)

Analyte	Detected Maximum Concentration[1]	Qualifier	Human Health Screening Value[2]	Human Health Screening Value Source	Exceeds Human Health Screening Value?	2X Average Background Concentration[3]	Exceeds 2X Average Background?[4]	COPC?[5]
Inorganics (mg/kg)								
Aluminum	1.67E+04	--	7.70E+03	0.1xRSL	YES	1.05E+04	YES	**YES**
Antimony	5.41E-01	J	3.10E+00	0.1xRSL	no	2.69E+00	no	no
Arsenic	1.45E+01	--	6.80E-01	RSL	YES	4.28E+00	YES	**YES**
Barium	4.07E+01	--	1.50E+03	0.1xRSL	no	3.91E+01	YES	no
Beryllium	4.55E+00	--	1.60E+01	0.1xRSL	no	2.88E-01	YES	no
Cadmium	1.03E+00	--	7.10E+00	0.1xRSL	no	4.83E-01	YES	no
Calcium	5.15E+03	--	EN	--	--	4.76E+02	YES	no
Chromium	2.30E+02	--	3.00E-01	RSL	YES	1.54E+01	YES	YES
Cobalt	3.72E+00	--	2.30E+00	0.1xRSL	YES	1.55E+00	YES	**YES**
Copper	2.71E+01	--	3.10E+02	0.1xRSL	no	4.34E+00	YES	no
Iron	4.72E+04	--	5.50E+03	0.1xRSL	YES	1.27E+04	YES	**YES**
Lead	2.17E+01	--	4.00E+01	0.1xRSL	no	1.03E+01	YES	no
Magnesium	2.88E+03	--	EN	--	--	2.75E+02	YES	no
Manganese	5.40E+02	--	1.80E+02	0.1xRSL	YES	1.53E+02	YES	**YES**
Mercury	1.44E-01	--	1.10E+00	0.1xRSL	no	7.10E-02	YES	no
Nickel	8.17E+00	--	1.50E+02	0.1xRSL	no	3.48E+00	YES	no
Potassium	1.03E+03	--	EN	--	--	2.16E+02	YES	no
Selenium	9.05E+00	--	3.90E+01	0.1xRSL	no	2.99E+00	YES	no
Silver	7.43E-01	--	3.90E+01	0.1xRSL	no	7.28E-01	YES	no
Sodium	4.20E+01	--	EN	--	--	4.02E+01	YES	no
Thallium	2.36E+01	--	7.80E-02	0.1xRSL	YES	3.12E+00	YES	**YES**
Vanadium	1.87E+02	--	3.90E+01	0.1xRSL	YES	3.91E+01	YES	**YES**
Zinc	4.26E+02	--	2.30E+03	0.1xRSL	no	9.47E+00	YES	no
Organics (mg/kg)								
Acetone	5.42E-02	--	6.10E+03	0.1xRSL	no	NA	--	no

Table C-12. Human Health COPC Screening for Ford Building Subunit Soil Media (0-1 ft) *(continued)*

Analyte	Detected Maximum Concentration[1]	Qualifier	Human Health Screening Value[2]	Human Health Screening Value Source	Exceeds Human Health Screening Value?	2X Average Background Concentration[3]	Exceeds 2X Average Background?[4]	COPC?[5]
Organics (mg/kg) (continued)								
Benzo[g,h,i]perylene	7.16E-02	J	NA	--	--	--	--	--
Benzo[a]anthracene	6.84E-02	J	1.10E+00	RSL	no	NA	--	no
Benzo[a]pyrene	6.14E-02	J	1.10E-01	RSL	no	NA	--	no
Benzo[b]fluoranthene	1.63E-01	J	1.10E+00	RSL	no	NA	--	no
Benzo[k]fluoranthene	6.58E-02	J	1.10E+01	RSL	no	NA	--	no
Bis(2-ethylhexyl)phthalate (DEHP)	8.58E-02	--	3.90E+01	RSL	no	NA	--	no
Carbazole	1.73E-02	J	NA	--	--	--	--	--
Chrysene	1.14E-01	J	1.10E+02	RSL	no	NA	--	no
Cumene (Isopropylbenzene)	4.73E-02	--	1.90E+02	0.1xRSL	no	NA	--	no
Dichloromethane (Methylene Chloride)	2.10E-03	J	5.70E+01	RSL	no	NA	--	no
Di-N-butyl phthalate	3.38E-02	J	6.30E+02	0.1xRSL	no	NA	--	no
Fluoranthene	4.21E-01	J	2.40E+02	0.1xRSL	no	NA	--	no
Indeno[1,2,3-cd]pyrene	7.67E-02	J	1.10E+00	RSL	no	NA	--	no
Methyl Ethyl Ketone	7.27E-03	--	2.70E+03	0.1xRSL	no	NA	--	no
Pentachlorophenol	2.29E-01	J	1.00E+00	RSL	no	NA	--	no
Phenanthrene	2.38E-01	J	NA	--	--	--	--	--
Pyrene	3.09E-01	J	1.80E+02	0.1xRSL	no	NA	--	no
Tetrachloroethylene (PCE)	3.18E-01	J	2.40E+01	RSL	no	NA	--	no
Toluene	9.00E-04	J	4.90E+02	0.1xRSL	no	NA	--	no
Pesticides/PCBs (mg/kg)								
Aroclor 1254	1.19E-01	--	2.40E-01	RSL	no	NA	--	no
Aroclor 1260	7.13E-02	--	2.40E-01	RSL	no	NA	--	no
Radionuclides (pCi/g)								
Cesium-137	1.53E-01	J	6.05E-02	PRG	YES	2.84E-01	no	no

Table C-12. Human Health COPC Screening for Ford Building Subunit Soil Media (0-1 ft) *(continued/end)*

Analyte	Detected Maximum Concentration[1]	Qualifier	Human Health Screening Value[2]	Human Health Screening Value Source	Exceeds Human Health Screening Value?	2X Average Background Concentration[3]	Exceeds 2X Average Background?[4]	COPC?[5]
Radionuclides (pCi/g) (continued)								
Cobalt-60	5.45E-01	--	3.30E-02	PRG	YES	NA	--	**YES**
Potassium-40	2.48E+01	--	1.44E-01	PRG	YES	2.33E+00	YES	**YES**
Thorium-232	1.64E+00	--	9.85E-03	PRG	YES	1.80E+00	YES	**YES**
Actinium-228	2.22E+00	--	na	+D-Th[6]	--	1.95E+00	--	no
Thorium-228	1.58E+00	J	na	+D-Th[6]	--	1.97E+00	--	no
Lead-212	2.07E+00	--	na	+D-Th[6]	--	2.19E+00	--	no
Bismuth-212	3.03E+00	J	na	+D-Th[6]	--	NA	--	no
Thallium-208	6.18E-01	--	na	+D-Th[6]	--	NA	--	no
Uranium-238	1.67E+00	--	1.25E-02	PRG	YES	1.01E+00	YES	**YES**
Uranium-233/234	1.22E+00	--	na	+D-U[7]	--	1.15E+00	--	no
Thorium-230	2.60E+00	--	na	+D-U[7]	--	1.13E+00	--	no
Lead-214	2.03E+00	--	na	+D-U[7]	--	NA	--	no
Bismuth-214	1.73E+00	--	na	+D-U[7]	--	2.24E+00	--	no

1 - Maximum detected concentration from surface soil interval (0-1ft) from Table A.3.1.
2 - Nonradiological RSLs are residential soil values from the generic USEPA Regional Screening Levels (RSLs) table, dated November 2020. Radiological PRGs are residential site-specific values derived using USEPA Radionuclide Toxicity and Preliminary Goals (PRG) for Superfund website calculator (dated October 2020) and eliminating the fruit and vegetable consumption pathways. All other inputs are default values. Both websites were accessed February 2021.
3 - Background screening values obtained from *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006), Table B-1 (0-1 ft interval).
4 - For screening purposes, maximum concentration of the naturally occurring (nonanthropogenic) constituents are compared to 2X average background concentration.
5 - Constituents are identified as COPCs if the maximum detected concentration exceeds the human health screening value and the 2X average background concentration.
6 - +D-Th - Actinium-228, bismuth-212, lead-212, thallium-208, thorium-228 are daughter products of thorium-232 and can be used to estimate its activity since these constituents are in secular equilibrium. The highest activity (most conservative) was used to estimate the activity of thorium-232 (bismuth-212 [3.03 pCi/g]). The daughter products are not screened separately since they are considered in the thorium-232 secular equilibrium PRG.
7 - +D-U - Bismuth-214, lead-214, thorium-230, and uranium-233/234 are daughter products of uranium-238 and can be used to estimate its activity since the constituents are in secular equilibrium. The highest activity (most conservative) was used to estimate the activity of uranium-238 (thorium-230 [2.60 pCi/g]). The daughter products are not screened separately since they are considered in the uranium-238 secular equilibrium PRG.

EN – essential nutrient. RSL not available
NA – not available
na - not appliable per footnotes 6 and 7 above.
PRG – preliminary remediation goal
RSL – regional screening level

This page is intentionally left blank.

Table C-13. Human Health Risk/Hazard Calculation for Ford Building Subunit Soil Media (0-1 ft) Residential Scenario

Analyte[1]	EPC[2]	Residential RSL/PRG[3]	Residential Hazard Estimate[4]	Residential Risk Estimate[5]	Target Organ	COC?[6]
Noncarcinogenic Hazard Estimate						
Aluminum	8.11E+03	7.74E+04	1.05E-01		Neurological	no
Arsenic	4.53E+00	3.49E+01	1.30E-01		Dermal	no
Chromium	2.48E+01	3.48E+03	7.12E-03		Other	no
Cobalt	1.20E+00	2.34E+01	5.15E-02		Hematological	no
Iron	1.61E+04	5.48E+04	2.93E-01		Hepatic	no
Manganese	1.32E+02	1.83E+03	7.21E-02		Neurological	no
Thallium	3.78E+00	7.82E-01	4.83E+00		Hematological	**YES**
Vanadium	4.93E+01	3.93E+02	1.25E-01		Dermal	no
	Total Hazard Index =		**5.72E+00**			
Carcinogenic Risk Estimate						
Arsenic	4.53E+00	6.77E-01		6.69E-06		**YES**
Chromium	2.48E+01	3.01E-01		8.24E-05		**YES**
	Total Inorganic Risk =			**8.90E-05**		
Cobalt-60	5.45E-01	3.30E-02		1.65E-05		**YES**
Potassium-40	2.48E+01	1.44E-01		1.72E-04		**YES**
Throium-232	3.03E+00	9.85E-03		3.08E+04		**YES**
Uranium-238	2.60E+00	1.25E-02		2.08E-04		**YES**
	Total Radiological Risk =			**7.04E-04**		
	Total Media Risk =			**7.93E-04**		

1 - Analytes from Table C-5 that were identified as COPCs.
2 - EPC - reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration (see Table A.1.1).
3 - Nonradiological RSLS are residential soil site-specific values from the generic USEPA Regional Screening Levels (RSLs) Table, dated November 2020 (see Attachment C-1). Radiological PRGs are residential soil site-specific values derived using the USEPA Radionuclide Preliminary Remediation Goals (PRGs) for Superfund website calculator (dated October 2020) and eliminating the fruit and vegetable pathways. All other inputs are default parameters; website accessed February 2021 (see Attachment C-2).
4 - Residential Hazard Estimate = EPC/RSL.
5 - Residential Risk Estimate = (EPC/[RSL or PRG])x1E-06
6 - For noncarcinogens, no constituents are identified as COCs if the total media HI<1. If the total media HI≥1, then the constituents are segregated based on relevant target organs. Hazard quotients (HQs) are summed according to target organs (see table below). Constituents are identified as COCs if the total organ HQ>1 and the total organ HI>11. For carcinogens, constituents are identified as COCs if the individual cancer risk≥1E-06.

Neurological	Aluminum	1.05E-01
	Manganese	7.21E-02
	Total Neurological	1.77E-01

Hematological	Cobalt	5.15E-02
	Thallium	4.83E+00
	Total Hematological	***4.89E+00***

Dermal	Arsenic	1.30E-01
	Vanadium	1.25E-01
	Total Dermal	2.55E-01

Hepatic	Iron	2.93E-01
	Total Hepatic	2.93E-01

Other	Chromium	7.12E-03
	Total Other	7.12E-03

Table C-14. Human Health Risk/Hazard Calculation for Ford Building Subunit Soil Media (0-1 ft) Industrial Scenario

Analyte[1]	EPC[2]	Industrial RSL/PRG[3]	Industrial Hazard Estimate[4]	Industrial Risk Estimate[5]	Target Organ	COC?[6]
Noncarcinogenic Hazard Estimate						
Aluminum	8.11E+03	1.12E+06	7.24E-03		Neurological	no
Arsenic	4.53E+00	4.79E+02	9.45E-03		Dermal	no
Chromium	2.48E+01	3.48E+03	7.12E-03		Other	no
Cobalt	1.20E+00	3.47E+02	3.47E-03		Hematological	no
Iron	1.61E+04	8.18E+05	1.96E-02		Hepatic	no
Manganese	1.32E+02	2.56E+04	5.15E-03		Neurological	no
Thallium	3.78E+00	1.17E+01	3.23E-01		Hematological	no
Vanadium	4.93E+01	5.83E+03	8.45E-03		Dermal	no
	Total Hazard Index =		**3.84E-01**			
Carcinogenic Risk Estimate						
Arsenic	3.55E+00	3.00E+00		1.51E-06		**YES**
Chromium	2.48E+01	6.33E+00		3.92E-06		**YES**
	Total Inorganic Risk =			**5.42-06**		
Cobalt-60	5.45E-01	4.83E-02		1.13E-05		**YES**
Potassium-40	2.48E+01	2.19E-01		1.13E-04		**YES**
Thorium-232	3.03E+00	1.53E-02		1.98E-04		**YES**
Uranium-238	2.60E+00	2.00E-02		1.30E-04		**YES**
	Total Inorganic Risk =			**4.53E-04**		
	Total Media Risk =			**4.58E-04**		

1 - Analytes from Table C-5 that were identified as COPCs.
2 - EPC - reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration (see Table A.3.1).
3 - Nonradiological RSLS are residential soil site-specific values from the generic USEPA Regional Screening Levels (RSLs) Table, dated November 2020 (see Attachment C-1). Radiological PRGs are residential soil site-specific values derived using the USEPA Radionuclide Preliminary Remediation Goals (PRGs) for Superfund website calculator (dated October 2020) and eliminating the fruit and vegetable pathways. All other inputs are default parameters; both websites were accessed February 2021 (see Attachment C-2).
4 - Industrial Hazard Estimate = EPC/RSL.
5 - Industrial Risk Estimate = (EPC/[RSL or PRG])x1E-06
6 - For noncarcinogens, no constituents are identified as COCs if the total media HI<1. If the total media HI≥1, then the constituents are segregated based on relevant target organs. Hazard quotients (HQs) are summed according to target organs (see table below). Constituents are identified as COCs if the total organ HH>1. For carcinogens, constituents are identified as COCs if the individual cancer risk≥1E-06.

Attachment C-1
USEPA Regional Screening Levels Table
RSLs for Default Resident and Default Industrial Worker Scenarios

(November 2020)

Website accessed February 2021

This page was intentionally left blank.

USEPA Regional Screening Levels Table *RSLs for Default Resident and Default Industrial Worker Scenarios* (November 2020)

SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD$_o$ (mg/kg-day)	key	RfC$_i$ (mg/m^3)	key	VOC	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Tap Water (ug/L)	key	MCL (ug/L)
Inorganics																	
				1.0E+00	P	5.0E-03	P		Aluminum	7429-90-5	7.7E+04	n	1.1E+06	nm	2.0E+04	n	
				4.0E-04	I	3.0E-04	A		Antimony	7440-36-0	3.1E+01	n	4.7E+02	n	7.8E+00	n	6.0E+00
1.5E+00	I	4.3E-03	I	3.0E-04	I	1.5E-05	C		Arsenic	7440-38-2	6.8E-01	c*R	3.0E+00	cR	5.2E-02	c	1.0E+01
				2.0E-01	I	5.0E-04	H		Barium	7440-39-3	1.5E+04	n	2.2E+05	nm	3.8E+03	n	2.0E+03
		2.4E-03	I	2.0E-03	I	2.0E-05	I		Beryllium	7440-41-7	1.6E+02	n	2.3E+03	n	2.5E+01	n	4.0E+00
		1.8E-03	I	1.0E-03	I	1.0E-05	A		Cadmium	7440-43-9	7.1E+01	n	9.8E+02	n			
				1.5E+00	I				Chromium (III)	16065-83-1	1.2E+05	nm	1.8E+06	nm	2.2E+04	n	
5.0E-01	C	8.4E-02	G	3.0E-03	I	1.0E-04	I		Chromium (VI)	18540-29-9	3.0E-01	c	6.3E+00	c	3.5E-02	c	
		9.0E-03	P	3.0E-04	P	6.0E-06	P		Cobalt	7440-48-4	2.3E+01	n	3.5E+02	n	6.0E+00	n	
				4.0E-02	H				Copper	7440-50-8	3.1E+03	n	4.7E+04	n	8.0E+02	n	1.3E+03
				7.0E-01	P				Iron	7439-89-6	5.5E+04	n	8.2E+05	nm	1.4E+04	n	
									Lead	7439-92-1	4.0E+02	G	8.0E+02	G	1.5E+01	G	1.5E+01
				2.4E-02	G	5.0E-05	I		Manganese	7439-96-5	1.8E+03	n	2.6E+04	n	4.3E+02	n	
						3.0E-04	I	V	Mercury (elemental)	7439-97-6	1.1E+01	ns	4.6E+01	ns	6.3E-01	n	2.0E+00
				1.0E-04	I				Methyl mercury	22967-92-6	7.8E+00	n	1.2E+02	n	2.0E+00	n	
		2.6E-04	C	2.0E-02	I	9.0E-05	A		Nickel	7440-02-0	1.5E+03	n	2.2E+04	n	3.9E+02	n	
				5.0E-03	I	2.0E-02	C		Selenium	7782-49-2	3.9E+02	n	5.8E+03	n	1.0E+02	n	5.0E+01
				5.0E-03	I				Silver	7440-22-4	3.9E+02	n	5.8E+03	n	9.4E+01	n	
				1.0E-05	X				Thallium	7440-28-0	7.8E-01	n	1.2E+01	n	2.0E-01	n	2.0E+00
				5.0E-03	G	1.0E-04	A		Vanadium	7440-62-2	3.9E+02	n	5.8E+03	n	8.6E+01	n	
				3.0E-01	I				Zinc	7440-66-6	2.3E+04	n	3.5E+05	nm	6.0E+03	n	
Organics																	
				4.0E-03	I			V	2-Methylnaphthalene-	91-57-6	2.4E+02	n	3.0E+03	n	3.6E+01	n	
				9.0E-01	I	3.1E+01	A	V	Acetone	67-64-1	6.1E+04	n	6.7E+05	nms	1.4E+04	n	
				3.0E-01	I			V	Anthracene	120-12-7	1.8E+04	n	2.3E+05	nm	1.8E+03	n	
1.0E-01	E	6.0E-05	E					V	Benzo[a]anthracene	56-55-3	1.1E+00	c	2.1E+01	c	3.0E-02	c	
1.0E+00	I	6.0E-04	I	3.0E-04	I	2.0E-06	I		Benzo[a]pyrene	50-32-8	1.1E-01	c	2.1E+00	c	2.5E-02	c	2.0E-01
1.0E-01	E	6.0E-05	E						Benzo[b]fluoranthene	205-99-2	1.1E+00	c	2.1E+01	c	2.5E-01	c	
1.0E-02	E	6.0E-06	E						Benzo[k]fluoranthene	207-08-9	1.1E+01	c	2.1E+02	c	2.5E+00	c	
1.4E-02	I	2.4E-06	C	2.0E-02	I				Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	3.9E+01	c*	1.6E+02	c	5.6E+00	c*	6.0E+00
				1.0E-01	I	4.0E-01	I	V	Cumene (Isopropylbenzene)	98-82-8	1.9E+03	ns	9.9E+03	ns	4.5E+02	n	
1.0E-03	E	6.0E-07	E						Chrysene	218-01-9	1.1E+02	c	2.1E+03	c	2.5E+01	c	

USEPA Regional Screening Levels Table *RSLs for Default Resident and Default Industrial Worker Scenarios* (November 2020)

SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m3)	key	VOC	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Tap Water (ug/L)	key	MCL (ug/L)
Organics (continued)																	
1.0E+00	E	6.0E-04	E						Dibenz[a,h]anthracene	53-70-3	1.1E-01	c	2.1E+00	c	2.5E-02	c	
2.0E-03	I	1.0E-08	I	6.0E-03	I	6.0E-01	I	V	Dichloromethane (Methylene Chloride)	75-09-2	5.7E+01	c**	1.0E+03	c**	1.1E+01	c**	5.0E+00
				1.0E-01	I				Di-N-butyl phthalate	84-74-2	6.3E+03	n	8.2E+04	n	9.0E+02	n	
				4.0E-02	I				Fluoranthene	206-44-0	2.4E+03	n	3.0E+04	n	8.0E+02	n	
				4.0E-02	I			V	Fluorene	86-73-7	2.4E+03	n	3.0E+04	n	2.9E+02	n	
1.0E-01	E	6.0E-05	E						Indeno[1,2,3-cd]pyrene	193-39-5	1.1E+00	c	2.1E+01	c	2.5E-01	c	
				6.0E-01	I	5.0E+00	I	V	Methyl ethyl ketone	78-93-3	2.7E+04	n	1.9E+05	nms	5.6E+03	n	
1.2E-01	C	3.4E-05	C	2.0E-02	I	3.0E-03	I	V	Naphthalene	91-20-3	2.0E+00	c*	8.6E+00	c*	1.2E-01	c*	
4.0E-01	I	5.1E-06	C	5.0E-03	I				Pentachlorophenol	87-86-5	1.0E+00	c	4.0E+00	c	4.1E-02	c	1.0E+00
				3.0E-02	I			V	Pyrene	129-00-0	1.8E+03	n	2.3E+04	n	1.2E+02	n	
4.6E-02	I	4.1E-06	I	5.0E-04	I	2.0E-03	I	V	Trichloroethylene (TCE)	79-01-6	9.4E-01	c**	6.0E+00	c**	4.9E-01	c**	5.0E+00
				8.0E-02	I	5.0E+00	I	V	Toluene	108-88-3	4.9E+03	ns	4.7E+04	ns	1.1E+03	n	1.0E+03
Pesticides/PCBs																	
1.7E+01	I	4.9E-03	I	3.0E-05	I			V	Aldrin	309-00-2	3.9E-02	c*	1.8E-01	c	9.2E-04	c	
2.0E+00	G	5.7E-04	G	2.0E-05	I			V	Aroclor 1254	11097-69-1	2.4E-01	c**	9.7E-01	c*	7.8E-03	c*	
2.0E+00	G	5.7E-04	G					V	Aroclor 1260	11096-82-5	2.4E-01	c	9.9E-01	c	7.8E-03	c	
3.5E-01	I	1.0E-04	I	5.0E-04	I	7.0E-04	I	V	Chlordane (technical mixture)	12789-03-6	1.7E+00	c*	7.7E+00	c*	2.0E-02	c*	2.0E+00
3.4E-01	I	9.7E-05	C	3.0E-04	X			V	DDE	72-55-9	2.0E+00	c*	9.3E+00	c*	4.6E-02	c	
3.4E-01	I	9.7E-05	I	5.0E-04	I				DDT	50-29-3	1.9E+00	c*	8.5E+00	c*	2.3E-01	c*	

A = Agency for Toxic Substances and Disease Registry (ATSDR)
C = California EPA
E = Relative Potency Factor
G = User's Guide
H = Health Effects Assessment Summary Tables (HEAST)
I = Integrated Risk Information System (IRIS)
P = Provisional Peer-Reviewed Toxicity Values
X = Provisional Peer-Reviewed Toxicity Values
c = cancer
n = noncancer
* = where: n SL < 100X c SL
** = where n SL < 10X c SL
R = Relative Bioavailability (RBA)
m = ceiling limit exceeded
s = C_{sat} exceeded
V = volatile organic compound

Attachment C-2
USEPA Radionuclide Preliminary Remediation Goals Website
Site-Specific PRGs for Resident Scenario

(October 2020)

(Website accessed February2021)

This page was intentionally left blank.

Site-Specific Resident Equation Inputs for Sediment/Soil

Variable	Value	Variable	Value	Variable	Value
TR (target cancer risk) unitless	1.00E-06	IRA_{res-c} (inhalation rate - resident child) m^3/day	10	ED_{res-a} (exposure duration - resident adult) yr	0
t_{res} (time - resident) yr	26	$IFS_{res-adj}$ (age-adjusted soil ingestion factor - resident) mg	1.12E+06	EF_{res-c} (exposure frequency - resident child) day/yr	0
ED_{res} (exposure duration - resident) yr	26	$IFA_{res-adj}$ (age-adjusted soil inhalation factor - resident) m^3	1.61E+05	EF_{res-a} (exposure frequency - resident adult) day/yr	0
ET_{res} (exposure time - resident) hr/day	24	GSF_i (gamma shielding factor - indoor) unitless	0.4	City (Climate Zone)	0
ET_{res-c} (exposure time - resident child) hr/day	24	$MLF_{produce}$ (produce plant mass loading factor) unitless	0.26	A_s ECODS N-1 (acres)	0.4
ET_{res-a} (exposure time - resident adult) hr/day	24	Slab size for ACF (area correction factor) m^2	1.00E+06	A_s Central Shops Scrap Lumber Pile (acres)	2.07
ET_{res-i} (exposure time - indoor resident) hr/day	16.416	Cover thickness for GSF (gamma shielding factor) cm	0	A_s Ford Building (acres)	0.2
ET_{res-o} (exposure time - outdoor resident) hr/day	1.752	IRV_{res-a} (vegetable consumption rate - resident adult) g/day	0	Q/C_{wp} (g/m^2-s per kg/m^3)	93.77
ED_{res-c} (exposure duration - resident child) yr	6	IRV_{res-c} (vegetable consumption rate - resident child) g/day	0	PEF (particulate emission factor) m^3/kg	1.36E+09
ED_{res-a} (exposure duration - resident adult) yr	20	$IFV_{res-adj}$ (age-adjusted vegetable ingestion factor - resident) g	0	A (PEF Dispersion Constant)	16.2302
EF_{res} (exposure frequency - resident) day/yr	350	$IFF_{res-adj}$ (age-adjusted fruit ingestion factor - resident) g	0	B (PEF Dispersion Constant)	18.7762
EF_{res-c} (exposure frequency - resident child) day/yr	350	IRF_{res-a} (fruit consumption rate - resident adult) g/day	0	C (PEF Dispersion Constant)	216.108
EF_{res-a} (exposure frequency - resident adult) day/yr	350	IRF_{res-c} (fruit consumption rate - resident child) g/day	0	V (fraction of vegetative cover) unitless	0.5
IRS_{res-a} (soil intake rate - resident adult) mg/day	100	$CF_{res-produce}$ (contaminated plant fraction) unitless	0	U_m (mean annual wind speed) m/s	4.69
IRS_{res-c} (soil intake rate - resident child) mg/day	200	TR (target cancer risk) unitless	0	U_t (equivalent threshold value)	11.32
IRA_{res-a} (inhalation rate - resident adult) m^3/day	20	ED_{res-c} (exposure duration - resident child) yr	0	F(x) (function dependent on U_m/U_t) unitless	0.194

Output generated February 2021

Site-Specific Resident PRGs for Soil

Isotope	Ingestion PRG *(pCi/g)*	InhalationPRG *(pCi/g)*	External Exposure PRG *(pCi/g)*	Produce Consumption PRG *(pCi/g)*	Total PRG *(pCi/g)*
Peak PRG for Cesium-137	2.79E+01	9.97E+04	6.06E-02		6.05E-02
Peak PRG for Cobalt-60	8.28E+01	2.96E+05	3.30E-02		3.30E-02
Peak PRG for Potassium-40	1.53E+01	3.80E+04	1.45E-01		1.44E-01
Peak PRG for Thorium-232	3.08E-01	3.65E+01	1.02E-02		9.85E-03
Peak PRG for Uranium-238	1.44E-01	5.83E+01	1.36E-02		1.24E-02

PRG = preliminary remediation goal

Attachment C-3
USEPA Radionuclide Preliminary Remediation Goals for Superfund Table:
Default PRGs for Industrial Worker Scenario

(**October 2020)**

(Website accessed February 2021)

This page was intentionally left blank.

Default Industrial Worker Equation Inputs for Soil

Variable	Units	Value
Cover layer thickness for GSF (gamma shielding factor)	cm	Default
TR (target cancer risk)	unitless	1.00E-06
t_w (time - composite worker)	yr	25
EF_w (exposure frequency - composite worker)	day/yr	250
ED_w (exposure duration - composite worker)	yr	25
ET_w (exposure time - composite worker)	hr/day	8
IRA_w (inhalation rate - composite worker)	m^3/day	60
IRS_w (soil intake rate - composite worker)	mg/day	100
Site area for ACF (area correction factor)	m^2	Default
City (Climate Zone)		Default
A_s ECODS N-1	acres	0.4
A_s Central Shop Scrap Lumber Pile	acres	2.07
A_s Ford Building	acres	0.2
Q/C_{wp}	g/m^2-s per kg/m^3	93.77
PEF (particulate emission factor)	m3/kg	1.36E+09
A (PEF Dispersion Constant)		16.2302
B (PEF Dispersion Constant)		18.7762
C (PEF Dispersion Constant)		216.108
V (fraction of vegetative cover)	unitless	0.5
U_m (mean annual wind speed)	m/s	4.69
U_t (equivalent threshold value)		11.32
F(x) (function dependent on U_m/U_t)	unitless	0.194

Site-Specific Industrial Worker PRGs for Soil

Isotope	Ingestion PRG *(pCi/g)*	InhalationPRG *(pCi/g)*	External Exposure PRG *(pCi/g)*	Total PRG *(pCi/g)*
Peak PRG for Cesium-137	6.62E+01	1.27E+05	9.08E-02	9.07E-02
Peak PRG for Cobalt-60	7.46E+02	3.69E+05	4.83E-02	4.83E-02
Peak PRG for Potassium-40	1.06E+02	4.90E+04	2.19E-01	2.19E-01
Peak PRG for Thorium-232	1.74E+00	4.70E+01	1.54E-02	1.53E-02
Peak PRG for Uranium-238	6.36E-01	7.52E+01	2.06E-02	2.00E-02

PRG = preliminary remediation goal

Attachment C-4
MCLs/RSLs/AWQC for Surface Water Data Screening of Nonradiological Constituents

(Website accessed February 2021)

This page was intentionally left blank.

MCLs/RSLs/AWQC for Surface Water Data Screening of Nonradiological Constituents

Analyte	CAS No.	MCL[1]	Tap Water SL[2]	SCDHEC AWQC[3]
Inorganics (µg/L)				
Aluminum	7429-90-5		2.00E+04	
Antimony	7440-36-0	6.00E+00	7.80E+00	5.6E+00
Arsenic	7440-38-2	1.00E+01	5.20E-02	1.00E+01
Barium	7440-39-3	2.00E+03	3.80E+03	
Chromium VI	18540-29-9		3.50E-02	
Copper	7440-50-8	1.30E+03	8.00E+02	1.3E+03
Iron	7439-89-6		1.40E+04	
Lead	7439-92-1	1.50E+01	1.50E+01	
Manganese	7439-96-5		4.30E+02	
Vanadium	7440-62-2		8.60E+01	
Zinc	7440-66-6		6.00E+03	7.40E+03
Organics (µg/L)				
Acetone	67-64-1		1.40E+04	

MCL = maximum contaminant level
SL = screening level
SCDHEC = South Carolina Department of Health and Environmental Control
AWQC = ambient water quality criteria
[1]Values from *USEPA, EPA-816-F-09-004,* May 2009.
[2]Values from *USEPA Regional Screening Levels (RSLS) – Generic Tables, Summary Table* (November 2020).
[3]Values from *R.61-68, Water Classification & Standards, South Carolina Department of Health and Environmental Control, Bureau of Water*

This page was intentionally left blank.

Attachment C-5
MCLs/PRGs for Surface Water Data Screening of Radiological Constituents

(Website accessed February 2021)

This page was intentionally left blank.

MCLs/PRGs for Surface Water Data Screening of Radiological Constituents

Isotope	MCL *(pCi/L)*	Tap Water PRG *(pCi/L)*
Gross Alpha	1.5E+01	
Nonvolatile Beta	a	

MCL = maximum contaminant level
PRG = preliminary remediation goal
a - MCL = activity concentration for beta emitters equivalent to an annual dose of 4 mrem/yr

This page was intentionally left blank.

APPENDIX D

ECOLOGICAL RISK ASSESSMENT

This page was intentionally left blank.

TABLE OF CONTENTS

Section **Page**

List of Figures **D-4**

List of Tables **D-4**

List of Attachments **D-5**

List of Abbreviations and Acronyms **D-7**

D-1. Introduction **D-9**

D-1.1 Background ***D-9***
D-1.2 Data ***D-11***
D-1.3 Habitats/Receptors/Preliminary Assessment and Measurement Endpoints ***D-15***
D-1.4 Sources of Literature-Based Thresholds ***D-19***

D-2. Ecological Risk Assessment Process **D-24**

D-2.1 Screening-Level Effects Evaluation ***D-24***
D-2.1.1 ESV Screening - Soil Media D-26
D-2.1.2 ESV Screening - Sediment Media D-27
D-2.1.3 ESV Screening - Surface Water Media D-27

D-3. Refinement-Level Risk (Hazard) Calculation **D-28**

D-3.1 RSV Screening - Soil Media ***D-29***
D-3.2 RSV Screening - Sediment Media ***D-29***
D-3.3 RSV Screening - Surface Water Media ***D-29***
D-3.4 Results/Refinement of Constituents of Concern ***D-29***
D-3.4.1 ECODS N-1 Subunit D-33
D-3.4.2 CSSLP Subunit D-42
D-3.4.3 Ford Building Subunit D-57
D-3.4.4 Screening Level Effects Conclusion D-70
D-3.5 Summary/Conclusion of Ecological Risk Assessment ***D-71***

D-4. References **D-71**

LIST OF FIGURES

Figure		Page
Figure D-1.	ECODS N-1, CSSLP and Ford Building OU Location	D-75
Figure D-2.	ECODS N-1 Sample Location Map	D-76
Figure D-3.	Central Shops Scrap Lumber Pile (631-2G) Sample Location Map	D-77
Figure D-4.	Ford Building Sample Location Map	D-78

LIST OF TABLES

Table		Page
Table D-1.	Screening Level Evaluation for ECODS N-1 Subunit (Soil 0-1 ft)	D-79
Table D-2.	Refinement Level Evaluation for ECODS N-1 Subunit (Soil 0-1 ft)	D-81
Table D-3.	Screening Level Evaluation for ECODS N-1 Subunit (Soil 1-4 ft)	D-82
Table D-4.	Refinement Level Evaluation for ECODS N-1 Subunit (Soil 1-4 ft)	D-85
Table D-5.	Screening Level Evaluation for CSSLP Subunit (Soil 0-1 ft)	D-86
Table D-6.	Refinement Level Evaluation for CSSLP Subunit (Soil 0-1 ft)	D-89
Table D-7.	Screening Level Evaluation for CSSLP Subunit (Soil 1-4 ft)	D-90
Table D-8.	Refinement Level Evaluation for CSSLP Subunit (Soil 1-4 ft)	D-93
Table D-9.	Screening Level Evaluation for CSSLP Surface Water Impoundment Area (Sediment 0-1 ft)	D-94
Table D-10.	Refinement Level Evaluation for CSSLP Surface Water Impoundment Area (Sediment 0-1 ft)	D-96
Table D-11.	Screening Level Evaluation for CSSLP Surface Water Impoundment Area (Surface Water, Unfiltered)	D-97
Table D-12.	Refinement Level Evaluation for CSSLP Surface Water Impoundment Area (Surface Water, Unfiltered)	D-98
Table D-13.	Screening Level Evaluation for CCSLP Surface Water Impoundment Area (Surface Water, Filtered)	D-99
Table D-14.	Refinement Level Evaluation for CSSLP Surface Water Impoundment Area (Surface Water, Filtered)	D-100
Table D-15.	Screening Level Evaluation for Ford Building Subunit (Soil 0-1 ft)	D-101
Table D-16.	Screening Level Evaluation for Ford Building Subunit (Soil 0-1 ft) *(Continued/End)*	D-103
Table D-17.	Refinement Level Evaluation for Ford Building Subunit (Soil 0-1 ft)	D-104
Table D-18.	Screening Level Evaluation for Ford Building (Soil 1-4 ft)	D-105
Table D-19.	Refinement Level Evaluation for Ford Building (Soil 1-4 ft)	D-108

LIST OF ATTACHMENTS

Section		Page
Attachment D-1.	Derivation of ECODS N-1, CSSLP, and Ford Building OU ESVs and RSVs	D-107
Attachment D-2.	EPA Region 4 Screening Table for Soil, Sediment, and Surface Water (March 2018)	D-125
Attachment D-3.	LANL No Effect and Low Effect ESLs Ecorisk Database Release 4.1, Los Alamos National Laboratory (2017)	D-147
Attachment D-4.	SCDHEC Standards, R.61-68 Water Classification and Standards Table for Protection of Freshwater Aquatic Life	D-153
Attachment D-5.	Uncertainty Tables	D-165
Attachment D-6.	RESRAD Biota Values Argonne National Laboratory (2006) Biota (v.1.8) [software]	D-175
Attachment D-7.	Los Alamos National Laboratory Receptor-Specific Low Effect ESLs (2017)	D-179
Attachment D-8	ECODS N-1, CSSLP, and Ford Building OU Area Use Factors	D-221
Attachment D-9	PAUF-Adjusted Hazard Quotients	D-225

This page was intentionally left blank.

LIST OF ABBREVIATIONS AND ACRONYMS

AWQC	ambient water quality criteria
BRA	Baseline Risk Assessment
CMS	Corrective Measures Study
COC	constituent of concern
COPC	constituent of potential concern
COPEC	constituent of potential ecological concern
CSM	Conceptual Site Model
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
EPC	exposure point concentration
ERA	Ecological Risk Assessment
ESL	ecological screening level
ESV	ecological screening value
FS	Feasibility Study
ft	feet
HQ	hazard quotient
IOU	Integrator Operable Unit
LANL	Los Alamos National Laboratory
LOAEL	Low Observed Adverse Effect Level
LTR	Lower Three Runs
m	meter
NOAEL	No Observed Adverse Effect Level
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
RCOC	refined constituent of concern
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RI	remedial investigation
RME	reasonable maximum exposure
RSV	refinement screening values

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

SRS	Savannah River Site
SVOA	semivolatile organic analyte
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
VOA	volatile organic analyte
VOC	volatile organic compound

D-1. INTRODUCTION

The ecological risk assessment (ERA) presented in this appendix supports the Early Construction and Operational Disposal Site (ECODS) N-1 (No Building Number [NBN]), Central Shops Scrap Lumber Pile (631-2G) (CSSLP), and Ford Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (OU). From this point forward, the investigation area will be referred to as the ECODS N-1, CSSLP, and Ford Building OU.

The ERA process is in accordance with the conceptual site model (CSM) presented in Section 2.3. The CSM is a graphical depiction of the known and suspected sources of contamination within the ECODS N-1, CSSLP, and Ford Building OU, the types of contaminants and potentially affected media, the known and potential routes of migrations, and the potential ecological receptors, including terrestrial and aquatic/semi-aquatic receptors. Concentrations of constituents present in sediment, soil, and surface water are screened in a multi-step process to screening values to determine the potential for impact to either of these receptor groups.

The ECODS N-1, CSSLP, and Ford Building OU is comprised of three subunits (Figure D-1); the ERA is conducted and presented for all of these subunits. Subunits represent geographically distinct locations within the ECODS N-1, CSSLP, and Ford Building OU, each of which contain 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. The subunits include the ECODS N-1 Subunit, the CSSLP Subunit (Upland Area and Surface Water Impoundment Area), and the Ford Building Subunit

Figure D-2 presents sampling locations and layout of the ECODS N-1 Subunit. Figure D-3 presents sampling locations at the CSSLP Upland and CSSLP Surface Water Impoundment Area, and Figure D-4 presents sampling locations associated with the Ford Building.

D-1.1 Background

As previously mentioned, the ECODS N-1, CSSLP, and Ford Building OU consists of three subunits.

D-1.1.1 ECODS N-1 (NBN)

The ECODS N-1 subunit is located just south of N Area in relatively flat terrain, approximately 23 m (75 ft) south of the railroad tracks, which run adjacent to N Area (Figure D-1). The area surrounding the ECODS N-1 subunit is wooded with heavy underbrush. It contains no stressed vegetation or other visual indications of contamination. The ECODS N-1 subunit was used to dispose of materials associated with the construction and operation of N Area. The ECODS N-1 subunit was in use from August 1952 to June 1954. The subunit is approximately107 m (350 ft) long by 15 m (50 ft) wide. Waste disposed of in ECODS N-1 was buried in two trenches, each approximately 46 m (150 ft) long, located end to end.

Figure D-2 shows the sampling locations for the ECODS N-1 subunit.

D-1.1.2 Central Shops Scrap Lumber Pile (631-2G)

The CSSLP subunit was historically used as an equipment laydown and rubble storage area in addition to an area for burning construction related materials. Various unknown amounts and types of wood scrap were burned at the CSSLP subunit which may have included treated lumber and/or creosote-treated wood. The CSSLP subunit surface water impoundment area was constructed between 1992 and 1994 in the southern portion. Surface water runoff from the CSSLP subunit upland soil area flows into the CSSLP subunit surface water impoundment area. The U.S. Department of Energy (USDOE), the U.S. Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC) agreed in project scoping meetings conducted in December 2019 and August 2021 to address the surface water impoundment area and upland soil together as the CSSLP subunit. The CSSLP subunit as a whole measure approximately 91.4 m (300 ft) by 91.4 m (300 ft) and covers about 0.84 ha (2.07 ac).

Figure D-3 shows the sampling locations for the CSSLP subunit.

D-1.1.3 Ford Building

The Ford Building was constructed in the 1950s and performed multiple missions while active until the 1990s. At points in the building's history, it was used to test Ford Company-manufactured motor control packages, and repair/rework of leaking contaminated process water heat exchangers

for Savannah River Site's (SRS) reactors. After completion of active missions, the building and surrounding area was used to store excess equipment (in waste containers [e.g., Sealands] and/or bagged/wrapped in plastic) that was chemically and/or radiologically contaminated. The Ford Building is located on the southeastern side of N Area, within the facility boundary.

In 2019, representatives from the Department of Energy, USEPA, and SCDHEC reached agreement that the Ford Building (690-N), excluding the building slab, would undergo D&D using the Integrated Sampling Model (ISM) (SRNS 2019a). Following D&D, an engineered concrete cap was installed, extending out 0.3 m (1 ft) from the building edge (SRNS 2019, 2021). Post-decommissioning facility remnants (including the building slab) will be closed as part of the ECODS N-1, CSSLP, and Ford Building OU. Ancillary equipment and other areas that will also be included in the closure process of this OU are the remnants of 1) a 13.8 kilovolt (kV) Substation (652-44N), 2) a Fuel Oil Tank Containment Dike, 3) a Shielding Remnant Area, and 4) the 745-N Excess Equipment Yard (Figure D-4). These four areas were included in the Contaminant Fate and Transport modelling for the surrounding soils of the Ford Building subunit. The fuel oil tank has been removed and only the concrete dike remains. The 13.8 kV substation has been dismantled and only the concrete pad and retention walls remain. The surrounding soils of the Ford Building subunit cover an area that is approximately 145 m by 154 m (475 ft by 505 ft) and is approximately168 ha (416 ac).

The risk assessment considers environmental media associated with the ECODS N-1, CSSLP, and Ford Building subunits including surface and subsurface soil, as well as sediment/soil and surface water associated with the CSSLP Surface Water Impoundment Area.

D-1.2 Data

Characterization activities for soil, sediment, and surface water media were conducted at the ECODS N-1, CSSLP, and Ford Building OU in 2001, 2014, and 2019. A sampling and analysis plan was developed to address remaining data gaps and characterization activities were implemented from September 2020 through October 2020 (SRNS 2020).

Groundwater is not part of this OU. Groundwater will be investigated and remediated, as applicable, under the Central Shops Groundwater OU.

All data used in the ERA for the ECODS N-1 are presented in Appendix A. The ProUCL (USEPA 2015) software package was used to calculate the 95% upper confidence limit (UCL) on the arithmetic mean; these data are presented in Appendix A. The data distribution and recommended 95%UCL as determined by ProUCL for each constituent are presented as footnotes to the tables in Appendix A. Non-detected constituent concentrations were processed in accordance with the ProUCL User's Guide. The Data Usability Reports (DURs) for the 2019 Pre-Workplan Characterization Samples and the 2020 Workplan Characterization Samples are presented in Appendix J. The reports provide an assessment of the precision, accuracy, representativeness, comparability, and completeness data quality indicators and measurement performance criteria. The DURs concluded that that the data quality objectives were met, and that the data is considered usable for the purposes of decision-making in the RI/BRA. In addition, the Site Evaluation Report for Early Construction and Operational Disposal Site (ECODS) N 1 (U) presents a Laboratory Quality Discussion (Section IV) and a Site Evaluation Validation Report (Section V) for the samples that were collected in 2001 (WSRC 2001).

D-1.2.1 ECODS N-1 (NBN)

In 2019, a pre-Work Plan characterization effort collected soil samples at the surface (0 to 0.3-m [0 to 1 ft]), shallow subsurface (0.3 to 1.2-m [1 to 4 ft]), and deep subsurface (2.4 to 3-m [8 to 10 ft]) soils at fourteen locations for TAL analysis (Figure D-2). Sample locations were biased to locations that exceeded the screening criteria in the 2001 Site Evaluation report and to vertically and horizontally bound 2001 Site Evaluation locations with elevated metal results. Because of the site history of burning activities at ECODs N-1, hexavalent chromium (Cr+6) analyses were performed on the 2019 samples collected adjacent to the 2001 samples that showed elevated total chromium (Cr) levels at depth (2.4-3.0 m [8-10 ft]). Naturally occurring chromium that is present in the soil or in industrial debris may be oxidized during burning to the more toxic form, hexavalent chromium.

The 2020 RFI/RI Workplan (SRNS 2020) characterization was also a biased sampling effort focusing on elevated metals sample locations within the ECODS N-1 unit and the need for subunit specific background samples. Twenty-four soil samples were collected from the ECODS N-1 subunit including surface samples (0.0 to 0.3 m [0 to 1 ft]), shallow subsurface samples (0.3 to

1.2 m [1 to 4 ft]), and deep subsurface samples (2.4 to 3.0 m [8 to 10 ft] and 3.0 to 3.6 m [10 to 12 ft]) from three locations inside the subunit and three background locations outside of the unit boundary. The 2020 characterization samples were analyzed for TAL metals (including hexavalent chromium) and visually examined for the presence of asbestos.

D-1.2.2 Central Shops Scrap Lumber Pile (631-2G)

D-1.2.2.1 Upland Area

In 2019, a pre-Work Plan characterization effort collected soil samples at the Scrap Lumber Pile (631-2G) 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 nineteen locations (Figure D-3). Sample locations were selected in a 30.5 m (100 ft) grid pattern to cover the area of the Scrap Lumber Pile (631-2G) subunit. The soil samples were analyzed for TAL, TCL, and radiological indicator parameters (gross alpha and nonvolatile beta) analyses. The CSSLP had not previously received any extensive characterization in the past.

The RFI/RI Workplan (SRNS 2020) characterization further defined the nature and extent of contamination at some 2019 sample locations and identified if elevated metal (including hexavalent chromium) results are due to native soil conditions or related to unit operations. Naturally occurring chromium that is present in soil or in industrial debris may be oxidized during burning to the more toxic form, hexavalent chromium. At six (6) locations inside the CSSLP subunit and three (3) background locations outside of the unit boundary, thirty (30) soil samples were collected in 2020. Sample locations within the subunit focused on previously identified locations of elevated metal concentrations. The following four (4) soil intervals were sampled: surface samples (0.0 to 0.3-m [0 to 1 ft]), shallow subsurface samples (0.3 to 1.2 m [1 to 4 ft]), and deep subsurface samples (2.4 to 3.0 m [8 to 10 ft] and 3.0 to 3.6 m [10 to 12 ft]). All soil samples were analyzed for TAL metals analyses, including hexavalent chromium, because of the history of burning material and the elevated 2019 chromium results.

D-1.2.2.2 CSSLP Surface Water Impoundment Area

In 2020, a Work Plan characterization effort collected sediment at the surface (0 to 0.3 m [0 to 1 ft]) and shallow subsurface (0.3 to 1.2 m [1 to 4 ft]), and surface water (filtered and unfiltered) at the CSSLP Subunit Surface Water Impoundment Area (Figure D-3). The sediment samples were analyzed for TAL and radiological indicator parameters (gross alpha and nonvolatile beta) analyses. Because of the site history of burning activities at ECODs N-1, hexavalent chromium (Cr+6) analyses were performed on the sediment samples.

The surface water samples (unfiltered and filtered) were analyzed for TAL and radiological indicator parameters (gross alpha and nonvolatile beta) analyses. Because of the site history of burning activities at ECODs N-1, hexavalent chromium (Cr+6) analyses were performed on the surface water samples.

D-1.2.3Ford Building

As part of the 2019 pre-Work Plan characterization effort, 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 locations (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 subunit (Figure D-4):

- At the Excess Equipment Yard (745-N), eleven locations in a 10 m to 15 m (30 ft to 50 ft) grid pattern to cover the area and at one deeper subsurface location (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]) soil samples;

- At the Ford Building, sixteen locations around the exterior of the Ford Building, the 13.8 kV Substation, and the Fuel Oil Tank Containment Dike using a biased sampling plan for areas of suspected contamination. Surface (0 to 0.3 m [0 to 1 ft]) soil and shallow subsurface (0.3 to 1.2 m [1 to 4 ft]) soil samples were collected at all sixteen locations;

- At the Ford Building, three of the sixteen locations soil samples were also collected at 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] depth intervals;

- Eleven sample locations around the shielding remnant area using a biased sampling plan for areas of suspected contamination; a deeper subsurface at one location (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]) soil samples were collected.

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 (gross alpha and nonvolatile beta) analyses.

D-1.3 Habitats/Receptors/Preliminary Assessment and Measurement Endpoints

The ECODS N-1, CSSLP, and Ford Building OU includes soil in the ECODS N-1, CSSLP, and Ford Building subunits, and sediment/soil and water and in the Surface Water Impoundment Area associated with the CSSLP. The ecological setting species, including habitats, wildlife, and Threatened and Endangered Species (TES), are discussed in Section 2.1.

The habitats within the ECODS N-1, CSSLP, and Ford Building OU support both terrestrial and aquatic/semi-aquatic receptors. The media of concern is primarily soil (ECODS N-1, CSSLP, and Ford Building), and sediment and surface water (CSSLP Surface Water Impoundment Area).

Assessment endpoints are tailored to groups of organisms with similar feeding strategies and/or exposure scenarios appropriate for the ECODS N-1, CSSLP, and Ford Building OU. Based on these considerations, the following assessment and measurement endpoints and their representative receptors were selected as discussed below.

- Protection of terrestrial autotrophs (plants) to maintain habitat structure and functional base for terrestrial animals. Plants are a food source for many animals and have direct exposure to contaminated soil. The use of a "generic" plant as receptor is indicative of the broad concern for plants in general and the role they play in the ecosystem rather than any particular species. The measurement endpoint is a comparison of the measured constituent concentration in soil to generic plant toxicity benchmarks. This preliminary comparison is expressed as a hazard quotient (HQ) calculation based on the screening of ECODS N-1, CSSLP, and Ford Building OU data summarized in Appendix A.

- Protection of soil-dwelling invertebrate communities to maintain species diversity and nutrient cycling. Soil-dwelling invertebrate communities are selected because the soil invertebrate community is ecologically important, is susceptible to constituents in soil, and may be exposed at the ECODS N-1, CSSLP, and Ford Building OU. The soil-dwelling invertebrate community is essential for decomposition of detritus, for energy and nutrient cycling, and is an important component of the diet of insectivorous mammals and birds. Earthworms are chosen as the representative species of soil-dwelling invertebrates because they are important in promoting soil fertility, are highly exposed to soil constituents, and toxicity information is available. The measurement endpoint is a comparison of the measured constituent concentration in soil-to-earthworm toxicity benchmarks. This preliminary comparison is expressed as a HQ calculation based on the screening of ECODS N-1, CSSLP, and Ford Building OU data summarized in Appendix A.

- Protection of herbivorous mammal communities to ensure that exposure of contaminants in forage and soils does not have a negative impact on growth, survival, and reproduction. Herbivorous mammals are ecologically important because they provide a food base for higher trophic level receptors and are susceptible to soil constituents within the ECODS N-1, CSSLP, and Ford Building OU. Rabbits are chosen as the representative species of herbivorous mammals because they are exposed to soil constituents by their consumption of plant material, and they ingest soil during feeding. This preliminary comparison is expressed as an HQ calculation based on the screening of ECODS N-1, CSSLP, and Ford Building OU data summarized in Appendix A.

- Protection of insectivorous mammal communities to ensure that exposure of contaminants in prey, forage, and soils does not have a negative impact on growth or survival. Insectivorous mammals are ecologically important because they help to control the size of the terrestrial invertebrate population that might otherwise damage populations of plant primary producers. They also are susceptible to soil constituents within the ECODS N-1, CSSLP, and Ford Building OU. Shrews are chosen as the representative species of the insectivorous mammals because they are highly exposed to constituents by their consumption of large quantities of terrestrial invertebrates. They also ingest soil during feeding, including soil within the bodies of earthworms and other prey. This preliminary comparison is expressed as an HQ calculation

based on the screening of ECODS N-1, CSSLP, and Ford Building OU data summarized in Appendix A.

- Protection of omnivorous mammal communities to ensure that exposure of contaminants in prey, forage, and abiotic media does not have a negative impact on growth, survival, and reproduction. Mammalian omnivores are ecologically important because they consume a variety of small mammals and plants, helping balance the populations of terrestrial invertebrates, rodents, and other small mammals as well as disperse seeds for plant reproduction. They also are susceptible to soil constituents at the waste unit. The mouse was chosen as the representative receptor because of its omnivorous food habits and largely to represent the importance of rodents as a food source for higher consumers (carnivores and omnivores), making it important in the functional food web. They are ubiquitous, abundant, and ingest soil during feeding, including soil within the bodies of earthworms and other prey. This preliminary comparison is expressed as an HQ calculation based on the screening of ECODS N-1, CSSLP, and Ford Building OU data summarized in Appendix A.

- Protection of insectivorous, herbivorous, and omnivorous bird communities to ensure that exposure of contaminants in prey, forage, surface water, and soils does not have a negative impact on growth, survival, and reproduction. Insectivorous birds are ecologically important because they help to control the size of the terrestrial invertebrate population that might otherwise damage populations of plant primary producers. American robins are chosen as the representative terrestrial species because they are representative of birds that forage for ground-dwelling invertebrates and fruits, with a relatively high potential exposure to contaminants from its diet. The American robin is considered in several functional roles for avian receptors: an insectivore, herbivore, and omnivore. They also ingest soil during feeding, including soil within the bodies of earthworms and other prey. The violet-green swallow is selected as the representative avian aerial insectivore because 100 percent of its diet can be assumed to come from emergent aquatic insects, which allows for the consideration of bioaccumulation from aquatic sources to a high-level avian receptor. This preliminary comparison is expressed as an HQ calculation based on the screening of ECODS N-1, CSSLP, and Ford Building OU data summarized in Appendix A.

- Protection of aerial insectivorous mammal communities to ensure that exposure of contaminants in prey, forage, and surface water does not have a negative impact on growth, survival, and reproduction. Aerial insectivorous mammals are ecologically important because they help to control the size of the invertebrate population that might otherwise damage populations of plant primary producers. They also are susceptible to soil or water constituents within the ECODS N-1, CSSLP, and Ford Building OU. Bats are chosen as the representative species of the aerial insectivorous mammal niche because they are exposed to constituents by their consumption of flying invertebrates, and they utilize aquatic habitats as a source of water. Bats provide a beneficial service by foraging on flying insects, many of which are pests. They also eat large numbers of moths and beetles that cause agricultural damage. Bats will opportunistically roost and forage in various habitats. This comparison is expressed as an HQ calculation based on the screening of the ECODS N-1, CSSLP, and Ford Building OU data summarized in Appendix A.

- Protection of carnivorous bird communities to ensure that exposure of contaminants in prey does not have a negative impact on growth, survival, and reproduction. American kestrels are selected as the representative species because abundant information has been gathered concerning the kestrel's biology and it represents an organism with high susceptibility to contaminant biomagnification from soil via terrestrial pathways. The American kestrel is considered in two functional roles for avian receptors, intermediate carnivore and top carnivore. This comparison is expressed as an HQ calculation based on the screening of the ECODS N-1, CSSLP, and Ford Building OU data summarized in Appendix A.

- Protection of top carnivorous mammal communities to ensure that exposure of contaminants in prey does not have a negative impact on growth, survival, and reproduction. Carnivorous mammals are ecologically important because they maintain ecosystem structure and function by feeding on primary consumers (herbivores), reducing the impacts of herbivory. The red foxes are selected as the representative top carnivore because they represent a mammal with a relatively high contaminant biomagnification potential due to their largely carnivorous feeding habits. This comparison is expressed as an HQ calculation based on the screening of the ECODS N-1, CSSLP, and Ford Building OU data summarized in Appendix A.

- Protection of benthic invertebrate (sediment dwelling organism) communities from toxic effects of contaminants to maintain species diversity, biomass, and nutrient cycling (trophic structure). Identification of a specific receptor for this endpoint is not necessary. The benthic invertebrate community is ecologically important, serving as prey items for many other species as well as maintaining nutrient cycling in an aquatic system. Benthic organisms also are susceptible to constituents in sediment and are potentially exposed within the CSSLP subunit. The measurement endpoint is the measured concentration in sediment media compared to sediment toxicity threshold values. This preliminary comparison is expressed as an HQ calculation based on the screening of the CSSLP subunit.

- Protection of aquatic organism communities from the toxic effects of contaminants in abiotic media and food to maintain species diversity and ensure that ingestion of contaminants in fish and aquatic invertebrates do not have a negative impact on growth, survival, and reproduction. The aquatic community is ecologically important, serving as prey items for many species. Aquatic organisms are susceptible to constituents in surface water and are potentially exposed to contamination within the CSSLP subunit. The measurement endpoint is the measured concentration in surface water media compared to ambient water quality criteria (AWQC). This preliminary comparison is expressed as an HQ calculation based on the screening of the CSSLP subunit (data summarized in Appendix A).

The preliminary CSM for the ECODS N-1, CSSLP, and Ford Building OU is provided in Section 2.3. Data used in this evaluation are provided in Appendix A of this document.

D-1.4 Sources of Literature-Based Thresholds

Ecological threshold levels are media- 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 potential contaminants based on No Observed Adverse Effect Level (NOAEL) and Low Observed Adverse Effect Level (LOAEL) thresholds. The ECODS N-1, CSSLP, and Ford Building OU ecological screening values (ESVs) are used in the initial screening-level effects evaluation and 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 media constituents.

The threshold values used for the ESV and RSV assessments were derived from three sources: 1) the U.S. Environmental Protection Agency (USEPA) Region 4 Ecological Risk Assessment Supplement Guidance March 2018 Update (USEPA 2018); 2) the Los Alamos National Laboratory (LANL) ECORISK Database Tool (LANL 2017; and 3) the South Carolina Department of Health and Environmental Control (SCDHEC), R.61-68, Water Classifications and Standards (SCDHEC, 2020). A brief discussion of the hierarchy of values and generic methodology used to derive values in these sources follows:

- The USEPA Region 4 Ecological Risk Assessment Supplement Guidance March 2018 Update (USEPA 2018) provides threshold values for hazardous waste sites for surface water (Table 1a), sediment (Tables 2a, b, and c), and soil (Table 3) for non-radiological constituents and is provided in Attachment D-2.
    - The hierarchy of surface water values compiled in Table 1 is as follows: National Recommended Surface Water Criteria (NWQC), Tier 2 values or equivalent from the Great Lakes Initiative, state surface water standards, Suter and Tsao 1996 values, Canadian water quality values, the minimum value from either the Target Lipid Model or Ecological Structure Activity Relationship model, and the Office of Pesticide Programs Aquatic Life Benchmarks. In general, the most conservative was selected as the ESV. For the NWQC, the chronic AWQC value for the protection of aquatic life was used as the screening value. Table 1 chronic values are used for both the screening and refinement level assessments.
    - The sediment screening values in Table 2 are derived from the statistical interpretation of effects databases obtained from the literature. These benchmarks are generally based on observations of direct toxicity to benthic organisms. Table 2 provides both ESVs (for the screening level assessment) and RSVs (for the refinement level assessment).
    - The soil screening values in Table 3 typically address toxicity through direct exposure (i.e., toxicity to soil invertebrates such as earthworms, plants, and wildlife). The hierarchy for soil benchmarks is as follows: EPA Ecological Screening levels, U.S. Department of Energy laboratories (i.e., Los Alamos National Laboratory [LANL] and Oak Ridge

National Laboratory), and equilibrium partitioning modeled values for organic chemicals. Table 3 provides only a screening level threshold.

- LANL developed the ECORISK Database Tool (LANL 2017) to document and archive ecological screening levels. The LANL database tool includes thresholds for soil, sediment, and surface water. LANL develops literature-based toxicity reference values (TRVs) for various chemical exposure pathways and using the derived TRVs as well as dose rates (for radionuclides) and other benchmarks, LANL calculated No Effect and Low Effect ecological screening levels (ESLs) for various media and receptors. Details of this process are described in Toxicity Reference Value Development Methods for the Los Alamos National Laboratory, Revision 1 (LANL 2014). The ECORISK Database Tool compiles the resulting No Effect and Low Effect ESLs by media (surface water, sediment, soil) and receptor. The minimum ESL available from all receptors for a given media and constituent was used as the threshold level as follows: the minimum No Effect ESL was used as the threshold for the screening level assessment, and the minimum Low Effect ESL was used as the threshold for the refinement level assessment. Copies of the screening value tables used in this evaluation are provided in Attachment D-3 of this appendix.

- An additional source of threshold values used only for the assessment of surface water is the South Carolina Department of Health and Environmental Control, R.61-68, Water Classifications and Standards (freshwater aquatic life chronic values) regulation (SCDHEC 2020). These thresholds were used for both the screening level and refinement level assessments. The thresholds for select metals were not hardness adjusted since the ambient hardness is less than 25 mg/L (as $CaCO_3$). A copy of this regulation is provided in Attachment D-4.

The screening values derived from these sources are compared in the tables that are presented in Attachment D-1. All ESVs for a given constituent are identified by source, with the most conservative (i.e., lowest selected screening value) highlighted in yellow. The tables are as follows:

- Table I.A. SOIL MEDIA Screening Level (No Effect Screening Level)

- The source of the "EPA R4 Soil" column is the Screening Level column from EPA Table 3 for soils
- The source of the "LANL Soil" column is the No Effect ESL for soil from Attachment D-3 LANL ECORISK Database table of No Effects Ecological Screening Levels and Low Effects Ecological Screening Level

- Table I.B. SOIL MEDIA Refinement Level (Low Effect Screening Level)
  - There are no EPA Region 4 RSV values for soil, so "NA" is listed under "EPA R4 Soil"
  - The source of the "LANL Soil" column is the Low Effect ESL for soil from Attachment D-3 LANL ECORISK Database table of No Effects Ecological Screening Levels and Low Effects Ecological Screening Level

- Table II.A. SEDIMENT MEDIA Screening Level (No Effect Screening Level)
  - The source of the "EPA R4 Sediment" column is the Freshwater Sediment Screening Value ESV column from USEPA Table 2 for sediment
  - The source of the "EPA R4 Soil" column is the Screening Level column from USEPA Table 3 for soils
  - The source of the "LANL Sediment" column is the No Effect ESL for sediment from Attachment D-3 LANL ECORISK Database table of No Effects Ecological Screening Levels and Low Effects Ecological Screening Level
  - The source of the "LANL Soil" column is the No Effect ESL for soil from Attachment D-3 LANL ECORISK Database table of No Effects Ecological Screening Levels and Low Effects Ecological Screening Level

- Table II.B. SEDIMENT MEDIA Refinement Level (Low Effect Screening Level)
  - The source of the "EPA R4 Sediment" column is the Freshwater Sediment Screening Value RSV column from EPA Table 2 for sediment
  - There are no EPA Region 4 RSV values for soil, so "NA" is listed under "EPA R4 Soil"

- The source of the "LANL Sediment" column is the Low Effect ESL for sediment from Attachment D-3 LANL ECORISK Database table of No Effects Ecological Screening Levels and Low Effects Ecological Screening Level
- The source of the "LANL Soil" column is the Low Effect ESL for soil from Attachment D-3 LANL ECORISK Database table of No Effects Ecological Screening Levels and Low Effects Ecological Screening Level

- Table III.A. SURFACE WATER MEDIA Screening Level (Chronic/No Effect Screening Level)
  - The source of the "SCDHEC WQS" column is the Freshwater Aquatic Life Criterion Continuous Concentration (CCC) column from the SCDHEC regulation
  - The source of the "EPA R4 Surface Water" column is the Freshwater Screening Values Chronic column from EPA Table 1 for surface water
  - The source of the "LANL Surface Water" column is the No Effect ESL for surface water from Attachment D-3 LANL ECORISK Database table of No Effects Ecological Screening Levels and Low Effects Ecological Screening Level

- Table III.B. SURFACE WATER MEDIA Refinement Level (Chronic/Low Effect Screening Level)
  - The source of the "SCDHEC WQS" column is the Freshwater Aquatic Life CCC column from the SCDHEC regulation
  - The source of the "EPA R4 Surface Water" column is the Freshwater Screening Values Chronic column from EPA Table 1
  - The source of the "LANL Surface Water" column is determined as follows: If the lowest of the LANL values from Attachment D-3 LANL ECORISK Database table of No Effects Ecological Screening Levels and Low Effects Ecological Screening Level is for protection of aquatic communities, the No Effect ESL is used; if the lowest of the LANL values is for wildlife receptors, the Low Effect ESL is used

D-2. ECOLOGICAL RISK ASSESSMENT PROCESS

This ECODS N-1, CSSLP, and Ford Building OU ERA consists 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 for the ECODS N-1, CSSLP, and Ford Building OU includes a screening-level ecological effects evaluation (Section D.2.1) in which constituent concentrations in soil, sediment, or surface water media are compared to relevant ecological screening levels; constituents that exceed ESVs or that have no ESV are considered contaminants of potential ecological concern (COPECs). Frequency of detection is also considered during the ESV screening step. COPECs that result from the screening-level evaluation are carried forward to a refinement-level risk (hazard) calculation (Section D.2.2) in which refinement level HQs are calculated for each COPEC. The refinement level screening is based on LOAEL or chronic level thresholds and the 95% upper confidence level (UCL) on the mean. Constituents that fail the refinement level screening are considered constituents of potential concern (COPCs). Uncertainties associated with the screening thresholds, background concentrations, nature and extent of contamination, age of data, or contaminants that result from the screening and refinement processes are discussed in an uncertainty evaluation presented in Section D.2.3. The uncertainty discussion concludes with a determination of whether the constituent should or should not be considered a refined constituent of concern (RCOC). If RCOCs are identified, final action consideration is warranted.

D-2.1 Screening-Level Effects Evaluation

The purpose of the ecological screening-level effects evaluation for the ECODS N-1, CSSLP, and Ford Building OU is to conduct a conservative screen to identify constituents that may pose unacceptable risk to ecological receptors. The screening level evaluation is the initial step in determining constituents that require further evaluation. Screening is conducted by comparing the maximum concentration to the ESVs found in Attachment D-1 Tables I.A, II.A and III.A and to two times the average SRS background level (for soil and sediment media only). The maximum and data summary statistical values for each constituent with detected results for each subunit are presented in Appendix A as follows:

ECODS N-1

- Table A.1.1. ECODS N-1 Subunit Soil (0 to 1 ft)
- Table A.1.2. ECODS N-1 Subunit Soil (1 to 4 ft)
- Table A.1.4. Background ECODS N-1 Subunit Soil (0 to 1 ft)
- Table A.1.5. Background ECODS N-1 Subunit Soil (1 to 4 ft)

CSSLP

- Table A.2.1. CSSLP Subunit Soil (0 to 1 ft)
- Table A.2.2. CSSLP Subunit Soil (1 to 4 ft)
- Table A.2.4. Surface Water Impoundment Area Sediment/Soil (0 to 1 ft)
- Table A.2.7. Surface Water Impoundment Area Surface Water (Unfiltered)
- Table A.2.8. Surface Water Impoundment Area Surface Water (Filtered)
- Table A.2.9. Background CSSLP Subunit Soil (0 to 1 ft)
- Table A.2.10. Background CSSLP Subunit Soil (1 to 4 ft)
- Table A.2.12. Background Surface Water Impoundment Area Sediment – Carolina Bay (0 to 1 ft)
- Table A.2.15. Background Surface Water Impoundment Area Surface Water – Carolina Bay (Unfiltered)

Ford Building

- Table A.3.1. Ford Building Subunit Soil (0 to 1 ft)
- Table A.3.2. Ford Building Subunit Soil (1 to 4 ft)

The background data used in the screening level effects evaluation for both soil and sediment are taken from *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006). The report provides statistical summaries for many naturally occurring constituents at SRS. No background screen is performed for the surface water media.

Since maximum media concentrations are used in this step of the process, the assumption is made that ecological receptors are exposed to the highest (i.e., worst) concentration of a given constituent present at the unit. The combination of maximum media concentrations and conservative threshold values provide confidence that the COPCs resulting from the screenings are indeed protective.

Constituents that are recognized as essential nutrients (calcium, magnesium, potassium, and sodium) are identified as such and are not subject to further evaluation. These constituents are deemed necessary for life processes, therefore, consumption from natural sources is deemed to not be detrimental.

The ecological effects evaluation identifies the potential for adverse ecological effects based on conservative assumptions. The most conservative value (i.e., lowest concentration) between the EPA Region 4 and the NOAEL-based LANL values are used to conduct the screening level assessment. For the evaluation of surface water media, the June 2020 SCDHEC water quality standards (chronic values) also are considered.

D-2.1.1 ESV Screening - Soil Media

The screening level evaluation process is outlined below:

- Compare the unit maximum detected concentration to the ESV concentration (No Effect Screening Level) for the surface interval (0 to 1 ft) and subsurface interval (1 to 4 ft) and calculate a screening level HQ for each interval. HQ = Maximum Detected Concentration/ESV
- Compare the unit maximum concentration of the naturally occurring (non-anthropogenic) constituents for each interval to two times the average SRS background concentration (WSRC 2006)

- Constituents exceeding the ESV (HQ >1) or with no ESV, and exceeding the background screen, are identified as COPECs and are carried forward to step D.2.2. Constituents that are not identified as COPECs are dropped from further evaluation

D-2.1.2 ESV Screening - Sediment Media

The screening-level evaluation process is outlined below:

- Compare the unit maximum detected concentration to the ESV concentration (No Effect Screening Level) for the surface interval (0 to 1 ft) and calculate a screening level HQ = Maximum Detected Concentration/ESV

- Compare the unit maximum concentration of the naturally occurring (non-anthropogenic) constituents to two times the average SRS background concentration (WSRC 2006)

- Constituents exceeding the ESV (HQ >1) or with no ESV and exceeding background screen are identified as COPECs and are carried forward to step D.2.2. Constituents that are not identified as COPECs are dropped from further evaluation

D-2.1.3 ESV Screening - Surface Water Media

The screening-level evaluation process is outlined below:

- Compare the unit maximum concentration to the ESV concentration (AWQC chronic values or No Effect ESL) and calculate a screening level. HQ = Maximum Detected Concentration/ ESV

- Constituents exceeding the ESV (HQ > 1) or with no ESV are identified as COPECs and are carried forward to step D.2.2. Constituents that are not identified as COPECs are dropped from further evaluation

Tables summarizing the ecological screening-level effects evaluation for the ECODS N-1, CSSLP, and Ford Building OU are as follows:

- Table D-1 (for soil, 0 to 1 ft interval in the ECODS N-1 Subunit)

- Table D-3 (for soil, 1 to 4 ft interval in the ECODS N-1 Subunit)
- Table D-5 (for soil, 0 to 1 ft interval in CSSLP Subunit)
- Table D-7 (for soil, 1 to 4 ft interval in the CSSLP Subunit)
- Table D-9 (for sediment/soil, 0 to 1 ft interval in Surface Water Impoundment Area)
- Table D-11 (for surface water, unfiltered, in the Surface Water Impoundment Area)
- Table D-13 (for surface water, filtered, in the Surface Water Impoundment Area)
- Table D-15 (for soil, 0 to 1 ft interval in the Ford Building Subunit)
- Table D-17 (for soil, 1 to 4 ft interval in the Ford Building Subunit

The refinement tables are discussed below in Section D.2.2.

D-3. REFINEMENT-LEVEL RISK (HAZARD) CALCULATION

The refinement evaluation uses the RSVs found in Attachment D-1 Tables I.B, II.B, and III.B. Because of the conservative approach of the initial screening level evaluation (i.e., ESV screening), some of the constituents identified for further evaluation may or may not pose a possible unacceptable risk to ecological receptors. The refined screening process applies a more realistic and holistic approach to screening to further refine the list to those constituents that require further discussion and scrutiny. The method used to further refine ecological COPCs is based on the calculation of a refinement-level HQ by comparing the Exposure Point Concentration (EPC) to a LOAEL RSV. LOAEL-based RSVs are derived from Low Effect ESLs. The EPC is represented by the lower of the 95% UCL on the mean and maximum detected concentrations. Calculation of the HQ is illustrated in the equation below:

$$HQ = EPC/(LOAEL - based\ RSV)$$

Constituents with an HQ >1 are further discussed in Section D.2.3.

D-3.1 RSV Screening - Soil Media

For the COPECs identified in Section D.2.1.1, the refinement level process is outlined below:

- Calculate a refinement level HQ using the EPC and RSV (LOAEL-based ESL)
- Constituents with refinement levels HQ > 1 or with no RSV are identified as COPCs and are carried forward to Section D.2.3. Constituents that are not identified as COPCs are dropped from further evaluation

D-3.2 RSV Screening - Sediment Media

For COPECs identified from Section D.2.1.2, the refinement level process is outlined below:

- Calculate a refinement level HQ using the EPC and RSV (LOAEL-based ESL)
- Constituents with refinement levels HQ > 1 or with no RSV are identified as COPCs and are carried forward to Section D.2.3. Constituents that are not identified as COPCs are dropped from further evaluation

D-3.3 RSV Screening - Surface Water Media

For the COPECs identified from Section D.2.1.3, the refinement level process is outlined below:

- Calculate a refinement level HQ using the EPC and RSV (chronic value for AWQC, LOAEL ESL for wildlife receptors)
- Constituents with refinement levels HQ > 1 or with no RSV are identified as COPCs and are carried forward to Section D.2.3. Constituents that are not identified as COPCs are dropped from further evaluation

D-3.4 Results/Refinement of Constituents of Concern

The refinement level risk calculation is based, in general, on LOAEL or chronic level thresholds. Constituents that fail the refinement level screening are considered COPCs. Tables summarizing

the ecological refinement level effects evaluation for the ECODS N-1, CSSLP, and Ford Building OU subunits are as follows:

- Table D-2 (for soil 0 to 1 ft interval in the ECODS N-1 Subunit)
- Table D-4 (for soil 1 to 4 ft interval in the ECODS N-1 Subunit)
- Table D-6 (for soil 0 to 1 ft interval in CSSLP Subunit)
- Table D-8 (for soil 1 to 4 ft interval in the CSSLP Subunit)
- Table D-10 (for sediment/soil 0 to 1 ft interval in the Surface Water Impoundment Area)
- Table D-12 (for surface water unfiltered in the Surface Water Impoundment Area)
- Table D-14 (for surface water filtered in the Surface Water Impoundment Area)
- Table D-16 (for soil 0 to 1 ft interval in the Ford Building Subunit)
- Table D-18 (for soil 1 to 4 ft interval in the Ford Building Subunit)

Uncertainties associated with the screening thresholds, background concentrations, nature and extent of contamination, age of data, or contaminants that result from the screening and refinement processes are discussed in an uncertainty evaluation presented below. The uncertainty discussion concludes with a determination of whether the constituent is considered a RCOC. The major categories of uncertainty used in this evaluation and the major emphasis include the following:

- Unit related uncertainty, which includes uncertainties related to the nature and extent of contamination, consistency with history of use, and presence in background
- Data quality uncertainty and risk assessment uncertainties which includes uncertainties related to data quality and physical characteristics
- Risk assessment uncertainty which includes uncertainties related to toxicity data and changes in constituent activity concentrations due to radioactive decay

Using the three-step process described above, results of the ecological risk assessment are presented below by subunit.

In the uncertainty evaluation, exposure area concentrations are compared to background concentrations as one line of evidence to assist in the identification of RCOCs. A brief description of the primary sources of background information is provided below:

- Background datasets for ECODS N-1, CSSLP, and the CSSLP Surface Water Impoundment Area are provided in Appendix A. The tables identify the minimum, mean, and maximum concentrations (or activities) for detected results for the subunits and media listed below. A more thorough description of the OU background dataset is provided in Section 3.2.

  ECODS

  - Table A.1.6. Background ECODS N-1 Subunit Soil (All Depths)

  CSSLP

  - Table A.2.11. Background CSSLP Subunit Soil (All Depths)
  - Table A.2.14. Background Surface Water Impoundment Area Sediment – Carolina Bay (All Depths)
  - Table A.2.15. Background Surface Water Impoundment Area Surface Water – Carolina Bay (Unfiltered)

- *Background Soils Statistical Summary Report for the Savannah River Site* (WSRC 2006) provides statistical summaries for many naturally occurring constituents at SRS. The all-depth interval is the primary source of information used in this evaluation.

- The Integrator Operable Unit (IOU) background dataset identifies minimum, mean, and maximum concentrations (or activities) for surface water media. IOU background data were collected as part of the 2009/2010 characterization effort. The IOU background surface water dataset is published in Table A.1.10.2 of *Remedial Investigation/Baseline Risk Assessment for the Lower Three Runs Integrator Operable Unit (U)* (SRNS 2017).

As an additional line of evidence, toxicity uncertainty is addressed for radionuclides with no available ESLs by comparing unit activity concentrations to Tier 3 Biota Concentration Guides (BCGs) found in the RESidual RADioactivity (RESRAD) BIOTA database (Argonne National Laboratory [ANL] 2006), which is provided in Attachment D-6. The RESRAD Tier 3 values were generated by Savannah River National Laboratory based on the most conservative activity for each nuclide available for terrestrial animals and terrestrial plants for terrestrial systems, and aquatic animals and riparian animals for aquatic systems.

In this ecological risk assessment, average unit concentrations are given more significance than maximum concentrations since the wildlife receptors under consideration are not sedentary and their exposure is over a larger area than that encountered at a single sampling location. The exception to the assumption of non-sedentary behavior are soil invertebrates (i.e., earthworm), benthic organisms (for sediment media), and aquatic organisms (surface water). However, this is offset by the fact that the soil invertebrate, benthic organism, and aquatic organism endpoints are established at the community-level, and effects caused by a maximum concentration at a single location would not cause community-level impacts.

As a protective assumption appropriate for ecological risk screening, the area use factor (AUF) is set to 1 when calculating the HQ, making the conservative assumption that the animal receives all of its exposure from the contaminated site. This approach may overestimate risks to receptors whose home ranges are larger than the area of contamination being evaluated. To account for this overestimation of risk, the HQ can be modified by applying a population area use factor (PAUF), which uses the estimated area occupied by the population of a receptor species to assess the likelihood of any individual within the assessment population encountering the contaminated area. The PAUF is calculated based on the ratio of the subunit area to the known home range of the receptor (Mirenda 2012) to reflect the fact that receptors utilize an area beyond just the contaminated site. Calculated AUFs based on ECODS N-1, CSSLP, and Ford Building OU subunit areas can be found in Attachment D-8. AUF-adjusted HQs based on mean concentrations are discussed in the uncertainty section and presented in Attachment D-9.

D-3.4.1 ECODS N-1 Subunit

Results of the ESV screening (Step D.2.1), refinement-level risk calculations (Step D.2.2), and a discussion of associated uncertainties for each constituent of potential concern for the ECODS N-1 Subunit are provided below.

D-3.4.1.1 Screening Results for ECODS N-1 Subunit for Soil Media (0-1 ft)

Using maximum detected values, Table D-1 identifies the following constituents as COPECs based on ESV screening in the 0 to 1 ft soil interval evaluated for terrestrial receptors: Aroclor 1254, Aroclor 1260, bis(2-ethylhexyl)phthalate, copper, chromium, hexavalent chromium (from Method 7169A and Method 7199 analyses), cyanide, lead, mercury, nickel, vanadium, and zinc.

Sampling locations described for the ECODS N-1 Subunit are shown in Figure D-2.

D-3.4.1.2 Refinement Results for ECODS N-1 Subunit for Soil Media (0-1 ft)

Using EPC values (i.e., 95% UCL on the mean), Table D-2 identifies the following constituents as COPCs based on RSV screening in the 0 to 1 ft soil interval: bis(2-ethylhexyl)phthalate, cyanide lead, and vanadium.

D-3.4.1.3 Uncertainty Discussion for ECODS N-1 Subunit for Soil Media (0-1 ft)

An uncertainty analysis is performed for each COPC below, including an interpretive discussion of the lines of evidence and applicable uncertainty factors resulting in a recommendation whether the constituent should be considered an RCOC. HQ calculations for receptors that pertain to RSV exceedance from Section D.2.2 are referred to in this discussion and can be found in Attachment D-5, Table 1 for the 0-1 ft interval soil medium. AUF adjusted calculations are shown in Attachment D-9, Table 1. Sampling locations are provided in Figure D-2.

Bis(2-ethylhexyl)phthalate was detected in 15 of 24 samples with 12 J-qualified (i.e., estimated) results. In 2002, the maximum detected was 0.857 mg/kg at the ECN1-18 location. The mean detected concentration was 0.1011 mg/kg, and the EPC was 0.338 mg/kg. The mean is less than the RSV (0.2 mg/kg) while the EPC was greater.

The uncertainty evaluation (Attachment D-5, Table 1) shows HQ exceedances for the American robin (avian herbivore) HQ = 2.11E-03, American robin (avian omnivore) HQ = 8.45E-01, and American robin (avian insectivore) with a HQ >1.0, HQ = 1.69 using a protective AUF of 1 indicating the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of bis(2-ethylhexyl)phthalate, the resultant PAUF-adjusted HQ = 6.06E-07 (American robin, avian herbivore), HQ = 2.43E-04 (American robin, avian omnivore), and HQ = 4.85E-04 (American robin (avian insectivore) based on a 0.163 ha unit size for ECODS N-1 and a population area of 16.8 ha for the American robin. AUF adjusted calculations are shown in Attachment D-9, Table 1. The maximum background detected (0.746 mg/kg) at the ECN1-27 location (collected in 2001) is greater than the RSV (0.2 mg/kg). In addition, bis(2-ethylhexyl)phthalate is a common laboratory artifact and it is not likely unit related.

Bis(2-ethylhexyl)phthalate is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- The detected mean is within unit-specific background levels
- It is a common laboratory artifact
- PAUF-adjusted HQs were <1.0
- The RSV may be overly protective

Cyanide was detected in 9 of 27 samples with four J-qualified results. In 2001, the maximum detected concentration was 8.43 mg/kg at the ECN1-16 location. The detected mean was 0.9322 mg/kg, and the EPC was 1.546 mg/kg. The mean was less than the RSV (0.98 mg/kg). The uncertainty evaluation (Attachment D-5, Table 1) shows HQ exceedances for the American robin (avian herbivore) HQ = 1.55, American robin (avian omnivore) HQ = 1.56, and American robin (avian insectivore) HQ = 1.58 using a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of cyanide (0.9322 mg/kg), the resultant PAUF-adjusted HQ = 9.04E-03 for American robin, avian herbivore; HQ = 9.14E-03 for the American robin, avian omnivore; and HQ = 9.23E-03 for the American robin, avian insectivore. AUF adjusted calculations are shown in Attachment D-9, Table 1. The maximum unit-specific background detected was 0.7046 mg/kg at the ECN1-27 location (collected on 1/18/2001) (Table A.1.6).

Cyanide is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- Cyanide is naturally occurring
- The detected mean is less than the RSV
- The PAUF-adjusted HQs are <1

Lead was detected in 41 of 41 samples with two J-qualified (i.e, estimated) results, and a maximum of 1470 mg/kg at the ECN1-08 location. The mean detected concentration was 46.69 mg/kg and the EPC was 202.1 mg/kg. Both the mean and the EPC exceed the RSV of 23 mg/kg. The uncertainty evaluation presented in Attachment D-5, Table 1 shows HQ exceedances for the American robin (avian herbivore) HQ = 5.61, American robin (avian omnivore) HQ = 7.22, and American robin (avian insectivore) HQ = 8.79. The RSV HQ calculation is conducted using a protective assumption appropriate for risk screening where the area use factor (AUF) is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific population AUF (PAUF) (Mirenda 2012) using the mean concentration of lead, the resultant PAUF-adjusted HQ = 1.26E-02 (American robin, avian herbivore), HQ = 1.62E-02 (American robin, avian omnivore), and HQ = 1.97E-02 (American robin (avian insectivore). AUF adjusted calculations are shown in Attachment D-9, Table 1. Lead is naturally occurring. The maximum value for all depth intervals from SRS background soils (WSRC 2006) is 26.6 mg/kg which is less than the mean concentration at the unit (46.69 mg/kg). Background sampling associated with ECODS N-1 resulted in a maximum of 16.3 mg/kg for all depths at the ECN1-27 location (Table A.1.6).

Lead is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- Lead is naturally occurring
- The PAUF-adjusted HQs are <1

Vanadium was detected in 41 of 41 samples with six J-qualified results. The maximum, collected in 2001 from the ECN1-17 location, was 78.9 mg/kg. The detected mean was 31.61 mg/kg and the EPC 35.63 mg/kg. The RSV for vanadium is 9.5 mg/kg. The uncertainty evaluation (Attachment D-5, Table 1) shows HQ exceedances for the American robin (avian herbivore) HQ = 2.74, American robin (avian omnivore) HQ = 3.24, and American robin (avian insectivore) HQ

= 3.75 using a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of vanadium, the resultant PAUF-adjusted HQ = 2.36E-02 (American robin, avian herbivore), HQ = 2.79E-02 (American robin, avian omnivore), and HQ = 1.97E-02 (American robin (avian insectivore). AUF adjusted calculations are shown in Attachment D-9, Table 1. The maximum value for all depth intervals based on SRS background soil is 104 mg/kg, greater than unit maximum (WSRC 2006). The maximum unit background for vanadium is 75.3 mg/kg at the ECN1-25 location (Table A.1.6) which is lower than the unit maximum. However, the detected mean and EPC are less than unit background. Vanadium is naturally occurring and, with the detected mean value within background levels, and higher than the RSV, the screening threshold may be overprotective for this constituent.

Vanadium is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is naturally occurring
- Detected mean and EPC concentrations are within SRS and unit specific background levels
- The PAUF-adjusted HQs are <1
- Screening level is likely overprotective

Summary: The constituents identified as COPCs were ultimately screened out based on various lines of evidence. For all constituents, PAUF-adjusted HQs were well below 1.0. Copper, selenium, and vanadium are naturally occurring and fall within background levels. Bis(2-ethylhexyl)phthalate, hexavalent chromium, and cyanide all have mean detected concentrations less, or as with cyanide, close to the RSV. In summary, no constituents are identified as RCOCs for the ECODS N-1 subunit for the 0 to 1 ft surface soil interval.

D-3.4.1.4 Screening Results for ECODS N-1 Subunit for Soil Media (1-4 ft)

Using maximum detected values, Table D-3 identifies the following constituents as COPECs based on ESV screening in the soil media (1-4 ft interval) evaluated for terrestrial receptors: arsenic, Aroclor 1260, bis(2-ethylhexyl)phthalate, cadmium, chromium, hexavalent chromium (methods 7196A and 7199), copper, cyanide, lead, manganese, mercury, nickel, selenium, vanadium, and zinc. Sampling locations described for the ECODS N-1 Subunit are shown in Figure D-2.

D-3.4.1.5 Refinement Results for ECODS N-1 Subunit for Soil Media (1-4 ft)

Using EPC values (i.e., 95% UCL on the mean), Table D-4 identifies the following constituents as COPCs based on RSV screening in the soil medium (1-4 ft): bis(2-ethylhexyl)phthalate, cadmium, hexavalent chromium (Method 7199), copper, cyanide, lead, selenium, and vanadium.

D-3.4.1.6 Uncertainty Discussion for ECODS N-1 Subunit for Soil Media (1-4 ft)

An uncertainty analysis was performed for each COPC below, including an interpretive discussion of the lines of evidence and applicable uncertainty factors resulting in a recommendation whether the constituent should be considered an RCOC. HQ calculations for receptors that pertain to RSV exceedance from Section D.2.2 are referred to in this discussion and can be found in Attachment D-5, Table 2, for the 1-4 ft interval for the soil medium. AUF adjusted calculations are shown in Attachment D-9, Table 2. Sampling locations are provided in Figure D-2.

Bis(2-ethylhexyl)phthalate was detected in 16 of 24 samples with six J-qualified results. The maximum was 1.51 mg/kg from the END1-20 location in 2001. The detected mean was 0.1769 mg/kg, and the EPC was 0.416 mg/kg. The detected mean is less than the RSV (0.2 mg/kg). The uncertainty evaluation (Attachment D-5, Table 2) shows HQ exceedances for the American robin (avian herbivore) HQ = 2.60E-03, American robin (avian omnivore) HQ = 1.04, and American robin (avian insectivore) HQ = 2.08 using a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of bis(2-ethylhexyl)phthalate (0.416 mg/kg), the resultant PAUF-adjusted HQ = 1.06E-04 for American robin, avian herbivore; HQ = 4.23E-02 for the American robin, avian omnivore; and HQ = 8.45E-02 for the American robin, avian insectivore (Attachment D-9, Table 2). The unit-specific maximum background was 0.746 mg/kg from the ECN1-27 location (Table A.1.6) which is greater than the detected mean and EPC at the unit. In addition, bis(2-ethylhexyl)phthalate is a common laboratory artifact and it is not likely unit related.

Bis(2-ethylhexyl)phthalate is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- The detected mean at the unit is less than the RSV

- The detected mean and EPC concentration is less than unit-specific background
- The PAUF-adjusted HQs are < 1
- It is a common laboratory artifact

Cadmium was detected in 3 of 41 samples with 2 of the samples J-qualified (i.e., estimated). In 2001, the maximum detected concentration was 40.5 mg/kg at the ECN1-11 location. The mean detected concentration was 1.57 mg/kg, which is less than the RSV (3.0 mg/kg), and the EPC was 3.26 mg/kg. The uncertainty evaluation (Attachment D-5, Table 2) shows HQ exceedances for the American robin (avian omnivore) HQ = 1.09E+00, and American robin (avian insectivore) HQ = 1.60E+00 using a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. For the montane shew, the HQ = 1.09E+00. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of cadmium (1.57 mg/kg), the resultant PAUF-adjusted HQ = 6.51E-04 for American robin, avian herbivore; HQ = 4.99E-03 for the American robin, avian omnivore; and HQ = 9.36E-03 for the American robin, avian insectivore. The montane shrew PAUF-adjusted HQ = 5.37E-03 (Attachment D-9, Table 2).

Cadmium is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- The mean detected concentration is less than the RSV
- The PAUF-adjusted HQs are <1

Hexavalent chromium (Method 7199) was detected in 2 of 2 samples. None of the samples were J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 3.9 mg/kg at the ECN1-044 location. The mean detected concentration was 2.9 mg/kg, which is less than the RSV (3.4 mg/kg), and the EPC was 3.9 mg/kg. The uncertainty evaluation (Attachment D-5, Table 2) shows HQ exceedances for the American robin (avian herbivore) HQ = 1.86E-03, American robin (avian omnivore) HQ = 2.44E-03, and American robin (avian insectivore) HQ = 2.79E-03 using a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of hexavalent chromium 2.9 mg/kg), the resultant PAUF-adjusted HQ = 1.32E-05 for American robin, avian herbivore; HQ = 1.73E-05 for the American robin, avian omnivore;

and HQ = 1.98E-05 for the American robin, avian insectivore (Attachment D-9, Table 2). The maximum unit-specific background concentration was 2.6 mg/kg. In addition, a statistical review of hexavalent chromium data concluded that soil concentrations at the unit are comparable to background concentrations (Appendix H).

Hexavalent chromium is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is naturally occurring
- The mean detected concentration is less than the RSV
- The PAUF-adjusted HQs are <1

Copper was detected in 30 of 41 samples with 11 J-qualified results. The maximum was 17,700 mg/kg (sampling location ECN1-044) with a detected mean of 32.31 mg/kg, and an EPC of 2,339 mg/kg. The uncertainty evaluation (Attachment D-5, Table 2) shows HQ exceedances for the American robin (avian herbivore) HQ = 2.34E+01, American robin (avian omnivore) HQ = 3.9E+01, and American robin (avian insectivore) HQ = 5.44E+01 using a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of copper, the resultant PAUF-adjusted HQ = 3.09E-03 (American robin, avian herbivore), HQ = 5.14E-03 (American robin, avian omnivore), and HQ = 7.18E-03 (American robin (avian insectivore) (Attachment D-9, Table 2). The maximum value for all depth intervals based on SRS background soil is 74.20 mg/kg (WSRC 2006) which is greater than the unit detected mean. The maximum unit background for copper is 15.8 mg/kg at the ECN1-046-BKG location (Table A.1.6) which is lower than the detected mean at the unit. Copper is naturally occurring and, with the detected mean value within SRS background levels, screening thresholds may be overprotective for this constituent.

Copper is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is naturally occurring
- It is within SRS background levels
- The PAUF-adjusted HQs are <1

Cyanide was detected in 11 of 27 samples with 3 J-qualified results. The maximum was 5.72 at the ECN1-10 location (2001). The detected mean was 1.019 mg/kg, and the EPC was 1.617 mg/kg. The RSV for cyanide is 0.98 mg/kg which is just below the mean concentration at the unit. The uncertainty evaluation (Attachment D-5, Table 2) shows HQ exceedances for the American robin (avian herbivore) HQ = 1.62, American robin (avian omnivore) HQ = 1.63, and American robin (avian insectivore) HQ = 1.65 using a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of cyanide, the resultant PAUF-adjusted HQ = 9.74E-03 (American robin, avian herbivore), HQ = 9.83E-03 (American robin, avian omnivore), and HQ = 9.93E-03 (American robin, avian insectivore) (Attachment D-9, Table 2). The unit-specific background maximum is 0.706 mg/kg (Table A.1.6).

Cyanide is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- Cyanide is naturally occurring
- The PAUF-adjusted HQs are <1
- The RSV is similar to the detected mean at the unit

Lead was detected in 41 of 41 samples with no J-qualified results. The maximum, 889 mg/kg, was collected in 2020 from the ECN1-044 sampling location. The detected mean was 38.91 mg/kg and the EPC was 130.6 mg/kg. The RSV is 23.0 mg/kg. The uncertainty evaluation (Attachment D-5, Table 2) shows HQ exceedances for the American robin (avian herbivore) HQ = 3.63, American robin (avian omnivore) HQ = 4.66, and American robin (avian insectivore) HQ = 5.68 using a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of lead, the resultant PAUF-adjusted HQ = 1.03E-02 (American robin, avian herbivore), HQ = 1.33E-02 (American robin, avian omnivore), and HQ = 1.62E-02 (American robin, avian insectivore) (Attachment D-9, Table 2). The SRS soils background maximum for lead is 26.6 mg/kg (WSRC 2006) which is greater than the RSV. The unit-specific background from all depths was 16.3 mg/kg.

Lead is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- Lead is naturally occurring
- The RSV may be overprotective
- The PAUF-adjusted HQs are <1

Selenium was detected in seven of 41 samples with six J-qualified results. The maximum, 294 mg/kg, was collected at the ECN1-11 location in 2001. The detected mean was 8.831 mg/kg with an EPC of 41.14 mg/kg. The uncertainty evaluation (Attachment D-5, Table 2) shows HQ exceedances for the American robin (avian herbivore) HQ = 21.7, American robin (avian omnivore) HQ = 25.7, and American robin (avian insectivore) HQ = 29.4. The montane shrew (mammalian insectivore was also evaluated resulting in an HQ of 41.1. The uncertainty evaluation uses a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of vanadium, the resultant PAUF-adjusted HQ = 4.44E-02 (American robin, avian herbivore), HQ = 6.03E-02 (American robin, avian omnivore), and HQ = 5.27E-02 (American robin, avian insectivore) (Attachment D-9, Table 2). The PAUF-adjusted HQ for the montane shrew was 9.09E-02. The SRS soils background maximum for selenium is 12.2 mg/kg (WSRC 2006) which is greater than the detected mean at the unit. The unit-specific background from all depths was 0.625 mg/kg.

Selenium is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- Selenium is naturally occurring
- The mean is within SRS background levels
- The PAUF-adjusted HQs are <1.0

Vanadium was detected in 41 of 41 samples with five J-qualified results. The maximum, 79 mg/kg, was collected at the ECN1-20 location in 2001. The detected mean was 44.22 mg/kg with an EPC of 47.15 mg/kg. The RSV is 9.5 mg/kg. The uncertainty evaluation (Attachment D-5, Table 2) shows HQ exceedances for the American robin (avian herbivore) HQ = 3.63, American robin (avian omnivore) HQ = 4.29, and American robin (avian insectivore) HQ = 4.96 using a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. When

the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of vanadium, the resultant PAUF-adjusted HQ = 3.25E-02 (American robin, avian herbivore), HQ = 3.84E-02 (American robin, avian omnivore), and HQ = 4.45E-02 (American robin, avian insectivore) (Attachment D-9, Table 2). The SRS soils background maximum for vanadium is 104 mg/kg (WSRC 2006). The unit-specific background from all depths was 75.3 mg/kg (Table A.1.6). The unit maximum is less than the SRS background soils concentration. The detected mean and EPC are less than unit-specific background.

Vanadium is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- Vanadium is naturally occurring
- The mean and EPC are below unit background levels
- The unit maximum is less than SRS background levels
- The PAUF-adjusted HQs are <1

Summary: The constituents identified as COPCs were ultimately screened out based on various lines of evidence. For all constituents, PAUF-adjusted HQs were well below 1.0. Vanadium and copper are naturally occurring and fall within background levels. Bis(2-ethylhexl)phthalate, hexavalent chromium, and cyanide all have mean detected concentrations less, or as with cyanide, close to the RSV. In summary, no constituents are identified as RCOCs for the ECODS N-1 subunit for the 1 to 4 ft surface soil interval.

D-3.4.2 CSSLP Subunit

Results of the ESV screening (Step D.2.1), refinement-level risk calculations (Step D.2.2), and a discussion of associated uncertainties for each COPC for the CSSLP Subunit are provided below.

D-3.4.2.1 Screening Results for the CSSLP Subunit for Soil Media (0 to 1 ft)

Using maximum detected values, Table D-5 identifies the following constituents as COPECs based on ESV screening in the 0 to 1 ft soil interval evaluated for terrestrial receptors: acetone, arsenic, bis(2-ethylhexyl)phthalate, di-N-butylphthalate, chromium, hexavalent chromium (Method 7169A), copper, cyanide, lead, manganese, nickel, selenium, vanadium, and zinc. Sampling locations for the CSSLP Subunit are shown in Figure D-3.

D-3.4.2.2 Refinement Results for the CSSLP Subunit for Soil Media (0 to 1 ft)

Using EPC values (i.e., 95% UCL on the mean), Table D-6 identifies the following constituent as a COPC based on RSV screening in the 0 to 1 ft soil interval: vanadium.

D-3.4.2.3 Uncertainty Discussion for the CSSLP Subunit for Soil Media (0 to 1 ft)

An uncertainty analysis is performed for the COPC vanadium, below, including an interpretive discussion of the lines of evidence and applicable uncertainty factors resulting in a recommendation whether the constituent should be considered an RCOC. HQ calculations for receptors that pertain to RSV exceedance from Section D.2.2 are referred to in this discussion and can be found in Attachment D-5 in Table 3 for the soil medium (0 to 1 ft interval). AUF adjusted calculations are shown in Attachment D-9, Table 3. Sampling locations are provided in Figure D-3.

Vanadium was detected in 25 of 25 samples with two J-qualified results. The maximum, collected in 2020 from the CSSLP-029 location, was 47 mg/kg. The detected mean was 22.66 mg/kg and the ECP was 26.76 mg/kg. The RSV (9.5 mg/kg) was less than the mean. The uncertainty evaluation (Attachment D-5, Table 3) shows HQ exceedances for the American robin (avian herbivore) HQ = 2.06, American robin (avian omnivore) HQ = 2.43, and American robin (avian insectivore) HQ = 2.82 using a protective AUF set to 1 indicating the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean concentration of vanadium, the resultant PAUF-adjusted HQ = 1.39 E-01 (American robin, avian herbivore), HQ = 1.64E-01 (American robin, avian omnivore), and HQ = 1.90E-01 (American robin, avian insectivore) (Attachment D-9, Table 3). The SRS background soil maximum for vanadium is 104.0 mg/kg (WSRC 2006) which is greater than the detected mean (22.66 mg/kg), EPC (26.76 mg/kg), and the unit maximum (47.0 mg/kg).

Vanadium is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- Vanadium is naturally occurring
- The PAUF-adjusted HQs are <1
- Concentrations are below SRS background levels

Summary: Vanadium was ultimately screened out it is naturally occurring and falls within background levels. Also, PAUF-adjusted HQs were well below 1.0. No constituents are identified as RCOCs for the CSSLP subunit for the 0 to 1 ft surface soil interval.

D-3.4.2.4 Screening Results for CSSLP Soil Media (1 to 4 ft)

Using maximum detected values, Table D-7 identifies the following constituents as COPECs based on ESV screening in the 1 to 4 ft soil interval evaluated for terrestrial receptors: alpha-chlordane, antimony, arsenic, Arochlor 1254, Arochlor 1260, bis(2-ethylhexyl)phthalate, cadmium, chromium, hexavalent chromium (Method 7196A), copper, Dieldrin, di-N-butylphthalate, lead, Lindane, mercury, nickel, selenium, vanadium, and zinc. Sampling locations described for the CSSLP Subunit are shown in Figure D-3.

D-3.4.2.5 Refinement Results for CSSLP for Soil Media (1 to 4 ft)

Using EPC values (i.e., 95% UCL on the mean), Table D-8 identifies bis(2-ethylhexyl)phthalate, mercury, selenium, and vanadium as COPCs based on RSV screening in subsurface soil.

D-3.4.2.6 Uncertainty Discussion for CSSLP Subunit for Soil Media (1 to 4 ft)

An uncertainty analysis is performed for each COPC below, including an interpretive discussion of the lines of evidence and applicable uncertainty factors, resulting in a recommendation of whether the constituent should be considered an RCOC. HQ calculations for receptors that pertain to RSV exceedance from Section D.2.2 are referred to in this discussion and can be found in Attachment D-5, Table 4, for the soil medium (1 to 4 ft interval). AUF adjusted calculations are shown in Attachment D-9, Table 4. Sampling locations are provided in Figure D-3.

Bis(2-ethylhexyl)phthalate was detected in 10 out of 19 samples with 8 J-qualified results. The maximum, collected in 2019 at the CSSLP-3 sampling location, was 1.45 mg/kg. The detected mean was 0.0943 mg/kg and the ECP was 0.433 mg/kg. The detected mean is less than the RSV (0.2 mg/kg). The uncertainty evaluation presented in Attachment D-5, Table 4 shows HQ exceedances for the American robin (avian herbivore) (HQ = 2.71E-03), American robin (avian omnivore) (HQ = 1.08), and American robin (avian insectivore) (HQ = 2.17). As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific

PAUF (Mirenda 2012) using the mean, the receptor-specific screening values are concomitantly adjusted resulting in HQs as follows: American robin (avian herbivore) (HQ = 4.69E-05), American robin (avian omnivore) (HQ = 1.87E-02), and American robin (avian insectivore) (HQ = 2.34E-02) (Attachment D-9, Table 4). In addition, bis(2-ethylhexyl)phthalate is a common laboratory artifact and it is not likely unit related.

Bis(2-ethylhexyl)phthalate is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following line of evidence:

- The detected mean is less than the RSV
- The PAUF-adjusted HQs are < 1.0.
- It is a common laboratory artifact.

Mercury was detected in 23 of 23 samples with five J-qualified (i.e., estimated) results. The maximum detected concentration was 0.884 mg/kg at the CSSLP-18 location in 2019. The mean detected concentration was 0.0739 mg/kg, and the EPC was 0.24 mg/kg. The mean is less than the RSV of 0.13 mg/kg. The uncertainty evaluation presented in Attachment D-5, Table 4 shows HQ exceedances for the American robin (avian herbivore) (HQ = 3.58E-01), American robin (avian omnivore) (HQ = 1.09), and American robin (avian insectivore) (HQ = 1.85). As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean, the receptor-specific screening values are concomitantly adjusted resulting in HQs as follows: American robin (avian herbivore) (HQ = 8.77E-03), American robin (avian omnivore) (HQ = 1.81E-02), and American robin (avian insectivore) (HQ = 3.06E-02) (Attachment D-9, Table 4). Mercury is naturally occurring. The SRS background maximum is 0.30 mg/kg (WSRC 2006), and the mean detected concentration at the unit is within background levels. With background levels exceeding the RSV, screening thresholds may be overprotective.

Mercury is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is naturally occurring
- It is within SRS background levels
- PAUF-adjusted HQs are < 1
- Screening level is likely overprotective

Selenium was detected in 7 of 23 samples and all of the detected results were J-qualified (i.e., estimated). The maximum detected concentration was 3.95 mg/kg at the CSSLP-14 location in 2019. The mean detected concentration was 0.94 mg/kg and the EPC was 1.475 mg/kg, which is less than the RSV of 1.9 mg/kg. The uncertainty evaluation presented in Attachment D-5, Table 4, shows HQ exceedances for the American robin (avian insectivore) (HQ = 1.05E+00). For the montane shrew, the HQ = 1.48E+00. As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean, the receptor-specific screening values are concomitantly adjusted resulting in HQs as follows: American robin (avian herbivore) (HQ = 3.92E-02), American robin (avian omnivore) HQ = 4.56E-02, and American robin (avian insectivore) HQ = 5.32E-02. For the montane shrew, the HQ = 8.02E-02 (Attachment D-9, Table 4).

Selenium is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- The mean detected value is < RSV
- PAUF-adjusted HQs are <1

Vanadium was detected in 23 of 23 samples. None of the results were J-qualified (i.e., estimated). The maximum detected concentration was 48.2 mg/kg at the CSSLP-11 location in 2019. The mean detected concentration was 19.79 mg/kg and the EPC was 23.64 mg/kg, which both exceed the RSV of 9.5 mg/kg. The uncertainty evaluation presented in Attachment D-5, Table 4, shows HQ exceedances for the American robin (avian herbivore) (HQ = 1.82), American robin (avian omnivore) (HQ = 2.15), and American robin (avian insectivore) (HQ = 2.49). As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean, the receptor-specific screening values are concomitantly adjusted resulting in HQs as follows: American robin (avian herbivore) (HQ = 1.21E-02),

American robin (avian omnivore) (HQ = 9.7E-02), and American robin (avian insectivore) (HQ = 1.12E-01) (Attachment D-9, Table 4). Vanadium is naturally occurring, and the maximum detected concentration is within background levels. SRS background maximum is 104 mg/kg (WSRC 2006). With background levels exceeding the RSV, screening thresholds may be overprotective.

Vanadium is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is naturally occurring
- It is within SRS background levels
- PAUF-adjusted HQs are <1
- Screening level is likely overprotective

Summary: Mercury and vanadium are naturally occurring and fall within background levels. Bis(2-ethylhexyl)phthalate, as well as mercury, selenium, and vanadium were finally screened out due to PAUF-adjusted HQs being well below 1.0. In summary, no constituents are identified as RCOCs for the CSSLP 1 to 4 ft subsurface soil interval.

D-3.4.2.7 Screening Results for the CSSLP Surface Water Impoundment Area Sediment Media (0-1 ft)

Using maximum detected values, Table D-9 identifies the following constituents as COPECs based on ESV screening in the 0 to 1 ft-soil interval evaluated for terrestrial receptors: arsenic, bis(2-ethylhexyl)phthalate, hexavalent chromium (Method 7196A), and vanadium. Sampling locations described for the Surface Water Impoundment Area are shown in Figure D-3.

D-3.4.2.8 Refinement Results for the CSSLP Surface Water Impoundment Area Sediment Media (0-1 ft)

Using EPC values (i.e., 95% UCL on the mean), Table D-10 identifies vanadium as a COPC based on RSV screening in sediment/soil.

D-3.4.2.9 Uncertainty Discussion for CSSLP Surface Water Impoundment Area Sediment Media (0-1 ft)

An uncertainty analysis is performed for the COPC below, including an interpretive discussion of the lines of evidence and applicable uncertainty factors, resulting in a recommendation of whether the constituent should be considered an RCOC. HQ calculations for receptors that pertain to RSV exceedance from Section D.2.2 are referred to in this discussion and can be found in Attachment D-5, Table 5, for the sediment/soil medium (0 to 1 ft interval). AUF adjusted calculations are shown in Attachment D-9, Table 5.

Vanadium was detected in 4 out of 4 samples. None of the results were J-qualified (i.e., estimated). The maximum detected concentration was 39.2 mg/kg at the CSSLP-21-SED location in 2020. The mean detected concentration was 29.8 mg/kg, and the EPC was 39.2 mg/kg. Both the EPC and mean are greater than the RSV (9.5 mg/kg). The RSV is based on the American robin, the minimum RSV value available (LANL 2017). The uncertainty evaluation presented in Attachment D-5, Table 5, shows HQ exceedances for the American robin (avian herbivore) (HQ = 3.02), American robin (avian omnivore) (HQ = 3.56), and American robin (avian insectivore) (HQ = 4.13). Additionally, sediment-based HQ calculations show HQs for the Myotis little brown bat (mammalian aerial insectivore) as less than 1.0 (3.56E-02) and the violet-green swallow (avian aerial insectivore) as well, with an HQ of 6.64E-01. As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean, the receptor-specific screening values are concomitantly adjusted resulting in HQs as follows: American robin (avian herbivore) (HQ = 4.78E-02), American robin (avian omnivore) (HQ = 5.64E-02), and American robin (avian insectivore) (HQ = 6.54E-02). The PAUF-adjusted HQs, also calculated for the little brown bat (HQ = 2.37E-06) and violet-green swallow (6.50E-03), were well below 1.0 (Attachment D-9, Table 5). Vanadium is naturally occurring. The SRS background maximum is 104 mg/kg (WSRC 2006), and the maximum detected concentration at the unit is within background levels. Unit-specific background (Table A.2.14, Background Surface Water Impoundment Area Sediment – Carolina Bay [All Depths]) has a maximum of 26.2 mg/kg. With SRS and unit-specific background levels exceeding the RSV, screening thresholds may be overprotective.

Vanadium is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is naturally occurring
- It is within SRS background levels
- PAUF-adjusted HQs are <1
- Screening level is likely overprotective

Summary: Vanadium is naturally occurring and falls within background levels. Additionally, PAUF-adjusted HQs are well below 1.0. In summary, no constituents are identified as RCOCs for sediment/soil for the Surface Water Impoundment Area 0 to 1 ft interval.

D-3.4.2.10 Screening Results for the CSSLP Surface Water Impoundment Area Surface Water Media (Unfiltered)

Using maximum detected values, Table D-11 identifies the following constituents as COPECs based on ESV screening in surface water evaluated for terrestrial and aquatic receptors: aluminum, barium, copper, iron, lead, manganese, and zinc. Sampling locations described for the CSSLP Surface Water Impoundment Area are shown in Figure D-3.

D-3.4.2.11 Refinement Results for the CSSLP Surface Water Impoundment Area Surface Water Media (Unfiltered)

Using EPC values (i.e., 95% UCL on the mean), Table D-12 identifies the following constituents as COPCs based on RSV screening in surface water: aluminum, copper, iron, lead, manganese, and zinc.

D-3.4.2.12 Uncertainty Discussion for CSSLP Surface Water Impoundment Area Surface Water Media (Unfiltered)

An uncertainty analysis is performed for the COPCs below, including an interpretive discussion of the lines of evidence and applicable uncertainty factors, resulting in a recommendation of whether the constituent should be considered an RCOC. HQ calculations for receptors that pertain to RSV exceedance from Section D.2.2 are referred to in this discussion and can be found in Attachment D-5, Table 6, for the surface water medium (unfiltered). AUF adjusted calculations are shown in Attachment D-9, Table 6.

Aluminum was detected in three of three samples. None of the samples were J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 403 µg/L at the CSSLP-23 location. The mean detected concentration was 369.7 µg/L and the EPC was 403 µg/L which both exceed the minimum available RSV of 87 µg/L. The uncertainty evaluation presented in Attachment D-5, Table 6, shows one HQ exceedance for aquatic life (EPA) (HQ = 4.63). When the HQ is calculated with the mean, the HQ = 4.25 (Attachment D-9, Table 6). The maximum detected concentration at the unit is less than the unit-specific background (Carolina bay) maximum of 1,220 µg/L. Since aluminum is naturally occurring and concentrations are within background levels, screening thresholds may be overprotective

Aluminum is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- It is within SRS background levels
- Screening level is likely overprotective

Copper was detected in three of three samples. One of the results was J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 32.6 µg/L at the CSSLP-20 location. The mean detected concentration was 27.93 µg/L and the EPC was 32.6 µg/L which both exceed the minimum available RSV of 2.9 µg/L. The uncertainty evaluation presented in Attachment D-5, Table 6, shows three HQ exceedances: for aquatic community organisms (LANL) (HQ = 4.66), aquatic life (EPA) (HQ = 6.59), freshwater aquatic life (SCDHEC WQS) (HQ = 11.2). When the HQ is calculated with the mean, the HQs remain above 1.0: for aquatic community organisms (LANL) (HQ = 3.99), aquatic life (EPA) (HQ = 5.64), freshwater aquatic life (SCDHEC WQS) (HQ = 9.63) (Attachment D-9, Table 6). The maximum unit-specific (Carolina bay) background is 6.3 µg/L. The maximum from IOU background is 70.0 µg/L which is greater than the unit maximum.

Copper is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- It is within SRS IOU background levels for surface water
- Screening level is likely overprotective

Iron was detected in three of three samples. None of the results were J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 2660 µg/L at the CSSLP-23 location. The mean detected concentration was 2143 µg/L and the EPC was 2660 µg/L which both exceed the minimum available RSV of 1,000 µg/L. The uncertainty evaluation presented in Attachment D-5, Table 6, shows one HQ exceedances for aquatic life (EPA) (HQ = 2.66). When the HQ is calculated with the mean, the HQ remains above 1.0 for aquatic life (EPA) (HQ = 2.1) (Attachment D-9, Table 6). The maximum unit-specific (Carolina bay) background is 9840 µg/L which is greater than the unit maximum.

Iron is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- It is within unit-specific background levels
- Screening level is likely overprotective

Lead was detected in one of three samples. The one detected result was J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 4.5 µg/L at the CSSLP-20 location. The mean detected concentration was 2.6 µg/L and the EPC was 4.5 µg/L which both exceed the minimum available RSV of 0.54 µg/L. The uncertainty evaluation presented in Attachment D-5, Table 6, shows one HQ exceedance lead: for freshwater aquatic life (SCDHEC WQS) (HQ = 8.33). When the HQ is calculated with the mean, the HQ remains greater than 1.0 for freshwater aquatic life (SCDHEC WQS) (HQ = 4.81) (Attachment D-9, Table 6). The maximum unit-specific (Carolina bay) background is 4.48 µg/L which is greater than the unit mean. Also, the background maximum is greater than the RSV (0.54 µg/L) indicating that the RSV is likely overprotective.

Lead is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- The detected result is an estimated value (J-qualified)
- The unit mean is within unit-specific background levels
- Screening level is likely overprotective

Manganese was detected in three of three samples. None of the detected results were J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 400 µg/L at the CSSLP-23 location. The mean detected concentration was 251.7 µg/L and the EPC was 400 µg/L which both exceed the minimum available RSV of 93µg/L. The uncertainty evaluation presented in Attachment D-5, Table 6, shows one HQ exceedance for manganese for aquatic life (EPA) (HQ = 4.3). When the HQ is calculated with the mean, the HQ remains greater than 1.0 for aquatic life (EPA) (HQ = 2.7) (Attachment D-9, Table 6). The maximum unit-specific (Carolina bay) background is 2160 µg/L which is greater than the unit maximum. Also, the background maximum is greater than the RSV (93 µg/L) indicating that the RSV is likely overprotective.

Manganese is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- The unit is within unit-specific background levels
- Screening level is likely overprotective

Zinc was detected in three of three samples. None of the detected results were J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 41.7 µg/L at the CSSLP-20 location. The mean detected concentration was 39.53 µg/L and the EPC was 41.7 µg/L. The mean barely exceeds the minimum available RSV of 37 µg/L. The uncertainty evaluation presented in Attachment D-5, 7, shows one HQ exceedance for zinc for freshwater aquatic life (SCDHEC WQS) (HQ = 1.13). When the HQ is calculated with the mean, the HQ is slightly greater than 1.0 for aquatic life (EPA) (HQ = 1.07) (Attachment D-9, Table 6). The maximum unit-specific (Carolina bay) background is 45.5 µg/L which is greater than the unit maximum. Also, the background maximum is greater than the RSV (37 µg/L) indicating that the RSV is likely overprotective.

Zinc is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- The unit is within unit-specific background levels
- Screening level is likely overprotective

Summary: All constituents (aluminum, copper, iron, lead, manganese, and zinc) occur naturally and unit levels (maximum, EPC, and/or detected mean) fall within background levels. For copper, the detected mean was less than IOU background which evaluated surface water in aquatic and wetland environments within the SRS. For the other constituents, unit maximum concentrations were less than background. In addition, RSVs were less than background indicating that screening levels are likely overprotective. No constituents are identified as RCOCs for surface water (based on unfiltered data) for the CSSLP Surface Water Impoundment Area

D-3.4.2.13 Screening Results for the CSSLP Surface Water Impoundment Area Surface Water Media (Filtered)

Using maximum detected values, Table D-13 identifies the following constituents as COPECs based on ESV screening in surface water evaluated for terrestrial and aquatic receptors: aluminum, barium, copper, iron, lead, manganese, and zinc. Sampling locations described for the CSSLP Surface Water Impoundment Area are shown in Figure D-3.

D-3.4.2.14 Refinement Results for the CSSLP Surface Water Impoundment Area Surface Water Media (Filtered)

Using EPC values (i.e., 95% UCL on the mean), Table D-14 identifies the following constituents as COPCs based on RSV screening in surface water: aluminum, copper, iron, lead, manganese, and zinc.

D-3.4.2.15 Uncertainty Discussion for CSSLP Surface Water Impoundment Area Surface Water Media (Filtered)

An uncertainty analysis is performed for the COPCs below, including an interpretive discussion of the lines of evidence and applicable uncertainty factors, resulting in a recommendation of

whether the constituent should be considered an RCOC. HQ calculations for receptors that pertain to RSV exceedance from Section D.2.2 are referred to in this discussion and can be found in Attachment D-5, Table 7, for the surface water medium (filtered). AUF adjusted calculations are shown in Attachment D-9, Table 7.

Aluminum was detected in three of three samples. None of the samples were J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 395 µg/L at the CSSLP-21 location. The mean detected concentration was 364 µg/L and the EPC was 395 µg/L which both exceed the minimum available RSV of 87 µg/L. The uncertainty evaluation presented in Attachment D-5, Table 7, shows one HQ exceedance for aquatic life (EPA) (HQ = 4.54). When the HQ is calculated with the mean, the HQ = 4.18 (Attachment D-9, Table 7). The maximum detected concentration at the unit is less than the unit-specific background (Carolina bay) maximum of 1,630 µg/L. Since aluminum is naturally occurring and concentrations are within background levels, screening thresholds may be overprotective

Aluminum is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- It is within SRS background levels
- Screening level is likely overprotective

Copper was detected in three of three samples. One of the results was J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 39.6 µg/L at the CSSLP-20 location. The mean detected concentration was 28.8 µg/L and the EPC was 39.6 µg/L which both exceed the minimum available RSV of 2.9 µg/L. The uncertainty evaluation presented in Attachment D-5, Table 7, shows three HQ exceedances: for aquatic community organisms (LANL) (HQ = 5.66), aquatic life (EPA) (HQ = 8), freshwater aquatic life (SCDHEC WQS) (HQ = 13.8). When the HQ is calculated with the mean, the HQs remain above 1.0: for aquatic community organisms (LANL) (HQ = 4.11), aquatic life (EPA) (HQ = 5.82), freshwater aquatic life (SCDHEC WQS) (HQ = 9.93) (Attachment D-9, Table 7). The maximum unit-specific (Carolina bay) background is 6.27 µg/L. The maximum from IOU background is 70.0 µg/L which is greater than the unit maximum.

Copper is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- It is within SRS IOU background levels for surface water
- Screening level is likely overprotective

Iron was detected in three of three samples. None of the results were J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 2190 µg/L at the CSSLP-23 location. The mean detected concentration was 1957 µg/L and the EPC was 2190 µg/L which both exceed the minimum available RSV of 1,000 µg/L. The uncertainty evaluation presented in Attachment D-5, Table 7, shows one HQ exceedances for aquatic life (EPA) (HQ = 2.19). When the HQ is calculated with the mean, the HQ remains above 1.0 for aquatic life (EPA) (HQ = 1.96) (Attachment D-9, Table 7). The maximum unit-specific (Carolina bay) background is 8770 µg/L which is greater than the unit maximum.

Iron is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- It is within unit-specific background levels
- Screening level is likely overprotective

Lead was detected in one of three samples. The one detected result was J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 5.41 µg/L at the CSSLP-20 location. The mean detected concentration was 2.9 µg/L and the EPC was 5.41 µg/L which both exceed the minimum available RSV of 0.54 µg/L. The uncertainty evaluation presented in Attachment D-5, Table 7, shows one HQ exceedance lead: for freshwater aquatic life (SCDHEC WQS) (HQ = 1.0). When the HQ is calculated with the mean, the HQ remains greater than 1.0 for freshwater aquatic life (SCDHEC WQS) (HQ = 5.38) (Attachment D-9, Table 7). The maximum unit-specific (Carolina bay) background is 4.48 µg/L which is greater than the unit mean. Also, the background maximum is greater than the RSV (0.54 µg/L) indicating that the RSV is likely overprotective.

Lead is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- The detected result is an estimated value (J-qualified)
- The unit mean is within unit-specific background levels
- Screening level is likely overprotective

Manganese was detected in three of three samples. None of the detected results were J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 288 µg/L at the CSSLP-23 location. The mean detected concentration was 212.7 µg/L and the EPC was 288 µg/L which both exceed the minimum available RSV of 93µg/L. The uncertainty evaluation presented in Attachment D-5, Table 7, shows one HQ exceedance for manganese for aquatic life (EPA) (HQ = 3.1). When the HQ is calculated with the mean, the HQ remains greater than 1.0 for aquatic life (EPA) (HQ = 2.5) (Attachment D-9, Table 7). The maximum unit-specific (Carolina bay) background is 2050 µg/L which is greater than the unit maximum. Also, the background maximum is greater than the RSV (93 µg/L) indicating that the RSV is likely overprotective.

Manganese is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- The unit is within unit-specific background levels
- Screening level is likely overprotective

Zinc was detected in three of three samples. None of the detected results were J-qualified (i.e., estimated). In 2020, the maximum detected concentration was 40.6 µg/L at the CSSLP-20 location. The mean detected concentration was 35.87 µg/L and the EPC was 40.6 µg/L. The mean does exceed the minimum available RSV of 37 µg/L. The uncertainty evaluation presented in Attachment D-5, 7, shows one HQ exceedance for zinc for freshwater aquatic life (SCDHEC WQS) (HQ = 1.1). When the HQ is calculated with the mean, the HQ is slightly less than 1.0 for aquatic life (EPA) (HQ = 9.69E-01) (Attachment D-9, Table 7). The maximum unit-specific (Carolina bay) background is 74.9 µg/L which is greater than the unit maximum. Also, the

background maximum is greater than the RSV (37 µg/L) indicating that the RSV is likely overprotective.

Zinc is not recommended for further remedial evaluation as an ecological RCOC in surface water based on the following lines of evidence:

- It is naturally occurring
- The unit is within unit-specific background levels
- Screening level is likely overprotective

Summary: All constituents (aluminum, copper, iron, lead, manganese, and zinc) occur naturally and unit levels (maximum, EPC, and/or detected mean) fall within background levels. For copper, the detected mean was less than IOU background which evaluated surface water in aquatic and wetland environments within the SRS. For the other constituents, unit maximum concentrations were less than background. In addition, RSVs were less than background indicating that screening levels are likely overprotective. No constituents are identified as RCOCs for surface water (based on filtered data) for the CSSLP Surface Water Impoundment Area

D-3.4.3 Ford Building Subunit

Results of the ESV screening (Section D.2.1), refinement-level risk calculations (Section D.2.2), and a discussion of associated uncertainties for each constituent of potential concern for the Effluent Discharge Subunit are provided below.

D-3.4.3.1 Screening Results for the Ford Building Soil Media (0 to 1 ft)

Using maximum detected values, Table D-15 identifies the following constituents as COPECs based on ESV screening in the 0 to 1 ft soil interval evaluated for terrestrial receptors: actinium-228, aluminum, arsenic, Aroclor 1254, Aroclor 1260, beryllium, bis(2-ethylhexyl)phthalate, bismuth-212, cadmium, chromium, copper, cumene, di-N-butylphthalate, iron, lead, lead-214, manganese, mercury, potassium-40, selenium, tetrachloroethylene, thallium, thallium-208, vanadium, and zinc. Sampling locations described for the Ford Building are shown in Figure D-4.

The radionuclide constituents were identified as COPECs since there are no published ESVs available for these constituents. There also were no screening values for aluminum or iron. The COPECs are carried forward and processed further in the refinement-level evaluation step discussed below.

D-3.4.3.2 Refinement Results for the Ford Building for Soil Media (0 to 1 ft)

Using EPC values (i.e., 95% UCL on the mean), Table D-16 identifies the following constituents as COPCs based on RSV screening in the 0 to 1 ft soil interval: actinium-228, aluminum, bismuth-212, cumene, iron, lead-214, potassium-40, selenium, thallium, thallium-208, and vanadium.

The radionuclide constituents were identified as COPCs since there are no published RSVs available for these constituents. There were also no screening values for aluminum or iron. The COPCs are discussed further below.

D-3.4.3.3 Uncertainty Discussion for Ford Building for Soil Media (0 to 1 ft)

An uncertainty analysis was performed for each COPC below, including an interpretive discussion of the lines of evidence and applicable uncertainty factors resulting in a recommendation whether the constituent should be considered an RCOC. HQ calculations for receptors that pertain to RSV exceedance from Section D.2.2 are referred to in this discussion and can be found in Attachment D-5 in Table 8 for the soil medium (0 to 1 ft interval). AUF adjusted calculations are shown in Attachment D-9, Table 8. Sampling locations are provided in Figure D-4.

Actinium-228 was detected in seven of seven samples. None of the samples were J-qualified (i.e., estimated). The maximum detected concentration was 2.22 pCi/g at the FBFA-17 location in 2019 (see Figure D-4). The mean detected concentration was 1.677 pCi/g and the EPC was 1.947 pCi/g. Actinium-228 came through screening because there is no RSV available. However, actinium-228 is naturally occurring, and the maximum detected concentration associated with the unit is within background levels. The SRS maximum background activity is 2.54 pCi/g.

Actinium-228 is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is a naturally occurring radionuclide
- There is no screening threshold available
- It is within background

Aluminum was detected in 38 of 38 samples. Three of the samples were J-qualified (i.e., estimated). The maximum detected concentration was 16,700 mg/kg at the FBFA-13 location in 2019 (see Figure D-4). The mean detected concentration was 7,127.3 mg/kg and the EPC was 8,105 mg/kg. Aluminum came through screening because there is no RSV available. However, aluminum is naturally occurring, and the maximum detected concentration is within background levels. The SRS background maximum is 23,700 mg/kg.

Aluminum is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is naturally occurring
- There is no screening threshold
- It is within SRS background levels

Bismuth-212 was detected in six of seven samples. All the detected results were J-qualified. The maximum detected concentration was 3.03 pCi/g at the FBFA-17 location in 2019 (Figure D-4). The mean detected concentration was 1.772 pCi/g and the EPC was 2.30 pCi/g. Bismuth-212 came through screening because there is no RSV available. The half-life for bismuth-212 is 2.0 minutes. Also, bismuth-212 is naturally occurring, and the detected mean and EPC concentrations are within background levels. The IOU maximum background activity is 2.59 pCi/g.

Bismuth-212 is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It has a short half-life
- There is no screening threshold available
- It is a naturally occurring radionuclide
- It is within IOU background

Cumene was detected in two of 37 samples. Neither of the detected results were J-qualified. The maximum detected concentration was 0.0473 mg/kg at the FBFA-26 location in 2019 (Figure D-4). The mean detected concentration was 0.0015 mg/kg and the EPC was 0.012 mg/kg. Cumene came through screening because there is no RSV available. The ESV (0.04 mg/kg) is slightly higher than the maximum, and the mean and EPC are both less than the screening level

ESV. Cumene is a water-insoluble petrochemical used in the manufacture of several chemicals, including phenol and acetone. It readily volatilizes into the atmosphere from water and dry soil. EPA has classified cumene as a group D (not classifiable) for human carcinogenicity indicating inadequate or no human or animal data. Cumene is expected to adsorb moderately to strongly to soil/sediments and to undergo biodegradation in water and soil. Based on existing data, cumene is anticipated to be of relatively low risk (WHO 1999).

Cumene is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- There was a relatively low frequency of detection
- There is no RSV screening threshold available
- It is biodegradable
- The screening level ESV is less than the mean and EPC

Iron was detected in 38 of 38 samples. Two of the detected samples were J-qualified (i.e., estimated). The maximum detected concentration was 47,200 mg/kg at the FBFA-11 location in 2019. The mean detected concentration was 13,341.6 mg/kg and the EPC was 16,068 mg/kg. Iron came through screening because there is no RSV available. However, iron is naturally occurring, and the mean detected concentration is well within background. The SRS background maximum is 44,300 mg/kg.

Iron is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is naturally occurring
- There is no screening threshold
- It is within SRS background levels

Lead-214 was detected in seven of seven samples. None of the three samples were J-qualified (i.e., estimated). In 2019, the maximum detected concentration was 2.03 pCi/g at the FBFA-21 location (see Figure D-4). The mean detected concentration was 1.08 pCi/g and the EPC was 1.61 pCi/g. Lead-214 came through screening because there is no RSV available. Lead-214 is

naturally occurring and the half-life is short at 26.81 minutes. Further, the maximum is within background, the SRS background maximum for the uranium-238 decay series is 2.78 pCi/g.

Lead-214 is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is a naturally occurring radionuclide
- There is no screening threshold available
- It has a very short half-life
- It is within background

Potassium-40 was detected in seven of seven samples. Four of the detected results were J-qualified (i.e., estimated) results. In 2019, the maximum detected concentration was 24.08 pCi/g at the FBFA-17 location. The mean detected concentration was 5.436 pCi/g and the EPC was 24.8 pCi/g. Potassium-40 came through screening because there is no RSV available. Potassium-40 is naturally occurring. The maximum detected activity (24.08 pCi/g) is below the RESRAD Biota screening value of 119 pCi/g (Attachment D-6). Also, the mean detected is less than SRS background (8.53 pCi/g) (WSRC 2006). Additionally, the maximum detected concentration (24.08 pCi/g) is less than the RESRAD biota level of 119 pCi/g (Attachment 6). Further, potassium-40 was not used in SRS reactor processes, so the detections are regarded as non-DOE related.

Potassium-40 is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is a naturally occurring radionuclide
- There is no screening threshold available
- It is well below the RESRAD Biota level
- It is not DOE related
- It is within background

Selenium was detected in 7 of 38 samples. Four of the six detected results were J-qualified (i.e., estimated). The maximum detected concentration was 9.05 mg/kg at the FBFA-26 location in 2019. The mean detected concentration was 0.93 mg/kg, and the EPC was 1.75 mg/kg which exceeds the RSV of 1.0 mg/kg. The uncertainty evaluation presented in Attachment D-5, Table 8, shows HQ exceedances for the American robin (avian omnivore) (HQ = 1.09E+00), and American robin (avian insectivore) (HQ = 1.25E+00). An HQ was also calculated for the deer mouse

(mammalian omnivore) with an HQ of 1.46E+00, and for the American kestrel (insectivore/ carnivore) (HQ = 1.25E-02), and a montane shew (HQ = 1.75E+00). As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean, the receptor-specific screening values are concomitantly adjusted and result in HQs as follows: American robin (avian herbivore) (HQ = 2.64E-02), American robin (avian omnivore) (HQ = 3.14E-02), and American robin (avian insectivore) (HQ = 3.59E-02). The PAUF adjusted HQ for the deer mouse (2.34E-01), American kestrel (HQ = 1.42E-06), and montane shrew (HQ = 2.03E-05) were also well below 1.0 (Attachment D-9, Table 8).

Selenium is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- Mean detected result is < RSV
- PAUF adjusted HQs are less than 1

Thallium was detected in four of 38 samples. None of the six detected samples were J-qualified (i.e., estimated). The maximum detected concentration was 23.6 mg/kg at the FBFA-26 location in 2019. The mean detected concentration was 1.817 mg/kg and the EPC was 3.78 mg/kg which both exceed the RSV of 0.5 mg/kg. The uncertainty evaluation presented in Attachment D-5, Table 8, shows HQ exceedances for the American robin (avian herbivore) (HQ = 5.48E-02), American robin (avian omnivore) (HQ = 6.87E-02), and American robin (avian insectivore) (HQ = 8.40E-02). An HQ was also calculated for the deer mouse (mammalian omnivore) with an HQ of 5.25E-01, and for the American kestrel (insectivore/carnivore) (HQ = 7.88E-03). As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean, the receptor-specific screening values are concomitantly adjusted and result in HQs as follows: American robin (avian herbivore) (HQ = 1.42E-03), American robin (avian omnivore) (HQ = 1.78E-03), and American robin (avian insectivore) (HQ = 2.18E-03). The PAUF adjusted HQ for the deer mouse (7.62E-02) and American kestrel (HQ = 8.08E-07) were also well below 1.0 (Attachment D-9, Table 8). The mean

detected concentration is within background. The SRS background maximum is 8.13 mg/kg. Also, with background levels exceeding the RSV, screening thresholds may be overprotective.

Thallium is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- Screening threshold may be overprotective
- PAUF adjusted HQs are less than 1
- The mean is within background levels

Thallium-208 was detected in seven of seven samples. None of the three samples were J-qualified (i.e., estimated). The maximum detected concentration was 0.618 pCi/g at the FBFA-17 location in 2019. The mean detected concentration was 0.4774 pCi/g and the EPC was 0.561 pCi/g. Thallium-208 came through screening because there is no RSV available. Thallium-208 is a naturally occurring radionuclide and the half-life is short at 3.05 minutes. Further, the maximum is within background. The SRS background maximum for the thorium-232 decay series is 6.75 pCi/g.

Thallium-208 is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is a naturally occurring radionuclide
- It has a very short half-life
- It is within background

Vanadium was detected in 38 of 38 samples. None of the samples were J-qualified (i.e., estimated). The maximum detected concentration was 187 mg/kg at the FBFA-11 location in 2019. The mean detected concentration was 39.46 mg/kg and the EPC was 49.29 mg/kg, which both exceed the RSV of 9.5mg/kg (HQ calculated with the mean = 7.56). The uncertainty evaluation presented in Attachment D-5, Table 8, shows HQ exceedances for the American robin (avian herbivore) (HQ = 3.79), American robin (avian omnivore) (HQ = 4.48), and American robin (avian insectivore) (HQ = 5.19). Also evaluated were the deer mouse (HQ = 5.52E-01) and the American kestrel (HQ = 4.48E-01). As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean, the receptor-

specific screening values are concomitantly adjusted and result in HQs as follows: American robin (avian herbivore) (HQ = 1.64E-01), American robin (avian omnivore) (HQ = 1.93E-01), and American robin (avian insectivore) (HQ = 2.24E-01). The PAUF-adjusted HQs for the deer mouse was 1.19E-02, and the American kestrel (HQ = 7.66E-05) (Attachment D-9, Table 8). Vanadium is naturally occurring, and the mean detected concentration and EPC are within background. The SRS background maximum is 104 mg/kg. Also, with background levels exceeding the RSV, screening thresholds may be overprotective.

Vanadium is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is naturally occurring
- The mean is within SRS background levels
- PAUF adjusted HQs are <1
- Screening level is likely overprotective

Summary: Most constituents in this soil interval were identified as COPCs because they have no screening thresholds available. Only thallium and vanadium had a screening threshold available that was exceeded, but both were within background levels and likely have overprotective thresholds, also PAUF-adjusted HQs were <1.0. Selenium also had PAUF-adjusted HQs < 1.0, and the mean was less than the RSV. All other constituents were screened out due to estimated results, short half-lives, or for falling within background levels. In summary, no constituents are identified as RCOCs for the Ford Building subunit for the 0 to 1 ft surface soil interval.

D-3.4.3.4 Screening Results for Ford Building for Soil Media (1 to 4 ft)

Using maximum detected values, Table D-17 identifies the following constituents as COPECs based on ESV screening in the 1 to 4 ft soil interval evaluated for terrestrial receptors: actinium-228, aluminum, arsenic, Aroclor 1254, bismuth-212, bis(2-ethylhexyl)phthalate, chromium, copper, di-N-butylphthalate, iron, lead, lead-214, mercury, potassium-40, selenium, thallium, and thallium-208. Sampling locations described for the Ford Building Subunit are shown in Figure D-4.

The radionuclide constituents were identified as COPECs since there are no published ESVs available for these constituents. There were also no screening values for aluminum or iron. The

COPECs are carried forward and processed further in the refinement-level evaluation step discussed below.

D-3.4.3.5 Refinement Results for Ford Building for Soil Media (1 to 4 ft)

Using EPC values (i.e., 95% UCL on the mean), Table D-18 identifies the following constituents as COPCs based on RSV screening in the 1 to 4 ft soil interval: actinium-228, aluminum, bismuth-212, copper, iron, lead-214, potassium-40, selenium, thallium, and thallium-208.

The radionuclide constituents were identified as COPCs since there are no published RSVs available for these constituents. There also were no screening values for aluminum or iron. The COPCs are discussed further below.

D-3.4.3.6 Uncertainty Discussion for Ford Building for Soil Media (1 to 4 ft)

An uncertainty analysis is performed for each COPC below, including an interpretive discussion of the lines of evidence and applicable uncertainty factors, resulting in a recommendation whether the constituent should be considered an RCOC. HQ calculations for receptors that pertain to RSV exceedance from Section D.2.2 are referred to in this discussion and can be found in Attachment D-5, Table 9, for the subsurface soil medium (1 to 4 ft interval). AUF adjusted calculations are shown in Attachment D-9, Table 9. Sampling locations are provided in Figure D-4.

Actinium-228 was detected in two of two samples. None of the samples were J-qualified (i.e., estimated). The maximum detected concentration was 2.41 pCi/g at the FBFA-1 location in 2019 (see Figure D-4). The mean detected concentration was 2.025 pCi/g, and the EPC was 2.41 pCi/g. Actinium-228 came through screening because there is no RSV available. However, actinium-228 is naturally occurring, and the maximum detected concentration associated with the unit is within background levels. The SRS maximum background activity is 2.54 pCi/g.

Actinium-228 is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It is a naturally occurring radionuclide
- It is within background

- There is no screening threshold available

Aluminum was detected in 36 of 36 samples. None of the sample results were J-qualified (i.e., estimated). In 2019, the maximum detected concentration was 22,300 mg/kg at the FBFA-23 location (see Figure D-4). The mean detected concentration was 10,330.6 mg/kg and the EPC was 11,973 mg/kg. Aluminum came through screening because there is no RSV available. However, aluminum is naturally occurring, and the maximum detected concentration is within background levels. The SRS background maximum 23,700 mg/kg.

Aluminum is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is naturally occurring
- It is within SRS background levels
- There is no screening threshold

Bismuth-212 was detected in two of two samples. Neither of the detected results were J-qualified. The maximum detected concentration was 3.35 pCi/g at the FBFA-11 location in 2019 (Figure D-4). The mean detected concentration was 2.615 pCi/g and the EPC was 3.35 pCi/g. Bismuth-212 came through screening because there is no RSV available. The half-life for bismuth-212 is 2.0 minutes. Also, bismuth-212 is naturally occurring, and the detected mean is similar to background levels. The IOU maximum background activity is 2.59 pCi/g.

Bismuth-212 is not recommended for further remedial evaluation as an ecological RCOC in surface soil based on the following lines of evidence:

- It has a short half-life
- It is a naturally occurring radionuclide
- There is no screening threshold available
- It is similar to IOU background

Copper was detected in 36 of 37 samples. None of the samples were J-qualified (i.e., estimated). In 2019, the maximum detected concentration was 368 mg/kg at the FBFA-37 location. The mean detected concentration was 16.85 mg/kg, and the EPC was 73.05 mg/kg. The RSV (43 mg/kg) is greater than the mean detected value. The detected mean and EPC are within background. The SRS background maximum concentration is 74.2 mg/kg.

The uncertainty evaluation presented in Attachment D-5, Table 9, shows not HQ exceedance for the American robin (avian herbivore) (HQ = 7.31E-01), but does exceed 1.0 for the American robin (avian omnivore) (HQ = 1.22), and American robin (avian insectivore) (HQ = 1.7). As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean, the receptor-specific screening values are concomitantly adjusted and result in HQs as follows: American robin (avian herbivore) (HQ = 9.08E-03), American robin (avian omnivore) (HQ = 1.51E-02), and American robin (avian insectivore) (HQ = 2.11E-02) (Attachment D-9, Table 9).

Copper is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is a naturally occurring
- The EPC and detected mean are less than the RSV
- The mean and EPC are within background
- PAUF-adjusted HQs are <1.0

Iron was detected in 36 of 36 samples. None of the samples were J-qualified (i.e., estimated). In 2019, the maximum detected concentration was 34,200 mg/kg at the FBFA-15 location. The mean detected concentration was 18,238.89 mg/kg, and the EPC was 20,538 mg/kg. Iron came through screening because there is no RSV available. The maximum detected concentration is within background. SRS background maximum is 44,300 mg/kg.

Iron is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is naturally occurring
- It is within SRS background levels
- There is no screening threshold available

Lead-214 was detected in two of two samples. None of the samples were J-qualified (i.e., estimated). In 2019, the maximum detected concentration was 1.14 pCi/g at the FBFA-1 location (see Figure D-4). The mean detected concentration was 1.002 pCi/g and the EPC was 1.14 pCi/g. Lead-214 came through screening because there is no RSV available. The half-life of

lead-214 is 26.81 minutes. The maximum concentration is within background; the SRS background maximum concentration for the uranium-238 decay series is 2.78 pCi/g.

Lead-214 is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is a naturally occurring radionuclide
- There is no screening threshold available
- It has a very short half-life
- It is within background

Potassium-40 was detected in two of two samples. None of the samples were J-qualified (i.e., estimated). In 2019, the maximum detected concentration was 2.98 pCi/g at the FBFA-1 location (Figure D-4). The mean detected concentration was 2.235 pCi/g and the EPC was 2.98 pCi/g. Potassium-40 came through screening because there is no RSV available. The maximum concentration is within background; the SRS background maximum concentration for the potassium-40 is 8.53 pCi/g. Also, the maximum (2.98 pCi/g) is less than the RESRAD Biota level (119 pCi/g).

Potassium-40 is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is a naturally occurring radionuclide
- There is no screening threshold available
- It is within background
- It is below the RESRAD Biota level

Selenium was detected in 8 of 36 samples. Four of the sample results were J-qualified (i.e., estimated). In 2019, the maximum detected concentration was 16.5 mg/kg at the FBFA-26 location. The detected mean concentration was 1.465 mg/kg, and the EPC was 3.22. The RSV is 1.0 mg/kg. Selenium is naturally occurring. The detected mean and EPC are less than SRS background (12.2 mg/kg).

The uncertainty evaluation presented in Attachment D-5, Table 9, shows HQ exceedances for the American robin (avian herbivore) (HQ = 1.69), American robin (avian omnivore) (HQ = 2.01), and American robin (avian insectivore) (HQ = 1.7). Assessment of the deer mouse results in an HQ of 2.68, the montane shrew HQ = 2.22E+00, and the American kestrel HQ = 4.29E-01. As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the

animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean, the receptor-specific screening values are concomitantly adjusted and result in HQs as follows: American robin (avian herbivore) (HQ = 4.16E-02), American robin (avian omnivore) (HQ = 4.94E-03), and American robin (avian insectivore) (HQ = 5.64E-02). The PAUF-adjusted HQ for the deer mouse is 3.68E-01, for the montane shrew, the HQ = 8.50E-02, and for the American kestrel, the HQ = 4.27E-05 (Attachment D-9, Table 9).

Selenium is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is a naturally occurring
- The EPC and detected mean are within background
- The EPC and detected mean are less than the RSV
- PAUF-adjusted HQs are <1.0

Thallium was detected in was detected in 31 of 36 samples. One of the sample results was J-qualified (i.e., estimated). In 2019, the maximum detected concentration was 43.1 mg/kg at the FBFA-26 location. The mean detected concentration was 3.09 mg/kg and the EPC was 6.088 mg/kg. Thallium is naturally occurring. The RSV (0.5 mg/kg) is less than the mean. The unit mean and EPC for thallium is less than SRS background (8.13 mg/kg).

The uncertainty evaluation presented in Attachment D-5, Table 9, shows no HQ exceedances for the American robin (avian herbivore) (HQ = 8.82E-02), American robin (avian omnivore) (HQ = 1.76E-01), and American robin (avian insectivore) (HQ = 2.98E-01). Assessment of the deer mouse results in an HQ of 8.46E-01, and the American kestrel HQ = 6.09E-03. As a protective assumption appropriate for ecological risk screening, the AUF is set to 1 to indicate the animal receives all of its exposure from the contaminated site. When the AUF is adjusted to a unit-specific PAUF (Mirenda 2012) using the mean, the receptor-specific screening values are concomitantly adjusted and result in HQs as follows: American robin (avian herbivore) (HQ = 2.41E-03), American robin (avian omnivore) (HQ = 3.03E-03), and American robin (avian insectivore) (HQ = 3.70E-02). The PAUF-adjusted HQ for the deer mouse is 1.30E-01 and for the American kestrel, the HQ = 6.60E-07 (Attachment D-9, Table 9).

Thallium is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is a naturally occurring
- The EPC and detected mean are within background
- The EPC and detected mean are less than the RSV
- PAUF-adjusted HQ are <1.0

Thallium-208 was detected in two of two samples. None of the detected samples were J-qualified (i.e., estimated). In 2019, the maximum detected concentration was 0.578 pCi/g at the FBFA-11 location. The mean detected concentration was 0.5705 pCi/g and the EPC was 0.578 pCi/g. Thallium-208 came through screening because there is no RSV available. The half-life of thallium-208 is 3.05 minutes. Further, the maximum concentration is within background; the SRS background maximum for the thorium-232 decay series is 6.75 pCi/g.

Thallium-208 is not recommended for further remedial evaluation as an ecological RCOC in subsurface soil based on the following lines of evidence:

- It is a natural- occurring radionuclide
- It has a very short half-life
- It is within background

Summary: Radionuclide constituents in this soil interval were identified as COPCs because they have no screening thresholds available. Aluminum, copper, iron, and selenium, thallium had screening thresholds that was exceeded, but are naturally occurring and fall within background levels. Other reasons constituents were screened out were due to short half-lives or mean/EPC values were below thresholds. In summary, no constituents are identified as RCOCs for the Ford Building Subunit in the 1 to 4 ft subsurface soil interval.

D-3.4.4 Screening Level Effects Conclusion

The following three possible decisions can be made upon completion of the screening level evaluation:

- There are adequate data to conclude that ecological risks are negligible, therefore, there is no need for remediation on the basis of ecological risk

- The information indicates a potential for adverse ecological effects and a more thorough assessment is not warranted

- The information is not adequate to make a decision at this point and the ecological risk assessment process will continue to address data gaps

The screening level ecological effects evaluation for the ECODS N-1, CSSLP, and Ford Building OU indicates that additional information is not needed to make remedial decision recommendations for the protection of ecological receptors. Site-specific biological sampling or additional studies are not warranted. No problems warranting action are identified.

D-3.5 Summary/Conclusion of Ecological Risk Assessment

The following table presents the overall summary of the ERA by subunit. The revised CSM is presented in Chapter 3.

Subunit	ERA Soil 0 to 1 ft RCOCs	ERA Soil 1 to 4 ft RCOCs	ERA Sediment 0-to 1 ft RCOCs	ERA Surface Water RCOCs
ECODS N-1	None	None	NA	NA
CSSLP	None	None	NA	NA
Surface Water Impoundment Area	NA	NA	None	None
Ford Building	None	None	NA	NA

ERA = ecological risk assessment
NA = not applicable
RCOC = refined constituent of concern

D-4. REFERENCES

ATSDR, 1998. *Toxicological Profile for Chloromethane*, Public Health Service U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry, Atlanta, GA

ATSDR, 2002. *Toxicological profile for Aldrin and Dieldrin*, Public Health Service U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry, Atlanta, GA

ATSDR, 2005. *Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methyl-naphthlene*, Public Health Service U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry, Atlanta, GA

BCERF, 1998. *Pesticides and Breast Cancer Risk, an Evaluation of Chlordane*, Cornell University Program on Breast Cancer and Environmental Risk Factors, Ithaca, NY

Howard, 1989. *Handbook of Environmental Fate and Exposure Data for Organic Chemicals*, Vol. 1, Phillip H. Howard, CRC Press

LANL, 2014. *Toxicity Reference Value Development Methods for the Los Alamos National Laboratory*, Rev.1, Los Alamos National Laboratory Environmental Programs Directorate, Los Alamos, NM

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

Mirenda, 2012. *Screening-Level Ecological Risk Assessment Methods*, Revision 3, Richard J. Mirenda, Los Alamos National Laboratory, Los Alamos, NM

SCDHEC, 2020. *Water Classifications & Standards*, R. 61-68, South Carolina Department of Health and Environmental Control, Columbia, SC

SRNS, 2017. *Remedial Investigation/Baseline Risk Assessment for the Lower Three Runs Integrator Operable Unit (U)*, SRNS-RP-2017-00139, Revision 0, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC.

SRNS, 2019. *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, SCSRNS, 2020. *RCRA Facility Investigation/Remedial Investigation (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 Solution,s LLC, Savannah River Site, Aiken, SC.

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

Suter and Tsao, 1996. *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota*, 1996 Revision, G.W. Suter II and C.L. Tsao, Risk Assessment Program, Health Sciences Research Division, Oak Ridge, TN

USEPA, 2015. *Statistical Software ProUCL v5.1 for Environmental Applications for Data Sets With and Without Nondetect Observations,* United States Environmental Protection Agency

USEPA, 2018. *Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update* U.S. Environmental Protection Agency, Scientific Support Section, Superfund Division, Atlanta, GA

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

This page was intentionally left blank.

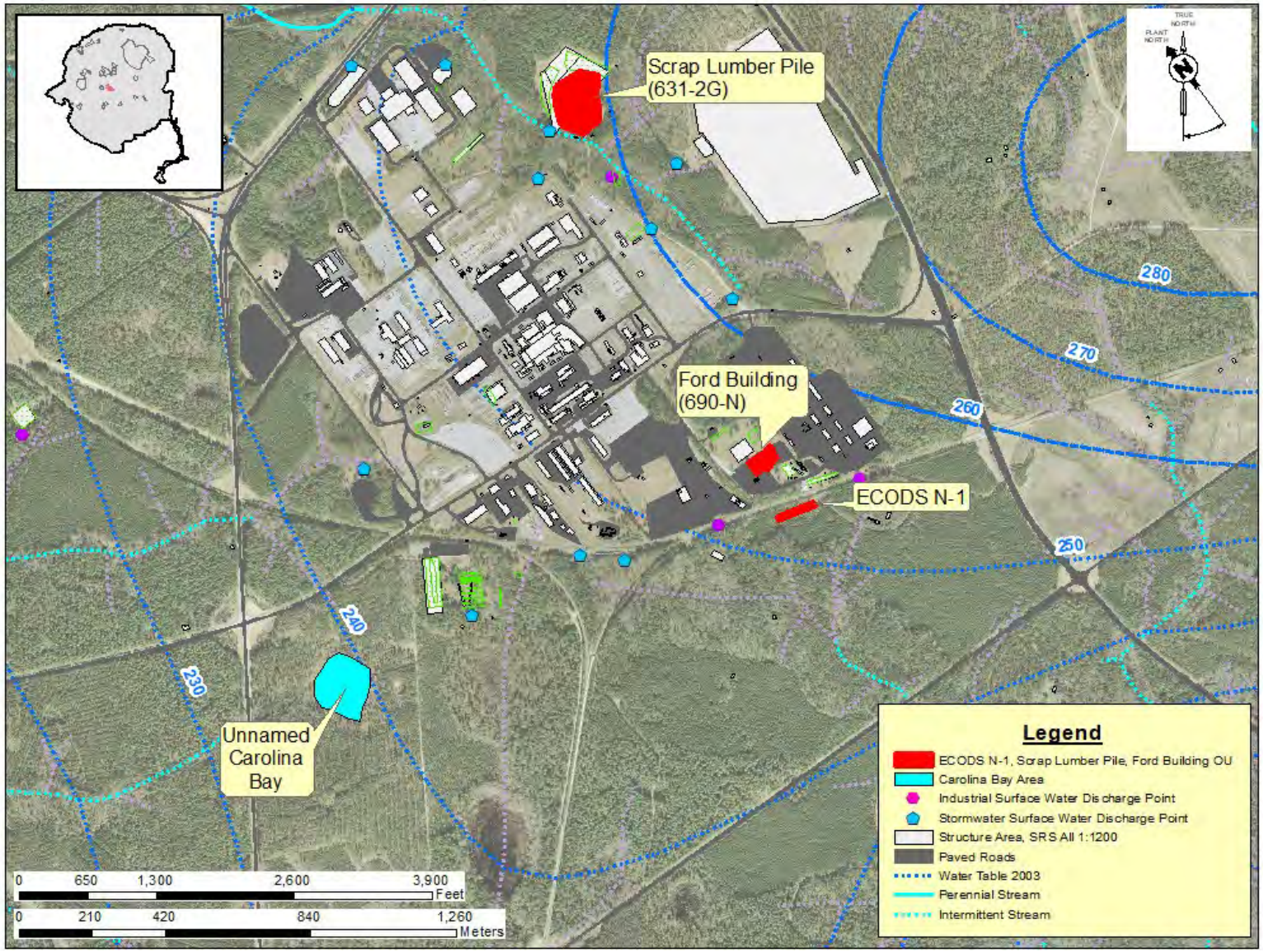


Figure D-1. ECODS N-1, CSSLP and Ford Building OU Location

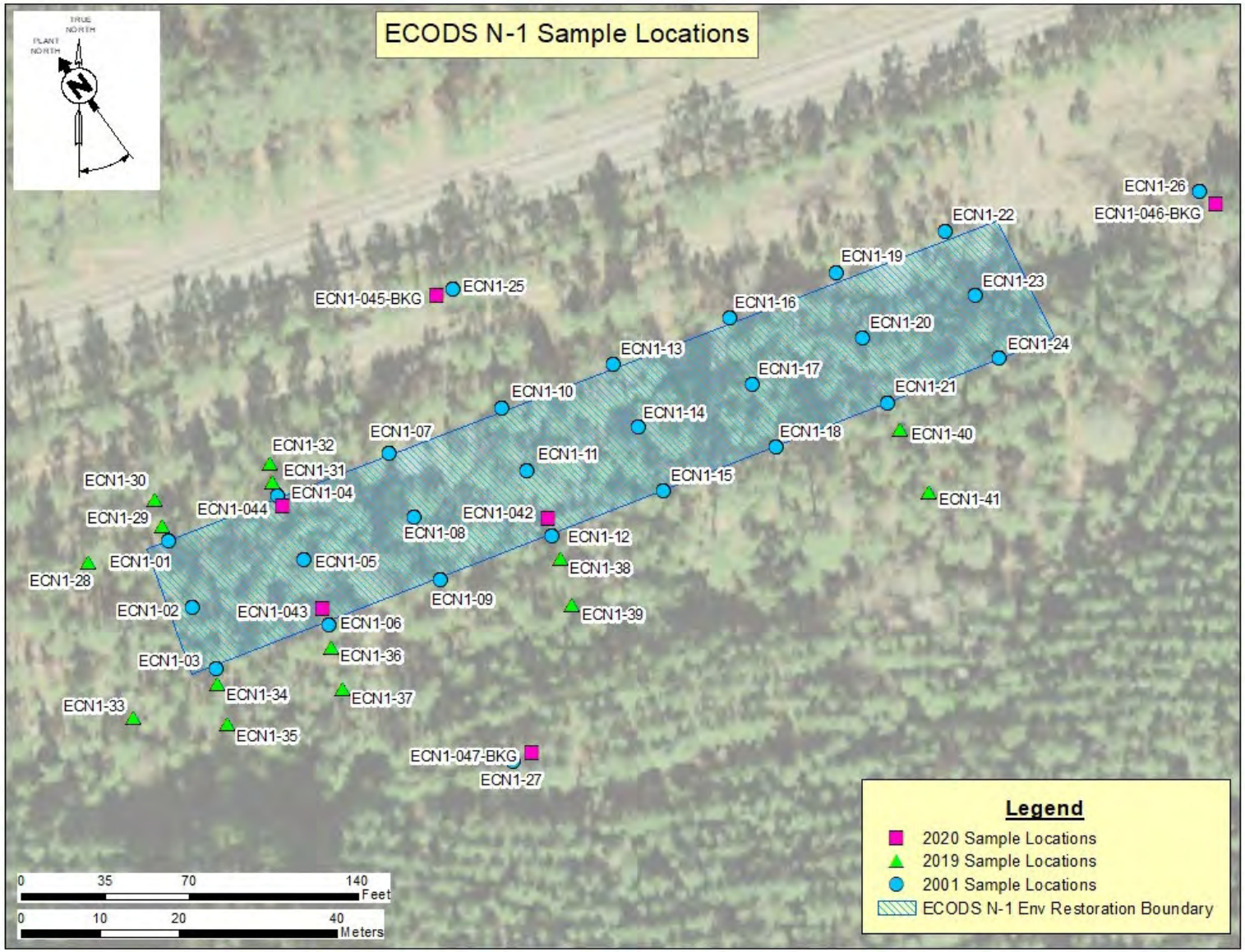


Figure D-2. ECODS N-1 Sample Location Map

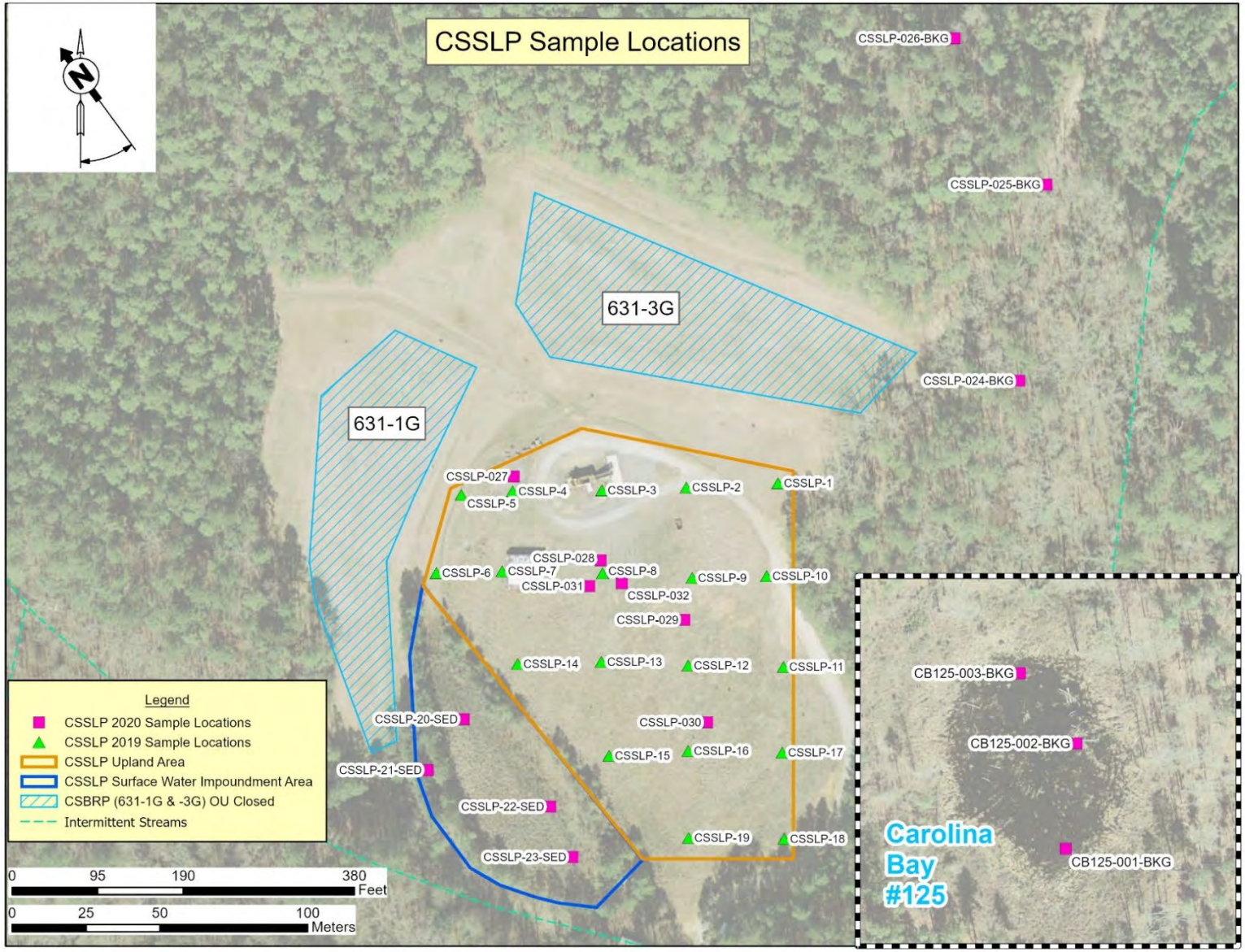


Figure D-3. Central Shops Scrap Lumber Pile (631-2G) Sample Location Map



Figure D-4. Ford Building Sample Location Map

Table D-1. Screening Level Evaluation for ECODS N-1 Subunit (Soil 0-1 ft)

Analyte	Detected Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Notes
Inorganics (mg/kg)										
ALUMINUM	1.12E+04		NA[7]	NA[7]	--	no	1.05E+04	YES	no	
ANTIMONY	1.26E+01	J	2.7E-01	a	46.67	YES	2.69E+00	YES	no	9
ARSENIC	5.08E+00	J	6.8E+00	b	0.74	no	4.28E+00	YES	no	
BARIUM	3.30E+01		3.3E+02	b	0.10	no	3.91E+01	no	no	
BERYLLIUM	2.70E-01	J	2.5E+00	b	0.11	no	2.89E-01	no	no	
CALCIUM	3.20E+02	J	EN[8]	Nutrient	--	no	4.76E+02	no	no	
CHROMIUM	5.02E+01		2.3E+01	a	2.18	YES	1.54E+01	YES	YES	
CHROMIUM, HEXAVALENT 7196A	2.90E+00		3.4E-01	a	8.53	YES	---	---	YES	
CHROMIUM, HEXAVALENT 7199	1.20E+00		3.4E-01	a	3.53	YES	---	---	YES	
COBALT	9.98E-01		1.3E+01	ab	0.08	no	1.54E+00	no	no	
COPPER	2.56E+02		1.4E+01	b	18.29	YES	4.34E+00	YES	YES	
CYANIDE	8.43E+00		9.8E-02	ab	86.02	YES	--	--	YES	
IRON	3.06E+04		NA[7]	NA[7]	--	no	1.27E+04	YES	no	
LEAD	1.47E+03		1.1E+01	a	133.64	YES	1.03E+01	YES	YES	
MAGNESIUM	1.48E+02		EN[8]	Nutrient	--	no	2.75E+02	no	no	
MANGANESE	7.35E+01		2.2E+02	ab	0.33	no	1.53E+02	no	no	
MERCURY	1.23E-01		1.3E-02	ab	9.46	YES	7.10E-02	YES	YES	
NICKEL	2.54E+01		1.0E+01	b	2.54	YES	3.48E+00	YES	YES	
POTASSIUM	9.75E+01		EN[8]	Nutrient	--	no	2.16E+02	no	no	
SELENIUM	2.42E+00	J	5.2E-01	ab	4.65	YES	2.99E+00	no	no	
THALLIUM	1.18E+00	J	5.0E-02	b	23.60	YES	3.12E+00	no	no	
VANADIUM	7.89E+01		4.7E+00	b	16.79	YES	3.91E+01	YES	YES	
ZINC	6.72E+01	J	4.6E+01	a	1.46	YES	9.47E+00	YES	YES	
Organics (mg/kg)										
ACETONE	6.19E-02		1.2E+00	ab	0.05	no	--	--	no	
CARBON DISULFIDE	3.80E-03	J	5.0E-03	a	0.76	no	--	--	no	

Table D-1. Screening Level Evaluation for ECODS N-1 Subunit (Soil 0-1 ft) *(Continued/End)*

Analyte	Detected Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Notes
Organics (mg/kg) (con'd)										
METHYL ETHYL KETONE	6.90E-03		1.0E+00	a	0.01	no	--	--	no	
2-METHYLNAPHTHALENE	2.37E-02	J	1.60E+01	a	0.001	no	--	--	no	
BENZO(G,H,I)PERYLENE	2.72E-02	J	1.10E+00	a	0.02	no	--	--	no	
BENZO[A]ANTHRACENE	3.22E-02	J	7.30E-01	a	0.04	no	--	--	no	
BENZO[A]PYRENE	3.10E-02	J	1.10E+00	a	0.03	no	--	--	no	
BENZO[B]FLUORANTHENE	5.97E-02	J	1.10E+00	a	0.05	no	--	--	no	
BIS(2-ETHYLHEXYL)PHTHALATE	8.57E-01		2.00E-02	ab	42.85	YES	--	--	YES	
CHRYSENE	7.31E-02	J	1.1E+00	a	0.07	no	--	--	no	
FLUORANTHENE	2.83E-02	J	1.1E+00	a	0.03	no	--	--	no	
PHENANTHRENE	3.18E-02	J	1.1E+01	b	0.003	no	--	--	no	
PYRENE	3.29E-02	J	1.1E+00	a	0.03	no	--	--	no	
Pesticides/PCBs (mg/kg)										
DDE	1.70E-03		2.1E-02	a	0.08	no	--	--	no	
DDT	2.30E-03		2.1E-02	ab	0.11	no	--	--	no	
AROCLOR 1254	4.69E-02		4.1E-02	a	1.14	YES	--	--	no	9
AROCLOR 1260	4.80E-02		4.1E-02	a	1.17	YES	--	--	no	9

1 - Maximum detected concentration from Appendix A Table A.1.1 ECODS Subunit Soil (0-1 ft).
2 - ESV from attachment D-1 Table I.A.
3 - a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).
3 - b = Los Alamos National Laboratory No Effect ESL for soil media (2017)
4 - Screening Level Hazard Quotient (HQ) = maximum detected concentration / ESV
5 - Background screening values obtained from *Background Soils Statistical Summary Report for Savannah River Site*, ERD-EN-2005,0223, Rev. 1, 10/06. For screening purposes, maximum concentration of only the naturally occurring (nonanthropogenic) constituents are compared to 2X average background concentration.
6 - COPEC = constituent of potential ecological concern. Analyte identified as a COPEC if the maximum detected concentration exceeds the ecological screening value (i.e., HQ>1), if available, and exceeds 2X average background concentration
7 - NA = not available, ESV for this constituent is not available.
8 - Essential nutrient, not subject to further evaluation.
9 - Eliminated due to frequency of detect <5% (minimum 20 samples)

Table D-2. Refinement Level Evaluation for ECODS N-1 Subunit (Soil 0-1 ft)

Analyte[1]	Exposure Point Concentration[2]	RSV[3]	RSV Source[4]	Refinement Level HQ[5]	EPC Exceeds RSV (HQ>1)?	COPC?[6]
Inorganics (mg/kg)						
CHROMIUM	1.64E+01	7.30E+01	b	0.2	no	no
CHROMIUM, HEXAVALENT 7196A	2.90E+00	3.40E+00	b	0.9	no	no
CHROMIUM, HEXAVALENT 7199	1.20E+00	3.40E+00	b	0.4	no	no
COPPER	2.20E+01	4.30E+01	b	0.5	no	no
LEAD	2.02E+02	2.30E+01	b	8.8	YES	YES
MERCURY	2.89E-02	1.30E-01	b	0.2	no	no
NICKEL	4.19E+00	2.10E+01	b	0.20	no	no
VANADIUM	3.56E+01	9.50E+00	b	3.8	YES	YES
ZINC	2.73E+01	4.80E+02	b	0.1	no	no
Organics (mg/kg)						
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	3.38E-01	2.00E-01	b	1.7	YES	YES
CYANIDE	1.55E+00	9.80E-01	b	1.6	YES	YES

1 - Analytes identified as COPECs from Table D-1
2 - EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.1.1 (0 to 1 ft)
3 - RSV from Attachment D-1 Table I.B
4 - a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).
4 - b = Los Alamos National Laboratory Low Effect ESL for soil media (2017)
5 - Refinement Level Hazard Quotient (HQ) = EPC / RSV
6 - COPC = constituent of potential concern. Analyte identified as a COPC if the refinement level HQ>1

Table D-3. Screening Level Evaluation for ECODS N-1 Subunit (Soil 1-4 ft)

Analyte	Detected Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Notes
Inorganics (mg/kg)										
ALUMINUM	2.30E+04		NA[7]	NA[7]	--	no	1.05E+04	YES	no	
ANTIMONY	5.89E+01		2.7E-01	a	218.1	YES	2.69E+00	YES	no	9
ARSENIC	1.04E+01		6.8E+00	b	1.53	YES	4.28E+00	YES	YES	
BARIUM	5.72E+01		3.3E+02	b	0.2	no	3.91E+01	YES	no	
BERYLLIUM	2.29E-01	J	2.5E+00		0.1	no	2.89E-01	no	no	
CADMIUM	4.05E+01		2.7E-01	b	150.0	YES	4.83E-01	YES	YES	
CALCIUM	2.01E+03		EN[7]	Nutrient	--	no	4.76E+02	YES	no	
CHROMIUM	4.58E+01		2.3E+01	a	2.0	YES	1.54E+01	YES	YES	
HEXAVALENT CHROMIUM 7196A	2.27E+00		3.4E-01	a	6.7	YES	---	---	YES	
HEXAVALENT CHROMIUM 7199	3.90E+00		3.4E-01	a	11.5	YES	---	---	YES	
COBALT	1.30E+00		1.3E+01	ab	0.1	no	1.55E+00	no	no	
COPPER	1.77E+04		1.4E+01	b	1264.3	YES	4.34E+00	YES	YES	
CYANIDE	5.72E+00		9.8E-02	ab	58	YES	--	--	YES	
IRON	4.39E+04		NA[8]	NA[8]	--	no	1.27E+04	YES	no	
LEAD	8.89E+02		1.1E+01	a	81	YES	1.03E+01	YES	YES	
MAGNESIUM	5.11E+02		EN[7]	Nutrient	--	no	2.75E+02	YES	no	
MANGANESE	4.88E+02		2.2E+02	ab	2.2	YES	1.53E+02	YES	YES	
MERCURY	1.05E-01		1.3E-02	ab	300	YES	7.10E-02	YES	YES	
NICKEL	1.41E+01		1.0E+01	b	1.4	YES	3.48E+00	YES	YES	
POTASSIUM	1.67E+02		EN[7]	Nutrient	--	no	2.16E+02	no	no	
SELENIUM	2.94E+02		5.2E-01	ab	565.4	YES	2.99E+00	YES	YES	
SILVER	3.04E-01	J	2.6E+00	b	0.1	no	7.28E-01	no	no	
SODIUM	1.26E+02	J	EN[7]	b	--	no	4.02E+01	YES	no	

Table D-3. Screening Level Evaluation for ECODS N-1 Subunit (Soil 1-4 ft) *(Continued)*

Analyte	Detected Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Notes
Inorganics (mg/kg) (cont'd)										
THALLIUM	2.33E+00		5.0E-02	b	46.6	YES	3.12E+00	no	no	
VANADIUM	7.90E+01		4.7E+00	b	16.8	YES	3.91E+01	YES	YES	
ZINC	1.40E+03	J	4.6E+01	a	30.4	YES	9.47E+00	YES	YES	
Organics (mg/kg)										
1,1,2,2 TETRACHLOROETHANE	1.60E-03		7.0E-02	a	0.02	NO	--	--	no	
ACETONE	1.92E-01		1.2E+00	ab	0.16	NO	--	--	no	
BENZO(G,H,I)PERYLENE	5.65E-02	J	1.1E+00	a	0.05	NO	--	--	no	
BENZO[A]ANTHRACENE	9.85E-02		7.3E-01	a	0.13	NO	--	--	no	
BENZO[A]PYRENE	1.03E-01		1.1E+00	a	0.09	NO	--	--	no	
BENZO[B]FLUORANTHENE	1.27E-01		1.1E+00	a	0.12	NO	--	--	no	
BENZO(K)FLUORANTHENE	5.92E-02	J	7.1E+01	a	0.00	NO	--	--	no	
BIS(2-ETHYLHEXYL)PHTHALATE	1.51E+00		2.0E-02	ab	76	YES	--	--	YES	
CARBON DISULFIDE	2.60E-03	J	5.0E-03	a	0.52	NO	--	--	no	
CHRYSENE	1.34E-01		1.1E+00	a	0.12	NO	--	--	no	
DIBENZ[AH]ANTHRACENE	2.82E-02	J	1.1E+00	a	0.03	NO	--	--	no	
DI-N-BUTYL PHTHALATE	1.20E-01		1.1E-02	a	10.91	YES	--	--	no	9
FLUORANTHENE	1.03E-01		1.1E+00	a	0.09	NO	--	--	no	
INDENO[1,2,3-CD]PYRENE	5.30E-02	J	1.1E+00	a	0.05	NO	--	--	no	
PHENANTHRENE	4.43E-02	J	1.1E+01	b	0.00	NO	--	--	no	
PYRENE	8.47E-02		1.1E+00	a	0.08	NO	--	--	no	

Table D-3. Screening Level Evaluation for ECODS N-1 Subunit (Soil 1-41 ft) *(Continued/End)*

Analyte	Detected Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Notes
Pesticides/PCBs (mg/kg)										
AROCLOR 1254	2.73E-02	J	4.1E-02	a	0.7	NO	--	--	no	
AROCLOR 1260	4.25E-02	J	4.1E-02	a	1.0	YES	--	--	YES	

1 - Maximum detected concentration from Appendix A Table A.1.2 ECODS N-1 Subunit Soil (1-4 ft).
2 - ESV from attachment D-1 Table I.A.
3 - a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).
3 - b = Los Alamos National Laboratory No Effect ESL for soil media (2017) electronic database
4 - Screening Level Hazard Quotient (HQ) = maximum detected concentration / ESV
5 - Background screening values obtained from *Background Soils Statistical Summary Report for Savannah River Site*, ERD-EN-2005,0223, Rev. 1, 10/06. For screening purposes, maximum concentration of only the naturally occurring (nonanthropogenic) constituents are compared to 2X average background concentration.
6 - COPEC = constituent of potential ecological concern. Analyte identified as a COPEC if the maximum detected concentration exceeds the ecological screening value (i.e., HQ>1), if available, and exceeds 2X average background concentration
7 - NA = not available, ESV for this constituent is not available.
8 - Essential nutrient, not subject to further evaluation.
9 - Eliminated due to frequency of detect <5% (minimum 20 samples)

Table D-4. Refinement Level Evaluation for ECODS N-1 Subunit (Soil 1-4 ft)

Analyte[1]	Exposure Point Concentration[2]	RSV[3]	RSV Source[4]	Refinement Level HQ[5]	EPC Exceeds RSV (HQ>1)?	COPC?[6]
Inorganics (mg/kg)						
ARSENIC	5.14E+00	3.1E+01	b	0.17	no	no
CADMIUM	3.26E+00	3.00E+00	b	1.1	no	YES
CHROMIUM	2.22E+01	7.30E+01	b	0.3	no	no
HEXAVALENT CHROMIUM 7196A	2.27E+00	3.40E+00	b	0.7	no	no
HEXAVALENT CHROMIUM 7199	3.90E+00	3.40E+00	b	1.1	YES	YES
COPPER	2.34E+03	4.30E+01	b	54.4	YES	YES
LEAD	1.31E+02	2.30E+01	b	5.7	YES	YES
MANGANESE	5.22E+01	1.10E+03	b	0.05	no	no
MERCURY	4.51E-02	1.30E-01	b	0.3	no	no
NICKEL	5.09E+00	2.10E+01	b	0.2	no	no
SELENIUM	4.11E+01	1.00E+00	b	41.1	YES	YES
VANADIUM	4.72E+01	9.50E+00	b	5.0	YES	YES
ZINC	2.84E+02	4.80E+02	b	0.6	no	no
Organics (mg/kg)						
BIS(2-ETHYLHEXYL)PHTHALATE (DEHP)	4.16E-01	2.00E-01	b	2.1	YES	YES
CYANIDE	1.62E+00	9.80E-01	b	1.7	YES	YES
Pesticides/PCBs (mg/kg)						
AROCLOR 1260	1.93E-02	8.80E+00	b	0.002	no	no

1 - Analytes identified as COPECs from Table D-3
2 - EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.1.2 ECODS N-1 Subunit (1-4 ft)
3 - RSV from Attachment D-1 Table I.B
4 - a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).
4 - b = Los Alamos National Laboratory Low Effect ESL for soil media (2017)
5 - Refinement Level Hazard Quotient (HQ) = EPC / RSV
6 - COPC = constituent of potential concern. Analyte identified as a COPC if the refinement level HQ>1

Table D-5. Screening Level Evaluation for CSSLP Subunit (Soil 0-1 ft)

Analyte	Detected Maximum[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Notes
Inorganics (mg/kg)										
ACETONE	5.79E-01	J	1.2E+00	a	0.5	no	---	---	no	
ALUMINUM	9.33E+03		NA[8]	NA[8]	--	no	1.05E+04	no	no	
ANTIMONY	1.57E+00	J	2.7E-01	a	6	YES	2.69E+00	no	no	
ARSENIC	6.31E+01		6.8E+00	b	9.3	YES	4.28E+00	YES	YES	
BARIUM	7.62E+01		3.3E+02	b	0.2	no	3.91E+01	YES	no	
BERYLLIUM	5.24E-01		2.5E+00	b	0.2	no	2.89E-01	YES	no	
CADMIUM	2.72E-01	J	2.7E-01	b	1.0	YES	4.83E-01	no	no	
CALCIUM	3.54E+03		EN[7]	Nutrient	--	no	4.76E+02	YES	no	
CHROMIUM	3.26E+01		2.3E+01	a	1.4	YES	1.54E+01	YES	YES	
CYANIDE	2.03E-01	J	9.8E-02	b	2.1	YES	---	---	YES	
HEXAVALENT CHROMIUM 7196A	9.86E-01		3.4E-01	a	2.9	YES	---	---	YES	
COBALT	4.26E+00		1.3E+01	ab	0.3	no	1.55E+00	YES	no	
COPPER	6.78E+01		1.4E+01	b	4.8	YES	4.34E+00	YES	YES	
IRON	1.51E+04		NA[8]	NA[8]	--	no	1.27E+04	YES	no	
LEAD	2.32E+01		1.1E+01	a	2	YES	1.03E+01	YES	YES	
MAGNESIUM	2.48E+03		EN[7]	Nutrient	--	no	2.75E+02	YES	no	
MANGANESE	2.64E+02		2.2E+02	ab	1.2	YES	1.53E+02	YES	YES	
MERCURY	2.82E-02		3.5E-04	ab	81	YES	7.10E-02	no	no	
NICKEL	1.38E+01		1.0E+01	b	1.4	YES	3.48E+00	YES	YES	
POTASSIUM	7.22E+02	J	EN[7]	Nutrient	--	no	2.16E+02	YES	no	
SELENIUM	3.13E+00	J	5.2E-01	ab	6.0	YES	2.99E+00	YES	YES	
SILVER	4.79E-01	J	2.6E+00	b	0.2	no	7.28E-01	no	no	
SODIUM	1.32E+02		EN7	Nutrient	--	no	4.02E+01	YES	no	

Table D-5. Screening Level Evaluation for CSSLP Subunit (Soil 0-1 ft) *(Continued)*

Analyte	Detected Maximum[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Notes
Inorganics (mg/kg)										
THALLIUM	6.81E-01	J	5.0E-02	a	13.6	YES	3.12E+00	no	no	
VANADIUM	3.99E+01		4.7E+00	b	8.5	YES	3.91E+01	YES	YES	
ZINC	1.62E+02		4.6E+01	a	3.5	YES	9.47E+00	YES	YES	
Organics (mg/kg)										
2-METHYLNAPHTHALENE	1.60E-02	J	2.7E+00	a	0.01	no	--	--	no	
ANTHRACENE	4.44E-01		6.8E+00	b	0.07	no	--	--	no	
BENZO(G,H,I)PERYLENE	7.63E-02		1.1E+00	a	0.07	no	--	--	no	
BENZO(K)FLUORANTHENE	2.26E-01		1.1E+00	a	0.21	no	--	--	no	
BENZO[A]ANTHRACENE	3.89E-01		8.0E-01	a	0.49	no	--	--	no	
BENZO[A]PYRENE	3.44E-01		1.1E+00	a	0.31	no	--	--	no	
BENZO[B]FLUORANTHENE	5.63E-01		1.1E+00	a	0.51	no	--	--	no	
BIS(2-ETHYLHEXYL)PHTHALATE	2.90E-01		2.0E-02	ab	14.50	YES	--	--	YES	
CARBAZOLE	6.02E-02	J	7.0E-02	a	0.86	no	--	--	no	
CHRYSENE	4.67E-01		1.1E+00	a	0.42	no	--	--	no	
CUMENE	4.57E-04	J	4.0E-02	a	0.01	no	--	--	no	
DIBENZ[A,H]ANTHRACENE	2.22E-02	J	1.1E+00	a	0.02	no	--	--	no	
DI-N-BUTYLPHTHALATE	4.24E-02	J	1.1E-02	a	3.85	YES	--	--	YES	
FLUORANTHENE	7.98E-01		1.1E+00	a	0.73	no	--	--	no	
INDENO[1,2,3-CD]PYRENE	7.56E-02		1.1E+00	a	0.07	no	--	--	no	
METHYL ETHYL KETONE	3.77E-03	J	1.0E+00	a	0.004	no	--	--	no	
NAPHTHALENE	1.96E-02	J	3.4E+00	a	0.01	no	--	--	no	
PHENANTHRENE	4.53E-01		1.1E+00	b	0.41	no	--	--	no	
PYRENE	6.10E-01		1.0E+01	a	0.06	no	--	--	no	

Table D-5. Screening Level Evaluation for CSSLP Subunit (Soil 0-1 ft) *(Continued/End)*

Analyte	Detected Maximum[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Notes
Pesticides/PCBs (mg/kg)										
ALDRIN	8.33E-04		3.0E-02	a	0.03	no	--	--	no	
ALPHA-CHLORDANE	5.34E-04		2.9E-03	a	0.18	no	--	--	no	
DDE	1.14E-03	J	6.3E-03	a	0.18	no	--	--	no	
DDT	6.10E-04	J	2.1E-02	ab	0.03	no	--	--	no	
GAMMA-CHLORDANE	7.97E-04		2.0E-02	a	0.04	no	--	--	no	
AROCLOR 1254	6.57E-03		4.1E-02	a	0.2	no	--	--	no	
AROCLOR 1260	1.53E-02		4.1E-02	a	0.4	no	--	--	no	

1 - Maximum detected concentration from Appendix A Table A.2.1 Soil Media (0-1 ft)
2 - ESV from Attachment D-1 Table I.A.
3 - a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018), Table 3.
3 - b = Los Alamos National Laboratory No Effect ESL for soil media (2017)
4 - Screening Level Hazard Quotient (HQ) = maximum detected concentration / ESV
5 - Background screening values obtained from the Background Soils Statistical Summary Report for the Savannah River Site, ERD-EN-2005-0223, Rev. 1, October 2006
6 - COPEC = constituent of potential ecological concern. Analyte identified as a COPEC if the maximum detected concentration exceeds the ecological screening value (i.e., HQ>1), if available, and exceeds 2X average background concentration
7 - Essential nutrient, not subject to further evaluation
8 - NA = not available, ESV for this constituent is not available.

Table D-6. Refinement Level Evaluation for CSSLP Subunit (Soil 0-1 ft)

Analyte[1]	Exposure Point Concentration[2]	RSV[3]	RSV Source[4]	Refinement Level HQ[5]	Exceeds RSV (HQ>1)?	COPC?[6]
Inorganics (mg/kg)						
ARSENIC	1.64E+01	3.1E+01	b	0.5	no	no
CHROMIUM	1.82E+01	7.3E+01	b	0.2	no	no
CYANIDE	1.59E-01	9.8E-01	b	0.2	no	no
HEXAVALENT CHROMIUM 7196A	7.93 E-01	3.4E+00	b	0.2	no	no
COPPER	2.81E+01	4.3E+01	b	0.7	no	no
LEAD	1.93E+01	2.3E+01	b	1	no	no
MANGANESE	9.89E+01	1.1E+03	b	0.1	no	no
NICKEL	5.35E+00	2.1E+01	b	0.3	no	no
SELENIUM	1.25E+00	1.0E+00	b	1.25	YES	YES
VANADIUM	2.68E+01	9.5E+00	b	2.8	YES	YES
ZINC	6.31E+01	1.2E+02	b	0.5	no	no
Organics (mg/kg)						
BIS(2-ETHYLHEXYL)PHTHALATE (DEHP)	1.18E-01	2.0E-01	b	0.59	no	no
DI-N-BUTYL PHTHALATE	2.40E-02	1.1E-01	b	0.22	no	no

1 - Analytes identified as COPECs from Table D-5
2 - EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.2.1 CSSLP Subunit (0-1 ft)
3 - RSV from Attachment D-1 Table I.B
4: a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
4: b = Los Alamos National Laboratory Low Effect ESL for Soil Media (2017)
5 - Refinement Level Hazard Quotient (HQ) = EPC / RSV
6 - COPC = constituent of potential concern. Analyte identified as a COPC if the refinement level HQ>1

Table D-7. Screening Level Evaluation for CSSLP Subunit (Soil 1-4 ft)

Analyte	Detected Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Note
Inorganics (mg/kg)										
ALUMINUM	1.25E+04		NA[8]	NA[8]	--	no	1.05E+04	YES	no	
ANTIMONY	2.37E+01		2.7E-01	a	8.78E+01	YES	2.69E+00	YES	YES	
ARSENIC	5.52E+01		6.8E+00	b	8.12E+00	YES	4.28E+00	YES	YES	
BARIUM	1.63E+02	J	3.3E+02	b	4.94E-01	no	3.91E+01	YES	no	
BERYLLIUM	4.61E-01	J	2.5E+00	b	1.84E-01	no	2.89E-01	YES	no	
CADMIUM	1.18E+00		2.7E-01	b	4.37E+00	YES	4.83E-01	YES	YES	
CALCIUM	4.40E+03		EN[7]	Nutrient	--	no	4.76E+02	YES	no	
CHROMIUM	3.81E+01		2.3E+01	a	1.66E+00	YES	1.54E+01	YES	YES	
CHROMIUM HEXAVALENT 7196A	6.98E-01		3.4E-01	a	2.05E+00	YES	---	---	YES	
COBALT	3.20E+00		1.3E+01	ab	2.46E-01	no	1.55E+00	YES	no	
COPPER	5.85E+01		1.4E+01	b	4.18E+00	YES	4.34E+00	YES	YES	
IRON	1.83E+04		NA[8]	NA[8]	--	no	1.27E+04	YES	no	
LEAD	3.42E+01		1.1E+01	a	3.11E+00	YES	1.03E+01	YES	YES	
MAGNESIUM	1.47E+03		EN[7]	Nutrient	--	no	2.75E+02	YES	no	
MANGANESE	1.95E+02		2.2E+02	ab	8.86E-01	no	1.53E+02	YES	no	
MERCURY	8.84E-01		3.5E-04	ab	2.53E+03	YES	7.10E-02	YES	YES	
NICKEL	1.46E+01		1.0E+01	b	1.46E+00	YES	3.48E+00	YES	YES	
POTASSIUM	7.57E+02		EN[7]	Nutrient	--	no	2.16E+02	YES	no	
SELENIUM	3.95E+00	J	5.2E-01	ab	7.60E+00	YES	2.99E+00	YES	YES	
SILVER	5.85E-01		2.6E+00	b	2.25E-01	no	7.28E-01	NO	no	
SODIUM	1.65E+02		EN[7]	Nutrient	--	no	4.02E+01	YES	no	
THALLIUM	6.11E-01	J	5.0E-02	a	1.22E+01	YES	3.12E+00	NO	no	
VANADIUM	4.82E+01		4.7E+00	b	1.03E+01	YES	3.91E+01	YES	YES	
ZINC	1.80E+02		4.6E+01	a	3.91E+00	YES	9.47E+00	YES	YES	

Table D-7. Screening Level Evaluation for CSSLP Subunit (Soil 1-4 ft) *(Continued)*

Analyte	Detected Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Note
Organics (mg/kg)										
2-METHYLNAPHTHALENE	1.34E-02	J	2.7E+00	a	4.96E-03	no	--	--	no	
ACETONE	5.21E-01	J	1.2E+00	ab	4.34E-01	no	--	--	no	
ANTHRACENE	9.55E-02	J	6.8E+00	b	1.40E-02	no	--	--	no	
BENZENE	5.00E-04	J	1.2E-01	a	4.17E-03	no	--	--	no	
BENZO(G,H,I)PERYLENE	1.64E-02	J	1.1E+00	a	1.49E-02	no	--	--	no	
BENZO[A]ANTHRACENE	4.54E-01		8.0E-01	a	5.68E-01	no	--	--	no	
BENZO[A]PYRENE	4.00E-01		1.1E+00	a	3.64E-01	no	--	--	no	
BENZO[B]FLUORANTHENE	7.19E-01		1.1E+00	a	6.54E-01	no	--	--	no	
BENZO(K)FLUORANTHENE	2.69E-01		1.1E+00	a	2.45E-01	no	--	--	no	
BIS(2-ETHYLHEXYL)PHTHALATE	1.45E+00	J	2.0E-02	ab	7.25E+01	YES	--	--	YES	
CHRYSENE	4.74E-01		1.1E+00	a	4.31E-01	no	--	--	no	
CUMENE	4.80E-03		4.0E-02	a	1.20E-01	no	--	--	no	
DIBENZ[A,H]ANTHRACENE	1.75E-02	J	1.1E+00	a	1.59E-02	no	--	--	no	
DI-N-BUTYLPHTHALATE	8.23E-02		1.1E-02	a	7.48E+00	YES	--	--	YES	
FLUORANTHENE	9.31E-01		1.1E+00	a	8.46E-01	no	--	--	no	
INDENO[1,2,3-CD]PYRENE	5.91E-02		1.1E+00	a	5.37E-02	no	--	--	no	
METHYL ETHYL KETONE	4.90E-03	J	1.0E+00	a	4.90E-03	no	--	--	no	
METHYLCYCLOHEXANE	5.00E-04	J	---		---	no	--	--	no	
PHENANTHRENE	3.73E-01		1.1E+00	b	3.39E-01	no	--	--	no	
PYRENE	7.26E-01		1.0E+01	a	7.26E-02	no	--	--	no	
Pesticides/PCBs (mg/kg)										
ALDRIN	3.20E-03		3.0E-02	a	1.07E-01	no	--	--	no	
ALPHA-CHLORDANE	8.10E-03		2.9E-03	a	2.79E+00	YES	--	--	YES	
AROCLOR 1254	1.26E-01		4.1E-02	a	3.07E+00	YES	--	--	YES	
AROCLOR 1260	6.68E-02		4.1E-02	a	1.63E+00	YES	--	--	YES	

Table D-7. Screening Level Evaluation for CSSLP Subunit (Soil 1-4 ft) *(Continued/End)*

Analyte	Detected Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Note
Pesticides/PCBs (mg/kg) (cont'd)										
DDD	5.90E-03	J	6.3E-03	b	9.37E-01	no	--	--	no	
DDE	5.40E-03	J	6.3E-03	a	8.57E-01	no	--	--	no	
DDT	6.00E-04	J	2.1E-02	a	2.86E-02	no	--	--	no	
DIELDRIN	2.05E-02		2.9E-03	a	7.07E+00	YES	--	--	YES	
GAMMA-CHLORDANE	8.72E-03		2.0E-02	a	4.36E-01	no	--	--	no	
LINDANE	2.82E-02		3.1E-03	a	9.10E+00	YES	--	--	YES	
Radionuclides (pCi/g)										
THORIUM-228	1.56E+00	J	4.3E+02	b	3.63E-03	no	1.97E+00	NO	no	
THORIUM-230	1.12E+00	J	5.2E+02	b	2.15E-03	no	1.13E+00	NO	no	
THORIUM-232	1.23E+00	J	6.2E+01	b	1.98E-02	no	2.09E+00	NO	no	

1 - Maximum detected concentration from Appendix A Table A.2.2 Soil Media (1-4 ft)
2 - ESV from Attachment D-1 Table I.A.
3 - a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018), Table 3.
3 - b = Los Alamos National Laboratory No Effect ESL for soil media (2017)
4 - Screening Level Hazard Quotient (HQ) = maximum detected concentration / ESV
5 - Background screening values obtained from the Background Soils Statistical Summary Report for the Savannah River Site, ERD-EN-2005-0223, Rev. 1, October 2006.
6 - COPEC = constituent of potential ecological concern. Analyte identified as a COPEC if the maximum detected concentration exceeds the ecological screening value (i.e., HQ>1), if available, and exceeds 2X average background concentration
7 - Essential nutrient, not subject to further evaluation
8 - NA = not available, ESV for this constituent is not available.

Table D-8. Refinement Level Evaluation for CSSLP Subunit (Soil 1-4 ft)

Analyte[1]	Exposure Point Concentration[2]	RSV[3]	RSV Source[4]	Refinement Level HQ[5]	EPC Exceeds RSV (HQ>1)?	COPC?[6]
Inorganics (mg/kg)						
ANTIMONY	6.02E+00	2.3E+01	b	0.3	no	no
ARSENIC	1.81E+01	3.1E+01	b	0.6	no	no
CADMIUM	2.93E-01	3.6E+00	b	0.1	no	no
CHROMIUM	2.28E+01	7.3E+01	b	0.3	no	no
CHROMIUM HEXAVALENT 7196A	6.98E-01	3.4E+00	b	0.2	no	no
COPPER	2.50E+01	4.3E+01	b	0.6	no	no
LEAD	1.61E+01	2.3E+01	b	0.7	no	no
MERCURY	2.40E-01	1.3E-01	b	1.8	YES	YES
NICKEL	5.99E+00	2.1E+01	b	0.3	no	no
SELENIUM	1.48E+00	1.0E+00	b	1.5	YES	YES
VANADIUM	2.36E+01	9.5E+00	b	2.5	YES	YES
ZINC	7.75E+01	1.2E+02	b	0.6	no	no
Organics (mg/kg)						
BIS(2-ETHYLHEXYL)PHTHALATE	4.33E-01	2.0E-01	b	2.165	YES	YES
DI-N-BUTYLPHTHALATE	3.88E-02	1.1E-01	b	0.353	no	no
Pesticides/PCBs (mg/kg)						
ALPHA-CHLORDANE	2.70E-03	1.3E+00	b	0.002	no	no
AROCLOR 1254	7.71E-02	4.1E-01	b	0.188	no	no
AROCLOR 1260	3.27E-02	8.8E+00	b	0.004	no	no
DIELDRIN	4.30E-03	9.0E-03	b	0.478	no	no
LINDANE (Gamma-BHC)	2.82E-02	9.5E-02	b	0.297	no	no

1 - Analytes identified as COPECs from Table D-7
2 - EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.2.2 CSSLP Subunit Soil (1-4 ft)
3 - RSV from Attachment D-1 Table I.B
4. a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
4. b = Los Alamos National Laboratory Low Effect ESL for Soil Media (2017)
5 - Refinement Level Hazard Quotient (HQ) = EPC / RSV
6 - COPC = constituent of potential concern. Analyte identified as a COPC if the refinement level HQ>1

Table D-9. Screening Level Evaluation for CSSLP Surface Water Impoundment Area (Sediment 0-1 ft)

Analyte[1]	Detected Maximum[2]	Qualifier	ESV[3]	ESV Source[4]	Screening Level HQ[5]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[6]	Maximum Exceeds Background?	COPEC?[6]	Notes
Inorganics (mg/kg)										
ALUMINUM	8.96E+03		2.5E+04	a	3.58E-01	no	1.05E+04	no	no	
ARSENIC	8.59E+00		6.8E+00	ac	1.26E+00	YES	4.28E+00	YES	YES	
BARIUM	3.34E+01		2.0E+01	a	1.67E+00	YES	3.91E+01	no	no	
BERYLLIUM	1.83E-01	J	2.5E+00	d	7.32E-02	no	2.89E-01	no	no	
CALCIUM	5.68E+02		NA[8]	Nutrient	--	no	4.76E+02	YES	no	
CHROMIUM	1.50E+01		2.3E+01	ac	6.52E-01	no	1.54E+01	no	no	
HEXAVALENT CHROMIUM 7196A	1.36E+00	J	3.4E-01	d	4.00E+00	YES	---	---	YES	
COBALT	7.78E-01		1.3E+01	d	5.98E-02	no	1.55E+00	no	no	
COPPER	4.13E+00		1.4E+01	d	2.95E-01	no	4.34E+00	no	no	
IRON	1.44E+04		2.0E+04	ac	7.20E-01	no	1.27E+04	YES	no	
LEAD	8.33E+00		1.1E+01	d	7.57E-01	no	1.03E+01	no	no	
MAGNESIUM	2.11E+02		NA[8]	Nutrient	--	no	2.75E+02	no	no	
MANGANESE	8.10E+01		2.2E+02	bd	3.68E-01	no	1.53E+02	no	no	
MERCURY	2.66E-02		3.5E-04	d	7.60E+01	YES	7.10E-02	no	no	
NICKEL	2.18E+00		1.0E+01	d	2.18E-01	no	3.48E+00	no	no	
POTASSIUM	2.00E+02		NA[8]	Nutrient	--	no	2.16E+02	no	no	
SODIUM	1.06E+01	J	NA[8]	Nutrient	--	no	4.02E+01	no	no	
THALLIUM	6.19E-01	J	5.0E-02	d	1.24E+01	YES	3.12E+00	no	no	
VANADIUM	3.92E+01		4.7E+00	d	8.34E+00	YES	3.91E+01	YES	YES	
ZINC	8.81E+00	J	4.6E+01	d	1.92E-01	no	9.47E+00	no	no	

Table D-9. Screening Level Evaluation for CSSLP Surface Water Impoundment Area (Sediment 0-1 ft) *(Continued/End)*

Analyte[1]	Detected Maximum[2]	Qualifier	ESV[3]	ESV Source[4]	Screening Level HQ[5]	Maximum Exceeds ESV (HQ>1)?	2x Average Background[6]	Maximum Exceeds Background?	COPEC?[6]	Notes
Organics (mg/kg)										
ACETONE	6.00E-02		6.5E-02	c	9.23E-01	no	---	---	no	
BENZO[A]ANTHRACENE	1.21E-02	J	1.0E-01	ac	1.21E-01	no	--	--	no	
BENZO[B]FLUORANTHENE	1.33E-02	J	1.9E-01	c	7.00E-02	no	--	--	no	
BIS(2-ETHYLHEXYL)PHTHALATE (DEHP)	2.16E-02	J	2.0E-02	a	1.08E+00	YES	--	--	YES	
DIMETHYL PHTHALATE	1.89E-02	J	3.5E-01	a	5.40E-02	no	--	--	no	
METHYL ETHYL KETONE	8.30E-03		1.0E+00	a	8.30E-03	no	--	--	no	
TOLUENE	4.00E-03		1.0E-02	c	4.00E-01	no	--	--	no	
Radionuclides (pCi/g)										
THORIUM-228	4.16E+00		4.3E+01	d	9.67E-02	no	2.21	no	no	
THORIUM-230	1.44E+00		5.2E+01	d	2.77E-02	no	1.35	no	no	
THORIUM-232	3.31E+00		6.2E+00	d	5.34E-01	no	2.09	no	no	
URANIUM-233/234	1.27E+00		4.4E+02	d	2.89E-03	no	1.29	no	no	
URANIUM-238	1.07E+00		6.7E+02	c	1.60E-03	no	1.01	no	no	

1 - Maximum detected concentration from Appendix A Table A.2.4 Sediment Media (0-1 ft)
2 - ESV is most conservative value (lowest concentration) between EPA Region 4 and Los Alamos National Laboratory for sediment or soil, D-1 Table II.A.
3 - a = EPA Region 4 Ecological Risk Assessment Supplemental Guidance (2018), Tables 2a, 2b, 2c (Sediment)
3 - b = EPA Region 4 Ecological Risk Assessment Supplemental Guidance (2018), Table 3 (Soil)
3 - c = Los Alamos National Laboratory No Effect ESL for Sediment Media
3 - d = Los Alamos National Laboratory No Effect ESL for Soil Media
4 - Screening Level Hazard Quotient (HQ) = maximum detected concentration / ESV
5 - Background screening values obtained from *Background Soils Statistical Summary Report for Savannah River Site*, ERD-EN-2005,0223, Rev. 1, 10/06. For screening purposes, maximum concentration of only the naturally occurring (nonanthropogenic) constituents are compared to 2X average background concentration.
6 - Constituents are identified as COPCs if the maximum detected concentration exceeds the ESV and the 2X average background concentration (if applicable).
7 - EN = essential nutrient
8 - NA = not available, ESV for this constituent is not available.

Table D-10. Refinement Level Evaluation for CSSLP Surface Water Impoundment Area (Sediment 0-1 ft)

Analyte1	EPC Concentration[2]	RSV[2]	RSV Source[3]	Refinement Level HQ[4]	EPC Exceeds RSV (HQ>1)?	COPC?[5]
Inorganics (mg/kg)						
ARSENIC	8.27E+00	3.1E+01	a	0.75	no	no
HEXAVALENT CHROMIUM 7196A	1.36E+00	3.4E+00	a	0.4	no	no
VANADIUM	3.92E+01	9.5E+00	c	4.1	YES	YES
Organics (mg/kg)						
BIS(2-ETHYLHEXYL)PHTHALATE (DEHP)	2.16E-02	2.0E-01	a	0.1	no	no

1 - Analytes identified as COPECs from Table D-9
2 - EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RSV from Attachment D-1 Table II.B
3 - a = EPA Region 4 Ecological Risk Assessment Supplemental Guidance (2018), Tables 2a, 2b, 2c (Sediment)
3 - b = EPA Region 4 Ecological Risk Assessment Supplemental Guidance (2018), Table 3 (Soil)
3 - c = Los Alamos National Laboratory No Effect ESL for Sediment Media
3 - d = Los Alamos National Laboratory No Effect ESL for Soil Media
4 - Refinement Level Hazard Quotient (HQ) = average concentration / RSV
5 - Constituents are identified as COCs if the HQ > 1.

Table D-11. Screening Level Evaluation for CSSLP Surface Water Impoundment Area (Surface Water, Unfiltered)

Analyte[1]	Detected Maximum[2]	Qualifier	ESV[3]	ESV Source[4]	Screening Level HQ[5]	Maximum Exceeds ESV (HQ>1)?	COPEC?[6]	Notes
Inorganics (µg/L)								
ALUMINUM	4.03E+02		8.70E+01	b	4.6	YES	YES	
ANTIMONY	3.58E+00	J	3.00E+01	c	0.1	no	no	
ARSENIC	2.33E+01	J	1.50E+02	abc	0.2	no	no	
BARIUM	2.01E+01		3.90E+00	c	5.2	YES	YES	
CALCIUM	6.96E+03		1.16E+05	b	0.4	no	no	
CHROMIUM	3.65E+00	J	1.10E+01	abc	0.3	no	no	Chromium VI
COPPER	3.26E+01		2.90E+00	a	11.2	YES	YES	
IRON	2.66E+03		1.00E+03	bc	2.7	YES	YES	
LEAD	4.50E+00	J	5.40E-01	a	8	YES	YES	
MAGNESIUM	1.87E+03		8.20E+04	b	0.02	no	no	
MANGANESE	4.00E+02		9.30E+01	b	4.3	YES	YES	
POTASSIUM	5.44E+03		5.30E+04	b	0.1	no	no	
SODIUM	9.86E+02		6.80E+05	b	0.001	no	no	
VANADIUM	6.13E+00		1.90E+01	c	0.3	no	no	
ZINC	4.17E+01		3.70E+01	a	1.1	YES	YES	
Organics (µg/L)								
Acetone	1.67E+01		1.50E+03	c	0.01	no	no	

1 - Maximum detected concentration from Appendix A Table A.2.7 Surface Water
2 - ESV from Attachment D-1 Table III.A
3: a = SCDHEC, R61-68, Water Classifications and Standards, chronic values for freshwater aquatic life (2020)
3: b = Table 1a in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
3: c = Los Alamos National Laboratory Ecorisk Database (2017)
4 - Screening Level Hazard Quotient (HQ) = maximum detected concentration/ESV
5 - COPEC = constituent of potential ecological concern. Analyte identified as a COPEC if the maximum detected concentration exceeds the ecological screening value (i.e., HQ>1); a background screen was not performed for surface water media

Table D-12. Refinement Level Evaluation for CSSLP Surface Water Impoundment Area (Surface Water, Unfiltered)

Analyte	Exposure Point Concentration[1]	Refinement Screening Value[2]	RSV Source[3]	Screening Level HQ[4]	Exceeds RSV (HQ>1)?	COPC?[6]
Inorganics (µg/L)						
ALUMINUM	4.03E+02	8.70E+01	b	4.6	YES	YES
BARIUM	2.01E+01	3.90E+01	c	0.5	no	no
COPPER	3.26E+01	2.90E+00	a	11.2	YES	YES
IRON	2.66E+03	1.00E+03	b	2.7	YES	YES
LEAD	4.50E+00	5.40E-01	a	8	YES	YES
MANGANESE	4.00E+02	9.30E+01	b	4.3	YES	YES
ZINC	4.17E+01	3.70E+01	a	1.1	YES	YES

1 - Analytes identified as COPECs from Table D-11
2 - EPC = exposure point concentration (EPC) is the lesser of the maximum detected concentration or the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.2.7 Surface Water
3 - RSV from Attachment D-1 Table III.B
4: a = SCDHEC, R61-68, Water Classifications and Standards, chronic values for freshwater aquatic life (2020)
4: b = Table 1a in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
4: c = Los Alamos National Laboratory (2017)
5 - Refinement Level Hazard Quotient (HQ) = EPC / RSV
6 - COPC = constituent of potential concern. Analyte identified as a COPC if the refinement level HQ>1

Table D-13. Screening Level Evaluation for CCSLP Surface Water Impoundment Area (Surface Water, Filtered)

Analyte[1]	Detected Maximum[2]	Qualifier	ESV[3]	ESV Source[4]	Screening Level HQ[5]	Maximum Exceeds ESV (HQ>1)?	COPEC?[6]	Notes
Inorganics µg/L								
ALUMINUM	3.95E+02		8.70E+01	b	4.5	YES	YES	
ARSENIC	2.02E+01	J	1.50E+02	b	0.1	no	no	
BARIUM	1.96E+01		3.90E+00	c	5.0	YES	YES	
CALCIUM	6.76E+03		1.60E+04	b	0.4	no	no	
HEXAVALENT CHROMIUM 7196A	4.21E+00	J	1.10E+01	bc	0.4	no	no	EPA Chromium VI (filtered)
COPPER	3.96E+01		2.90E+00	a	13.7	YES	YES	
IRON	2.19E+03		1.00E+03	bc	2.2	YES	YES	
LEAD	4.51E+00	J	5.40E-01	a	8	YES	YES	
MAGNESIUM	1.81E+03		8.20E+04	b	0.02	no	no	
MANGANESE	2.88E+02		9.30E+01	b	3.1	YES	YES	
POTASSIUM	5.23E+03		5.30E+04	b	0.1	no	no	
SODIUM	1.93E+03		6.80E+05	b	0.003	no	no	
VANADIUM	5.87E+00		1.90E+01	c	0.3	no	no	
ZINC	4.06E+01		3.70E+01	a	1.1	YES	YES	

1 - Maximum detected concentration from Appendix A Table A.2.8 Surface Water
2 - ESV from attachment D-1 Table III.A
3: a = SCDHEC, R61-68, Water Classifications and Standards, chronic values for freshwater aquatic life (2020)
3: b = Table 1a in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
3: c = Los Alamos National Laboratory Ecorisk Database (2017)
4 - Screening Level Hazard Quotient (HQ) = maximum detected concentration/ESV
5 - COPEC = constituent of potential ecological concern. Analyte identified as a COPEC if the maximum detected concentration exceeds the ecological screening value (i.e., HQ>1); a background screen was not performed for surface water media
6 - ESV for chromium VI (filtered)

Table D-14. Refinement Level Evaluation for CSSLP Surface Water Impoundment Area (Surface Water, Filtered)

Analyte	Exposure Point Concentration[1]	Refinement Screening Value[2]	RSV Source[3]	Refinement Level HQ[4]	Exceeds RSV (HQ>1)?	COPC?[6]
Inorganics (µg/L)						
ALUMINUM	3.95E+02	8.70E+01	b	4.5	YES	YES
BARIUM	1.96E+01	3.90E+01	c	0.5	no	no
COPPER	3.96E+01	2.90E+00	a	13.7	YES	YES
IRON	2.19E+03	1.00E+03	b	2.2	YES	YES
LEAD	5.41E+00	5.40E-01	a	10	YES	YES
MANGANESE	2.88E+02	9.30E+01	b	3.1	YES	YES
ZINC	4.06E+01	3.70E+01	a	1.1	YES	YES

1 - Analytes identified as COPECs from Table D-13
2 - EPC = exposure point concentration (EPC) is the lesser of the maximum detected concentration or the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.2.7 Surface Water
3 - RSV from Attachment D-1 Table III.B
4: a = SCDHEC, R61-68, Water Classifications and Standards, chronic values for freshwater aquatic life (2020)
4: b = Table 1a in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
4: c = Los Alamos National Laboratory (2017)
5 - Refinement Level Hazard Quotient (HQ) = EPC / RSV
6 - COPC = constituent of potential concern. Analyte identified as a COPC if the refinement level HQ>1

Table D-15. Screening Level Evaluation for Ford Building Subunit (Soil 0-1 ft)

Analyte	Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Notes
Inorganics (mg/kg)										
ALUMINUM	1.67E+04		NA[8]	NA[8]	--	no	1.05E+04	YES	YES	
ANTIMONY	5.41E-01	J	2.7E-01	a	2.00E+00	YES	2.69E+00	no	no	
ARSENIC	1.45E+01		6.8E+00	b	2.1	YES	4.28E+00	YES	YES	
BARIUM	4.07E+01		3.3E+02	b	1.23E-01	no	3.91E+01	YES	no	
BERYLLIUM	4.55E+00		2.5E+00	b	1.82E+00	YES	2.89E-01	YES	YES	
CADMIUM	1.03E+00		2.7E-01	b	3.81E+00	YES	4.83E-01	YES	YES	
CALCIUM	5.15E+03		EN[7]	Nutrient	--	no	4.76E+02	YES	no	
CHROMIUM	2.30E+02		2.3E+01	a	1.00E+01	YES	1.54E+01	YES	YES	
COBALT	3.72E+00		1.3E+01	ab	2.86E-01	no	1.55E+00	YES	no	
COPPER	2.71E+01		1.4E+01	b	1.94E+00	YES	4.34E+00	YES	YES	
IRON	4.72E+04		NA[8]	NA[8]	--	no	1.27E+04	YES	YES	
LEAD	2.17E+01		1.1E+01	a	1.97E+00	YES	1.03E+01	YES	YES	
MAGNESIUM	2.88E+03		EN[7]	Nutrient	--	no	2.75E+02	YES	no	
MANGANESE	5.40E+02		2.2E+02	ab	2.45E+00	YES	1.53E+02	YES	YES	
MERCURY	1.44E-01		1.3E-02	ab	1.11E+01	YES	7.10E-02	YES	YES	
NICKEL	8.17E+00		1.0E+01	b	8.17E-01	no	3.48E+00	YES	no	
POTASSIUM	1.03E+03		EN[7]	Nutrient	--	no	2.16E+02	YES	no	
SELENIUM	9.05E+00		5.2E-01	ab	1.74E+01	YES	2.99E+00	YES	YES	
SILVER	7.43E-01		2.6E+00	b	2.86E-01	no	7.28E-01	YES	no	
SODIUM	4.20E+01		EN[7]	Nutrient	--	no	4.02E+01	YES	no	
THALLIUM	2.36E+01		5.0E-02	a	4.72E+02	YES	3.12E+00	YES	YES	
VANADIUM	1.87E+02		4.7E+00	b	3.98E+01	YES	3.91E+01	YES	YES	
ZINC	4.26E+02		4.6E+01	a	9.26E+00	YES	9.47E+00	YES	YES	
Organics (mg/kg)										
ACETONE	5.42E-02		1.2E+00	a	4.52E-02	no	---	---	no	
BENZO(G,H,I)PERYLENE	7.16E-02	J	1.1E+00	a	6.51E-02	no	---	---	no	

Table D-15. Screening Level Evaluation for Ford Building Subunit (Soil 0-1 ft) *(Continued)*

Analyte	Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Maximum Exceeds ESV (HQ>1)?	2X Average Background[5]	Maximum Exceeds Background?	COPEC?[6]	Notes
Organics (mg/kg) (cont'd)										
BENZO[A]ANTHRACENE	6.84E-02	J	7.3E-01	a	9.37E-02	no	---	---	no	
BENZO[A]PYRENE	6.14E-02	J	1.1E+00	a	5.58E-02	no	---	---	no	
BENZO[B]FLUORANTHENE	1.63E-01	J	1.1E+00	a	1.48E-01	no	---	---	no	
BENZO(K)FLUORANTHENE	6.58E-02	J	1.1E+00	a	5.98E-02	no	---	---	no	
BIS(2-ETHYLHEXYL)PHTHALATE	8.58E-02		2.0E-02	ab	4.29E+00	YES	---	---	YES	
CARBAZOLE	1.73E-02	J	7.0E-02	a	2.47E-01	no	---	---	no	
CHRYSENE	1.14E-01		1.1E+00	a	1.04E-01	no	---	---	no	
CUMENE	4.73E-02	J	4.0E-02	a	1.18E+00	YES	---	---	YES	
DICHLOROMETHANE	2.10E-03	J	2.1E-01	a	1.00E-02	no	---	---	no	
DI-N-BUTYLPHTHALATE	3.38E-02	J	1.1E-02	a	3.07E+00	YES	---	---	YES	
FLUORANTHENE	4.21E-01	J	1.1E+00	a	3.83E-01	no	---	---	no	
INDENO[1,2,3-CD]PYRENE	7.67E-02	J	1.1E+00	a	6.97E-02	no	---	---	no	
METHYL ETHYL KETONE	7.27E-03		1.0E+00	a	7.27E-03	no	---	---	no	
PENTACHLOROPHENOL	2.29E-01	J	2.1E+00	a	1.09E-01	no	---	---	no	
PHENANTHRENE	2.38E-01	J	1.1E+01	b	2.16E-02	no	---	---	no	
PYRENE	3.09E-01	J	1.1E+00	a	2.81E-01	no	---	---	no	
TETRACHLOROETHYLENE	3.18E-01	J	6.0E-02	a	5.30E+00	YES	---	---	YES	
TOLUENE	9.02E-04	J	1.5E-01	a	6.01E-03	no	---	---	no	
Pesticides/PCBs										
AROCLOR 1254	1.19E-01		4.1E-02	a	2.90E+00	YES	---	---	YES	
AROCLOR 1260	7.13E-02		4.1E-02	a	1.74E+00	YES	---	---	YES	
Radionuclides (pCi/g)										
ACTINIUM-228	2.22E+00		NA[8]	NA[8]	NA	no	1.95E+00	YES	YES	
BISMUTH-212	3.03E+00	J	NA[8]	NA[8]	NA	no	NA	NA	YES	
BISMUTH-214	1.73E+00		NA[8]	NA[8]	NA	no	2.24E+00	no	no	

Table D-15. Screening Level Evaluation for Ford Building Subunit (Soil 0-1 ft) *(Continued/End)*

Analyte	Maximum Concentration [1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Max Exceeds ESV (HQ>1)?	2X Average Background[5]	Max Exceeds Background?	COPEC?[6]	Notes
Radionuclides (pCi/g) (cont'd)										
CESIUM-137	1.53E-01	J	1.4E+03	b	1.09E-04	no	2.84E-01	no	no	
COBALT-60	5.45E-01		7.60E+02	b	7.17E-04	no	NA	NA	no	
LEAD-212	2.07E+00		NA[8]	NA[8]	NA	NA	2.19E+00	no	no	
LEAD-214	2.03E+00		NA[8]	NA[8]	NA	NA	NA	NA	YES	
POTASSIUM-40	2.48E+01		NA[8]	NA[8]	NA	NA	2.33E+00	YES	YES	
THALLIUM-208	6.18E-01		NA[8]	NA[8]	NA	NA	NA	NA	YES	
THORIUM-228	1.58E+00	J	4.3E+01	b	3.67E-02	no	1.97E+00	no	no	
THORIUM-230	2.60E+00		5.2E+01	b	5.00E-02	no	1.13E+00	YES	no	
THORIUM-232	1.64E+00		6.2E+00	b	2.65E-01	no	1.80E+00	no	no	
URANIUM-233/234	1.22E+00		4.4E+02	b	2.77E-03	no	1.15E+00	YES	no	
URANIUM-238	1.67E+00		2.0E+03	b	8.35E-04	no	1.01E+00	YES	no	

1 - Maximum detected concentration from Appendix A Table A.3.1 Ford Building Subunit Soil (0-1 ft).
2 - ESV from Attachment D-1 Table I.A.
3 - a = Table 3, EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
3 - b = Los Alamos National Laboratory No Effect ESL for soil media (2017)
4 - Screening Level Hazard Quotient (HQ) = maximum detected concentration/ESV
5 - Background screening values obtained from the Background Soils Statistical Summary Report for the Savannah River Site, ERD-EN-2005-0223, Rev. 1, October 2006.
6 - COPEC = constituent of potential ecological concern. Analyte identified as a COPEC if the maximum detected concentration exceeds the ecological screening value (i.e., HQ>1), if available, and exceeds 2X average background concentration
7 - Essential nutrient, not subject to further evaluation
8 - NA = not available, ESV for this constituent is not available.

Table D-16. Refinement Level Evaluation for Ford Building Subunit (Soil 0-1 ft)

Analyte[1]	Exposure Point Concentration[2]	RSV[3]	RSV Source[4]	Refinement Level HQ[5]	HQ Exceeds RSV (HQ>1)?	COPC?[6]
Inorganics (mg/kg)						
ALUMINUM	8.11E+03	---	---	---	---	YES
ARSENIC	4.53E+00	3.1E+01	b	1.46E-01	no	no
BERYLLIUM	8.48E-01	2.5E+01	b	3.39E-02	no	no
CADMIUM	1.96E-01	3.6E+00	b	5.44E-02	no	no
CHROMIUM	2.48E+01	7.3E+01	b	3.40E-01	no	no
COPPER	5.80E+00	4.3E+01	b	1.35E-01	no	no
IRON	1.61E+04	---	---	---	---	YES
LEAD	8.28E+00	2.3E+01	b	3.60E-01	no	no
MANGANESE	1.32E+02	1.1E+03	b	1.20E-01	no	no
MERCURY	3.87E-02	1.3E-01	b	2.98E-01	no	no
SELENIUM	1.75E+00	1.0E+00	b	1.8E-00	YES	YES
THALLIUM	3.78E+00	5.0E-01	b	7.56E+00	YES	YES
VANADIUM	4.93E+01	9.5E+00	b	5.19E+00	YES	YES
ZINC	1.17E+02	4.7E+02	b	2.49E-01	no	no
Organics (mg/kg)						
BIS(2-ETHYLHEXYL)PHTHALATE (DEHP)	1.91E-02	2.0E-01	b	9.55E-02	no	no
CUMENE (ISOPROPYLBENZENE)	1.27E-02	---	---	---	---	YES
DI-N-BUTYL PHTHALATE	1.45E-02	1.1E-01	b	1.32E-01	no	no
TETRACHLOROETHYLENE	2.29E-01	0.94	b	2.44E-01	no	no
Pesticides/PCBs (mg/kg)						
AROCLOR 1254	1.98E-02	4.1E-01	b	4.83E-02	no	no
AROCLOR 1260	1.22E-02	8.8E+00	b	1.39E-03	no	no
Radionuclides (pCi/g)						
ACTINIUM-228	1.95E+00	---	---	---	---	YES
BISMUTH-212	1.86E+00	---	---	---	---	YES
LEAD-214	1.61E+00	---	---	---	---	YES
POTASSIUM-40	2.48E+01	---	---	---	---	YES
THALLIUM-208	5.61E-01	---	---	---	---	YES

1 -Analytes identified as COPECs from Table D-15

2 - EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.3.1 Ford Building Subunit (0-1 ft)

3 - RSV from Attachment D-1 Table I.B

4: a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)

4: b = Los Alamos National Laboratory Low Effect ESL for Soil Media (2017)

5 - Refinement Level Hazard Quotient (HQ) = EPC / RSV

6 - COPC = constituent of potential concern. Analyte identified as a COPC if the refinement level HQ>1

Table D-17. Screening Level Evaluation for Ford Building (Soil 1-4 ft)

Analyte	Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Max Exceeds ESV (HQ>1)?	2X Average Background[5]	Max Exceeds Background?	COPEC?[6]	Notes
Inorganics (mg/kg)										
ALUMINUM	2.23E+04		NA[8]	NA[8]	--	no	1.05E+04	YES	YES	
ANTIMONY	2.40E+00	J	2.7E-01	a	8.89E+00	YES	2.69E+00	no	no	
ARSENIC	9.20E+00		6.8E+00	b	1.35E+--	YES	4.28E+00	YES	YES	
BARIUM	6.21E+01		3.3E+02	b	1.88E-01	no	3.91E+01	YES	no	
BERYLLIUM	3.82E-01	J	2.5E+00	b	1.53E-01	no	2.89E-01	YES	no	
CALCIUM	8.74E+02	J	EN[7]	Nutrient	--	no	4.76E+02	YES	no	
CHROMIUM	4.83E+01		2.3E+01	a	2.10E+00	YES	1.54E+01	YES	YES	
COBALT	1.43E+00		1.3E+01	ab		no	1.55E+00	no	no	
COPPER	4.68E+02		1.4E+01	b	3.34E+01	YES	4.34E+00	YES	YES	
IRON	3.42E+04		NA[8]	NA[8]	--	no	1.27E+04	YES	YES	
LEAD	2.10E+01		1.1E+01	a	1.91E+00	YES	1.03E+01	YES	YES	
MAGNESIUM	2.60E+02		EN[7]	Nutrient	--	no	2.75E+02	no	no	
MANGANESE	6.15E+01		2.2E+02	ab	2.80E-01	no	1.53E+02	no	no	
MERCURY	1.08E-01		1.3E-02	ab	8.31E+00	YES	7.10E-02	YES	YES	
NICKEL	6.57E+00		1.0E+01	b	6.57E-01	no	3.48E+00	YES	no	
POTASSIUM	1.97E+02		EN[7]	Nutrient	--	no	2.16E+02	no	no	
SELENIUM	1.65E+01		5.2E-01	ab	3.17E+01	YES	2.99E+00	YES	YES	
SILVER	1.17E-01		2.6E+00	b	4.50E-02	no	7.28E-01	no	no	
SODIUM	1.63E+01		EN[7]	Nutrient	--	no	4.02E+01	no	no	
THALLIUM	4.31E+01		5.0E-02	a	8.62E+02	YES	3.12E+00	YES	YES	
VANADIUM	2.10E+01		4.7E+00	b	4.47E+00	YES	3.91E+01	no	no	
ZINC	4.30E+01		4.6E+01	a	9.35E-01	no	9.47E+00	YES	no	
Organics (mg/kg)										
ACETONE	8.53E-02		1.2E+00	a	7.11E-02	no	NA	NA	no	
ANTHRACENE	1.34E-01		2.9E+01	b	4.62E-03	no	NA	NA	no	

Table D-17. Screening Level Evaluation for Ford Building (Soil 1-4 ft) *(Continued)*

Analyte	Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Max Exceeds ESV (HQ>1)?	2X Average Background[5]	Max Exceeds Background?	COPEC?[6]	Notes
Organics (mg/kg) (cont'd_										
BENZO(G,H,I)PERYLENE	1.93E-02	J	1.1E+00	a	1.75E-02	no	NA	NA	no	
BENZO[A]ANTHRACENE	1.35E-02	J	7.3E-01	a	1.85E-02	no	NA	NA	no	
BENZO[A]PYRENE	1.62E-02	J	1.1E+00	a	1.47E-02	no	NA	NA	no	
BENZO[B]FLUORANTHENE	3.56E-02	J	1.1E+00	a	3.24E-02	no	NA	NA	no	
BENZO(K)FLUORANTHENE	1.28E-02	J	1.1E+00	a	1.16E-02	no	NA	NA	no	
BIS(2-ETHYLHEXYL)PHTHALATE	2.04E-02	J	2.0E-02	ab	1.02E+00	YES	NA	NA	YES	
BUTYLBENZYL PHTALATE	2.10E-01	J	5.9E-01	a	3.56E-01	no	NA	NA	no	
CARBAZOLE	1.29E-02	J	7.0E-02	a	1.84E-01	no	NA	NA	no	
CHRYSENE	3.67E-02	J	1.1E+00	a	3.34E-02	no	NA	NA	no	
CYCLOHEXANE	5.73E-04	J	---	---	---	---	NA	NA	no	
DICHLOROMETHANE	1.66E-02	J	2.1E-01	a	7.90E-02	no	NA	NA	no	
DI-N-BUTYLPHTHALATE	3.35E-02	J	1.1E-02	a	3.05E+00	YES	NA	NA	YES	
FLUORANTHENE	1.75E-01		1.1E+00	a	1.59E-01	no	NA	NA	no	
INDENO[1,2,3-CD]PYRENE	1.78E-02	J	1.1E+00	a	1.62E-02	no	NA	NA	no	
METHYL ETHYL KETONE	5.00E-03	J	1.0E+00	a	5.00E-03	no	NA	NA	no	
METHYL TERTIARY BUTYL ETHER	3.3E-03	J	---	---	---	---	NA	NA	no	
PHENANTHRENE	1.40E-01		1.1E+01	b	1.27E-02	no	NA	NA	no	
PYRENE	1.09E-01		1.1E+00	a	9.91E-02	no	NA	NA	no	
STYRENE	4.00E-04		1.2E+00	a	3.33E-04	no	NA	NA	no	
TETRACHLOROETHYLENE (PCE)	7.00E-04		6.0E-02	a	1.17E-02	no	NA	NA	no	
TOLUENE	5.00E-04		1.5E-01	a	3.33E-03	no	NA	NA	no	
Pesticides/PCBs mg/kg										
AROCLOR 1254	5.46E-02		4.1E-02	a	1.33E+00	YES	NA	NA	YES	
AROCLOR 1260	1.60E-02		4.1E-02	a	3.90E-01	no	NA	NA	no	
ANTHRACENE	1.34E-01		2.9E+01	b	4.62E-03	no	NA	NA	no	

Table D-17. Screening Level Evaluation for Ford Building (Soil 1-4 ft) *(Continued/End)*

Analyte	Maximum Concentration[1]	Qualifier	ESV[2]	ESV Source[3]	Screening Level HQ[4]	Max Exceeds ESV (HQ>1)?	2X Average Background[5]	Max Exceeds Background?	COPEC?[6]	Notes
Radionuclides pCi/g										
ACTINIUM-228	2.41E+00		NA[8]	NA[8]	NA	NA	1.95E+00	YES	YES	
BISMUTH-212	3.35E+00	J	NA[8]	NA[8]	NA	NA	NA	NA	YES	
BISMUTH-214	9.40E-01		NA[8]	NA[8]	NA	NA	2.24E+00	no	no	
LEAD-212	1.97E+00		NA[8]	NA[8]	NA	NA	2.19E+00	no	no	
LEAD-214	1.14E+00		NA[8]	NA[8]	NA	NA	NA	NA	YES	
POTASSIUM-40	2.98E+00		NA[8]	NA[8]	NA	NA	2.33E+00	YES	YES	
THALLIUM-208	5.78E-01		NA[8]	NA[8]	NA	NA	NA	NA	YES	
THORIUM-228	3.33E+00		4.3E+02	b	7.74E-03	no	1.97E+00	YES	no	
THORIUM-230	1.57E+00		5.2E+02	b	3.02E-03	no	1.13E+00	YES	no	
THORIUM-232	3.75E+00		6.2E+01	b	6.05E-02	no	1.80E+00	YES	no	
URANIUM-233/234	1.58E+00		4.4E+03	b	3.59E-04	no	1.15E+00	YES	no	
URANIUM-238	1.18E+00		2.0E+03	b	5.90E-04	no	1.01E+00	YES	no	

1 - Maximum detected concentration from Appendix A Table A.3.2 Ford Building Subunit Soil (1-4 ft).
2 - ESV from Attachment D-1 Table I.A.
3 - a = Table 3, EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
3 - b = Los Alamos National Laboratory No Effect ESL for soil media (2017)
4 - Screening Level Hazard Quotient (HQ) = maximum detected concentration/ESV
5 - Background screening values obtained from the Background Soils Statistical Summary Report for the Savannah River Site, ERD-EN-2005-0223, Rev. 1, October 2006.
6 - COPEC = constituent of potential ecological concern. Analyte identified as a COPEC if the maximum detected concentration exceeds the ecological screening value (i.e., HQ>1), if available, and exceeds 2X average background concentration
7 - Essential nutrient, not subject to further evaluation
8 - NA = not available, ESV for this constituent is not available.

Table D-18. Refinement Level Evaluation for Ford Building (Soil 1-4 ft)

Analyte[1]	Exposure Point Concentration[2]	Refinement Screening Value[3]	RSV Source[4]	Refinement Level HQ[5]	Exceeds RSV (HQ>1)?	COPC?[6]
Inorganics (mg/kg)						
ALUMINUM	1.20E+04	---	---	NA	---	YES
ARSENIC	5.4E+00	3.1E+01	b	1.74E-01	no	no
CHROMIUM	2.35E+01	7.3E+01	b	3.21E-01	no	no
COPPER	7.31E+01	4.3E+01	b	1.70E+00	YES	YES
IRON	2.05E+04	---	---	NA	---	YES
LEAD	6.66E+00	2.3E+01	b	2.90E-01	no	no
MERCURY	3.87E-02	1.3E-01	b	2.98E-01	no	no
SELENIUM	3.22E+00	1.0E+00	b	3.22E+00	YES	YES
THALLIUM	6.09E+00	5.0E-01	b	1.22E+01	YES	YES
Organics (mg/kg)						
BIS(2-ETHYLHEXYL)PHTHALATE (DEHP)	1.21E-02	2.0E-01	b	6.05E-02	no	no
DI-N-BUTYL PHTHALATE	1.49E-02	1.1E-01	b	1.35E-01	no	no
Pesticides/PCBs						
AROCLOR 1254	6.80E-03	4.1E-01	b	1.66E-02	no	no
Radionuclides (pCi/g)						
ACTINIUM-228	2.41E+00	NA[8]	NA[8]	NA	NA	YES
BISMUTH-212	3.35E+00	NA[8]	NA[8]	NA	NA	YES
LEAD-214	1.14E+00	NA[8]	NA[8]	NA	NA	YES
POTASSIUM-40	2.98E+00	NA[8]	NA[8]	NA	NA	YES
THALLIUM-208	5.78E-01	NA[8]	NA[8]	NA	NA	YES

1 -Analytes identified as COPECs from Table D-17
2 - EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. cRME from Appendix A Table A.3.2 Ford Building Subunit (1-4 ft)
3 - RSV from Attachment D-1 Table II.A
4: a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
4: b = Los Alamos National Laboratory Low Effect ESL for Soil Media (2017)
5 - Refinement Level Hazard Quotient (HQ) = EPC / RSV
6 - COPC = constituent of potential concern. Analyte identified as a COPC if the refinement level HQ>1

Attachment D-1

Derivation of ECODS N-1, CSSLP, and Ford Building ESVs and RSVs

This page intentionally left blank.

Derivation of Soil ESVs and RSVs
I. SOIL MEDIA
A. Screening Level (No Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Soil[1]	LANL Soil[2]	ESV	Notes
Acenaphthene	2.90E+01	2.00E+00	2.00E+00	4
Acenaphthylene	2.90E+01	1.20E+02	2.90E+01	4
Acetone	1.20E+00	1.20E+00	1.20E+00	
Actinium-228	---	---	---	
Aldrin	3.00E-02	3.70E-02	3.00E-02	
Alpha-benzene hexachloride (BHC)	3.00E-04	5.90E+01	3.00E-04	
Alpha-chlordane	2.90E-03	2.70E-01	2.90E-03	
Aluminum	---	---	---	
Anthracene	2.90E+01	2.10E+02	2.90E+01	4
Antimony	2.70E-01	2.30E+00	2.70E-01	
Aroclor 1242	4.10E-02	4.10E-02	4.10E-02	
Aroclor 1254	4.10E-02	4.10E-02	4.10E-02	
Aroclor 1260	4.10E-02	8.80E-01	4.10E-02	
Arsenic	1.80E+01	6.80E+00	6.80E+00	
Barium	3.30E+02	7.20E+02	3.30E+02	
Barium-133	---	---	---	
Benzene	1.20E-01	2.40E+01	1.20E-01	
Benzo(g,h,i)perylene	1.10E+00	2.50E+01	1.10E+00	5
Benzo[a]anthracene	1.10E+00	7.30E-01	7.30E-01	5
Benzo[a]pyrene	1.10E+00	6.20E+01	1.10E+00	5
Benzo[b]fluoranthene	1.10E+00	4.40E+01	1.10E+00	5
Benzo[k]fluoranthene	1.10E+00	7.10E+01	1.10E+00	5
Beryllium	2.50E+00	3.50E+01	2.50E+00	
Beta-benzene hexachloride (BHC)	3.00E-04	2.70E-01	3.00E-04	
Bis(2-ethylhexyl)phthalate (DEHP)	2.00E-02	2.00E-02	2.00E-02	
Bismuth-214	---	---	---	
Butylbenzylphthalate	5.90E-01	9.00E+01	5.90E-01	
Cadmium	3.60E-01	2.70E-01	2.70E-01	
Calcium	---	---	---	
Caprolactam	---	---	---	
Carbazole	7.00E-02	7.90E+01	7.00E-02	
Carbon Disulfide	5.00E-03	8.10E-01	5.00E-03	
Cesium-137	---	1.40E+03	1.40E+03	6
Chloroform	5.00E-02	8.00E+00	5.00E-02	
Chloromethane (Methyl Chloride)	---	---	---	
Chromium	2.30E+01	2.30E+01	2.30E+01	
Hexavalent Chromium	3.40E-01	1.40E+02	3.40E-01	
Chrysene	1.10E+00	3.10E+00	1.10E+00	
Cobalt	1.30E+01	7.60E+01	1.30E+01	
Copper	2.80E+01	1.40E+01	1.40E+01	
Cumene (Isopropylbenzene)	4.00E-02	---	4.00E-02	
Cyanide	1.00E-01	9.80E-02	9.80E-02	
DDD	2.10E-02	6.30E-03	6.30E-03	
DDE	2.10E-02	1.10E-01	2.10E-02	
DDT	2.10E-02	4.40E-02	2.10E-02	
Dibenz[A,H]anthracene	1.10E+00	1.40E+01	1.10E+00	
Dichloromethane	2.10E-01	---	2.10E-01	
Dieldrin	2.90E-03	4.50E-03	2.90E-03	
Dimethylphthalate	---	1.00E+02	1.00E+02	
Di-N-butylphthalate	1.10E-02	1.10E-02	1.10E-02	
Endosulfan sulfate	6.50E-03	---	6.50E-03	
Endrin	1.90E-03	1.40E-03	1.40E-03	
Endrin ketone	---	---	---	

Derivation of Soil ESVs and RSVs
I. SOIL MEDIA
A. Screening Level (No Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Soil[1]	LANL Soil[2]	ESV	Notes
Fluoranthene	1.10E+00	2.20E+01	1.10E+00	
Gamma-chlordane	2.00E-02	2.20E+00	2.00E-02	
Gamma-BHC	2.40E+00	4.90E-03	4.90E-03	
Heptachlor epoxide	1.50E-04	---	1.50E-04	
Indeno[1,2,3-cd]pyrene	1.10E+00	7.10E+01	1.10E+00	5
Iron	---	---	---	
Lead	1.10E+01	1.10E+01	1.10E+01	
Lead-212	---	---	---	
Lead-214	---	---	---	
Lindane (Gamma BHC)	---	9.50E-03	9.50E-03	
m,p-Xylene	1.00E-01	1.40E+00	1.00E-01	7
Magnesium	---	---	---	
Manganese	2.20E+02	1.10E+03	2.20E+02	
Mercury	1.30E-02	1.30E-02	1.30E-02	
Methylmercury	3.50E-04	3.50E-04	3.50E-04	
Methyl acetate	---	---	---	
Methyl ethyl ketone	1.00E+00	---	1.00E+00	
2-Methylnaphthalene	2.90E+01	1.60E+01	1.60E+01	
Naphthalene	2.90E+01	3.40E+00	3.40E+00	
Nickel	3.80E+01	1.00E+01	1.00E+01	
Pentachlorophenol	2.10E+00	3.60E+00	2.10E+00	
Phenanthrene	2.90E+01	1.10E+01	1.10E+01	
Potassium	---	---	---	
Potassium-40	---	---	---	
Pyrene	1.10E+00	2.00E+01	1.10E+00	
Radium-226	---	8.20E+00	8.20E+00	
Radium-228	---	1.10E+01	1.10E+01	
Selenium	5.20E-01	7.00E-01	5.20E-01	
Silver	4.20E+00	2.60E+00	2.60E+00	
Sodium	---	---	---	
Styrene	1.20E+00	1.20E+01	1.20E+00	
Tetrachloroethylene (PCE)	6.00E-02	1.80E-01	6.00E-02	
Thallium	5.00E-02	5.00E-02	5.00E-02	
Thallium-208	---	---	---	
Thorium-228	---	4.30E+02	4.30E+02	
Thorium-230	---	5.20E+02	5.20E+02	
Thorium-232	---	6.20E+01	6.20E+01	
Toluene	1.50E-01	2.30E+01	1.50E-01	
Tritium	---	2.40E+05	2.40E+05	
Uranium-233/234	---	4.40E+03	4.40E+03	8
Uranium-235	---	4.40E+03	4.40E+03	
Uranium-238	---	2.00E+03	2.00E+03	
Vanadium	7.80E+00	4.70E+00	4.70E+00	
Zinc	4.60E+01	4.70E+01	4.60E+01	

1 - Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018) (Attachment D-2)
2 - Los Alamos National Laboratory No Effect ESL for Soil Media (Attachment D-3) 2021 update, electronic file2017
3 - Ecological Screening Value= lowest (most conservative) screening value highlighted in yellow
4 - Values for EPA Region 4 soil are for total Low Molecular Weight PAHs
5 - Values for EPA Region 4 soil are for total High Molecular Weight PAHs
6 – Screening value is for Cesium-137 + Barium-137
7 – Values are for "Xylenes"
8 – Screening value is for Uranium-234.

Derivation of ESVs and RSVs
I. SOIL MEDIA
B. Refinement Level (Low Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Soil[1]	LANL Soil[2]	RSV[3]	Notes
Acenaphthene	NA	2.00E+00	2.00E+00	
Acenaphthylene	NA	1.20E+03	1.20E+03	
Acetone	NA	6.30E+00	6.30E+00	
Aldrin	NA	1.80E-01	1.80E-01	
Aluminum	NA	---	---	
Americium-241	NA	4.30E+05	4.30E+05	
Amino-2,6-dinitrotoluene[4-]	NA	1.20E+02	1.20E+02	
Amino-4,6-dinitrotoluene[2-]	NA	1.40E+02	1.40E+02	
Anthracene	NA	9.00E+00	9.00E+00	
Antimony	NA	2.30E+01	2.30E+01	
Aroclor 1016	NA	3.10E+00	3.10E+00	
Aroclor 1242	NA	4.10E-01	4.10E-01	
Aroclor 1248	NA	7.30E-02	7.30E-02	
Aroclor 1254	NA	4.10E-01	4.10E-01	
Aroclor 1260	NA	8.80E+00	8.80E+00	
Arsenic	NA	3.10E+01	3.10E+01	
Barium	NA	2.60E+02	2.60E+02	
Benzene	NA	2.40E+02	2.40E+02	
Benzo[a]anthracene	NA	7.30E+00	7.30E+00	
Benzo[a]pyrene	NA	1.90E+02	1.90E+02	
Benzo[b]fluoranthene	NA	1.80E+02	1.80E+02	
Benzo(g,h,i)perylene	NA	2.50E+02	2.50E+02	
Benzo[k]fluoranthene	NA	7.10E+02	7.10E+02	
Benzoic Acid	NA	1.00E+01	1.00E+01	
Benzyl Alcohol	NA	1.20E+03	1.20E+03	
Beryllium	NA	2.50E+01	2.50E+01	
BHC[alpha-]	NA	5.90E+02	5.90E+02	
BHC[beta-]	NA	1.30E+00	1.30E+00	
BHC[gamma-]	NA	9.50E-02	9.50E-02	
Bis(2-ethylhexyl)phthalate (DEHP)	NA	2.00E-01	2.00E-01	
Boron	NA	1.00E+01	1.00E+01	
Butanone[2-]	NA	9.20E+02	9.20E+02	
Butyl Benzyl Phthalate	NA	9.00E+02	9.00E+02	
Cadmium	NA	3.00E+00	3.00E+00	
Carbazole	NA	7.90E+02	7.90E+02	
Carbon Disulfide	NA	8.10E+00	8.10E+00	
Cesium-134	NA	6.80E+03	6.80E+03	
Cesium-137	NA	1.40E+04	1.40E+04	4
Alpha-chlordane	NA	1.30E+00	1.30E+00	
Gamma-chlordane	NA	1.10E+01	1.10E+01	
Chloroaniline[4-]	NA	1.00E+01	1.00E+01	
Chlorobenzene	NA	2.40E+01	2.40E+01	
Chloroform	NA	2.10E+01	2.10E+01	
Chlorophenol[2-]	NA	3.90E+00	3.90E+00	
Chromium	NA	7.30E+01	7.30E+01	5
Chromium(+6)	NA	3.40E+00	3.40E+00	
Chrysene	NA	3.10E+01	3.10E+01	
Cobalt	NA	1.30E+02	1.30E+02	
Cobalt-60	NA	7.60E+03	7.60E+03	
Copper	NA	4.30E+01	4.30E+01	
Cyanide	NA	9.80E-01	9.80E-01	6
DDD	NA	3.20E-02	3.20E-02	7
DDE	NA	5.50E-01	5.50E-01	8
DDT	NA	2.20E-01	2.20E-01	9

Derivation of ESVs and RSVs
I. SOIL MEDIA
B. Refinement Level (Low Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Soil[1]	LANL Soil[2]	RSV[3]	Notes
Dibenzo(a,h)anthracene	NA	1.40E+02	1.40E+02	
Dibenzofuran	NA	6.10E+01	6.10E+01	
1,2-Dichlorobenzene	NA	9.20E+00	9.20E+00	
1,3-Dichlorobenzene	NA	7.40E+00	7.40E+00	
1,4-Dichlorobenzene	NA	3.50E+00	3.50E+00	
Dichloroethane[1,1-]	NA	2.10E+03	2.10E+03	
Dichloroethane[1,2-]	NA	1.60E+00	1.60E+00	
Dichloroethene[1,1-]	NA	1.10E+02	1.10E+02	
Dichloroethene[cis/trans-1,2-]	NA	2.40E+02	2.40E+02	
Dieldrin	NA	9.00E-03	9.00E-03	
Diethyl Phthalate	NA	1.00E+03	1.00E+03	
Dimethyl Phthalate	NA	1.00E+02	1.00E+02	
Di-n-Butyl Phthalate	NA	1.10E-01	1.10E-01	
Dinitrobenzene[1,3-]	NA	1.60E-01	1.60E-01	
Dinitrotoluene[2,4-]	NA	6.00E+01	6.00E+01	
Dinitrotoluene[2,6-]	NA	4.00E+01	4.00E+01	
Di-n-octylphthalate	NA	9.10E+00	9.10E+00	
Diphenylamine	NA	1.30E+01	1.30E+01	
Endosulfan	NA	6.40E+00	6.40E+00	
Endrin	NA	1.40E-02	1.40E-02	
Europium-152	NA	5.20E+03	5.20E+03	
Fluoranthene	NA	2.30E+01	2.30E+01	
Fluorene	NA	1.90E+01	1.90E+01	
Fluoride	NA	1.20E+03	1.20E+03	
Heptachlor	NA	5.90E-01	5.90E-01	
Hexachlorobenzene	NA	7.90E-01	7.90E-01	
Hexanone[2-]	NA	3.60E+00	3.60E+00	
HMX	NA	1.60E+02	1.60E+02	
Indeno[1,2,3-cd]pyrene	NA	7.10E+02	7.10E+02	
Iodomethane	NA	7.60E-02	7.60E-02	
Iron	NA	---	---	
Kepone	NA	1.10E-01	1.10E-01	
Lead	NA	2.30E+01	2.30E+01	
Lead-210	NA	1.20E+04	1.20E+04	
Lithium	NA	3.50E+02	3.50E+02	
Manganese	NA	1.10E+03	1.10E+03	
Mercury (inorganic)	NA	1.30E-01	1.30E-01	
Mercury methyl	NA	3.50E-03	3.50E-03	
Methoxychlor[4,4'-]	NA	1.00E+01	1.00E+01	
Methyl-2-pentanone[4-]	NA	9.70E+01	9.70E+01	
Methylene Chloride	NA	2.20E+01	2.20E+01	
2-Methylnaphthalene	NA	1.60E+02	1.60E+02	
Methylphenol[2-]	NA	7.00E+00	7.00E+00	
Methylphenol[3-]	NA	7.00E+00	7.00E+00	
Molybdenum	NA	1.50E+02	1.50E+02	
Naphthalene	NA	1.00E+01	1.00E+01	
Neptunium-237	NA	5.00E+02	5.00E+02	
Nickel	NA	2.10E+01	2.10E+01	
Nitroaniline[2-]	NA	1.00E+01	1.00E+01	
Nitrobenzene	NA	2.20E+01	2.20E+01	
Nitroglycerine	NA	1.30E+02	1.30E+02	
Nitrotoluene[2-]	NA	9.80E+01	9.80E+01	
Nitrotoluene[3-]	NA	1.20E+02	1.20E+02	
Nitrotoluene[4-]	NA	2.10E+02	2.10E+02	

Derivation of ESVs and RSVs
I. SOIL MEDIA
B. Refinement Level (Low Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Soil[1]	LANL Soil[2]	RSV[3]	Notes
Pentachloronitrobenzene	NA	7.00E+00	7.00E+00	
Pentachlorophenol	NA	3.60E+00	3.60E+00	
PETN	NA	1.00E+03	1.00E+03	
Phenanthrene	NA	---	---	
Phenol	NA	8.00E+00	8.00E+00	
Plutonium-238	NA	8.20E+03	8.20E+03	
Plutonium-239, 240	NA	8.70E+03	8.70E+03	
Plutonium-241	NA	1.70E+05	1.70E+05	
Pyrene	NA	2.00E+01	2.00E+01	
Radium-226	NA	1.50E+01	1.50E+01	
Radium-228	NA	1.20E+01	1.20E+01	
RDX	NA	4.40E+00	4.40E+00	
Selenium	NA	1.00E+00	1.00E+00	
Silver	NA	2.60E+01	2.60E+01	
Sodium-22	NA	4.60E+04	4.60E+04	
Strontium (stable)	NA	9.50E+02	9.50E+02	
Strontium-90 + Yittrium-90	NA	3.40E+03	3.40E+03	
Styrene	NA	1.20E+01	1.20E+01	
Tetrachlorodibenzodioxin[2,3,7,8-]	NA	1.20E+02	1.20E+02	
Tetrachloroethene	NA	9.40E-01	9.40E-01	
Tetryl	NA	7.20E+00	7.20E+00	
Thallium	NA	5.00E-01	5.00E-01	
Thorium-228	NA	4.30E+02	4.30E+02	
Thorium-229	NA	4.70E+02	4.70E+02	
Thorium-230	NA	5.20E+02	5.20E+02	
Thorium-232	NA	6.20E+01	6.20E+01	
Titanium	NA	7.70E+02	7.70E+02	
Toluene	NA	2.30E+02	2.30E+02	
Toxaphene (Technical Grade)	NA	4.10E+01	4.10E+01	
Trichlorobenzene[1,2,4-]	NA	2.70E+00	2.70E+00	
Trichloroethane[1,1,1-]	NA	2.60E+03	2.60E+03	
Trichloroethene	NA	4.20E+02	4.20E+02	
Trichlorofluoromethane	NA	3.50E+02	3.50E+02	
Trinitrobenzene[1,3,5-]	NA	2.80E+01	2.80E+01	
Trinitrotoluene[2,4,6-]	NA	1.30E+01	1.30E+01	
Tritium	NA	3.60E+05	3.60E+05	
Uranium	NA	2.50E+02	2.50E+02	
Uranium-233	NA	4.40E+03	4.40E+03	
Uranium-234	NA	4.40E+03	4.40E+03	
Uranium-235	NA	4.40E+03	4.40E+03	
Uranium-236	NA	4.70E+04	4.70E+04	
Uranium-238	NA	2.00E+04	2.00E+04	
Vanadium	NA	9.50E+00	9.50E+00	
Vinyl Chloride	NA	1.20E+00	1.20E+00	
m,p-Xylene	NA	1.80E+00	1.80E+00	10
Zinc	NA	1.20E+02	1.20E+02	

1 - Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018) (Attachment D-2)
2 - Los Alamos National Laboratory Low Effect ESL for Soil Media (2017) (Attachment D-3)
3 - Refinement Screening Value= lowest (most conservative) screening value
4 – Screening value is for Cesium-137 + Barium-137
5 - Values for Chromium (Total)
6 – Value for Cyanide (total)
7 - Value for DDD[4,4'-]
8 - Value for DDE[4,4'-]
9 - Value for DDT[4,4'-]
10 – Value for Xylenes

Derivation of ESVs and RSVs
II. SEDIMENT MEDIA
A. Screening Level (No Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Sediment[1]	EPA R4 Soil[2]	LANL Sediment[3]	LANL Soil[4]	ESV[5]	Notes
Acenaphthene	6.70E-03	2.90E+01	7.60E-02	2.50E-01	6.70E-03	Total LMW-PAHs
Acenaphthylene	5.90E+00	2.90E+01	7.60E-02	1.20E+02	7.60E-02	Total LMW-PAHs
Acetone	6.50E-02	1.20E+00	6.50E-02	1.20E+00	6.50E-02	
Aldrin	2.90E-02	3.00E-02	4.20E-02	3.70E-02	2.90E-02	
Aluminum	2.50E+04	---	2.50E+04	---	2.50E+04	
Americium-241	---	---	1.00E+03	4.30E+04	1.00E+03	
Amino-2,6-dinitrotoluene[4-]	4.70E-02	1.40E+01	1.40E+01	1.20E+01	4.70E-02	
Amino-4,6-dinitrotoluene[2-]	2.80E-02	---	1.70E+01	1.40E+01	2.80E-02	
Anthracene	5.70E-02	2.90E+01	5.70E-02	6.80E+00	5.70E-02	
Antimony	2.00E+00	2.70E-01	4.50E+01	2.30E+00	2.70E-01	
Aroclor 1016	---	---	5.90E-02	1.10E+00	5.90E-02	
Aroclor 1242	---	4.10E-02	5.30E-02	4.10E-02	4.10E-02	
Aroclor 1248	---	---	8.10E-03	7.30E-03	7.30E-03	
Aroclor 1254	---	4.10E-02	5.30E-02	4.10E-02	4.10E-02	
Aroclor 1260	---	4.10E-02	5.90E-02	8.80E-01	4.10E-02	
Arsenic	9.80E+00	1.80E+01	9.70E+00	6.80E+00	6.80E+00	
Barium	2.00E+01	3.30E+02	1.50E+02	1.10E+02	2.00E+01	
Benzene	1.00E-02	1.20E-01	1.00E-02	2.40E+01	1.00E-02	
Benzo[a]anthracene	1.08E-01	1.10E+00	1.00E-01	7.30E-01	1.00E-01	Total HMW-PAHs
Benzo[a]pyrene	1.50E-01	1.10E+00	1.50E-01	6.20E+01	1.50E-01	Total HMW-PAHs
Benzo[b]fluoranthene	1.90E-01	1.10E+00	1.90E-01	1.80E+01	1.90E-01	Total HMW-PAHs
Benzo(g,h,i)perylene	1.70E-01	1.10E+00	1.70E-01	2.50E+01	1.70E-01	Total HMW-PAHs
Benzo[k]fluoranthene	2.40E-01	1.10E+00	2.40E-01	7.10E+01	2.40E-01	Total HMW-PAHs
Benzoic Acid	1.90E-02	1.00E-02	1.20E+00	1.00E+00	1.00E-02	
Benzyl Alcohol	3.70E-03	2.00E-03	3.00E+02	1.20E+02	2.00E-03	
Beryllium	---	2.50E+00	6.60E+01	2.50E+00	2.50E+00	
BHC[alpha-]	3.00E-04	3.00E-04	6.60E+01	5.90E+01	3.00E-04	
BHC[beta-]	5.00E-03	3.00E-04	5.00E-03	2.70E-01	3.00E-04	aquatic life
BHC[gamma-] (Lindane)	2.40E-03	3.10E-03	2.30E-03	9.50E-03	2.30E-03	aquatic life
Bis(2-ethylhexyl)phthalate (DEHP)	1.80E-01	2.00E-02	2.60E-02	2.00E-02	2.00E-02	
Boron	---	7.50E+00	1.00E+01	2.00E+00	2.00E+00	
Butanone[2-]	7.60E+00	1.00E+00	3.00E+03	3.50E+02	1.00E+00	
Butyl Benzyl Phthalate	1.00E-01	---	1.00E-01	9.00E+01	1.00E-01	
Cadmium	1.00E+00	3.60E-01	3.00E-01	2.70E-01	2.70E-01	
Carbazole	6.90E-02	7.00E-02	1.30E+02	7.90E+01	6.90E-02	
Carbon Disulfide	7.80E-03	5.00E-03	1.30E+00	8.10E-01	5.00E-03	
Cesium-134	---	---	3.20E+02	6.80E+02	3.20E+02	
Cesium-137	---	---	7.20E+02	1.40E+03	7.20E+02	Cesium-137 + Barium-137
Alpha-chlordane	6.00E-05	2.90E-03	3.20E-03	2.70E-01	6.00E-05	
Gamma-chlordane	6.00E-05	2.00E-02	3.20E-03	2.20E+00	6.00E-05	Chlordane[gamma-]
Chloroaniline[4-]	9.00E-04	1.00E+00	---	1.00E+00	9.00E-04	
Chlorobenzene	3.00E-02	2.40E+00	3.00E-02	2.40E+00	3.00E-02	
Chloroform	8.70E-02	5.00E-02	9.20E+00	8.00E+00	5.00E-02	
Chlorophenol[2-]	5.50E-02	6.00E-02	5.50E-02	3.90E-01	5.50E-02	
Chromium	4.34E+01	2.30E+01	4.30E+01	2.30E+01	2.30E+01	Chromium (total)
Chromium(+6)	---	3.40E-01	6.60E+02	3.40E-01	3.40E-01	
Chrysene	1.66E-01	1.10E+00	1.60E-01	3.10E+00	1.60E-01	Total HMW-PAHs
Cobalt	5.00E+01	1.30E+01	2.20E+02	1.30E+01	1.30E+01	

Derivation of ESVs and RSVs
II. SEDIMENT MEDIA
A. Screening Level (No Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Sediment[1]	EPA R4 Soil[2]	LANL Sediment[3]	LANL Soil[4]	ESV[5]	Notes
Cobalt-60	---	---	2.00E+02	7.60E+02	2.00E+02	
Copper	3.16E+01	2.80E+01	2.30E+01	1.40E+01	1.40E+01	
Cyanide	---	1.00E-01	1.00E-01	9.80E-02	9.80E-02	Cyanide (total)
DDD	3.50E-03	2.10E-02	8.20E-03	6.30E-03	3.50E-03	DDD[4,4'-]
DDE	1.40E-03	2.10E-02	3.10E-03	1.10E-01	1.40E-03	DDE[4,4'-]
DDT	1.00E-03	2.10E-02	4.10E-03	4.40E-02	1.00E-03	DDT[4,4'-]
Dibenzo(a,h)anthracene	3.30E-02	1.10E+00	3.30E-02	1.40E+01	3.30E-02	Total HMW-PAHs
Dibenzofuran	5.10E-01	1.50E-01	5.10E-01	6.10E+00	1.50E-01	
1,2-Dichlorobenzene	9.50E-02	9.00E-02	1.00E+00	9.20E-01	9.00E-02	
1,3-Dichlorobenzene	8.90E-02	8.00E-02	8.20E-01	7.40E-01	8.00E-02	
1,4-Dichlorobenzene	3.00E-02	8.80E-01	3.00E-02	8.90E-01	3.00E-02	
Dichloroethane[1,1-]	2.00E-03	4.00E-02	2.00E-02	2.10E+02	2.00E-03	
Dichloroethane[1,2-]	4.28E-01	9.00E-02	6.10E+00	8.50E-01	9.00E-02	
Dichloroethene[1,1-]	1.00E-01	4.00E-02	1.00E-01	1.10E+01	4.00E-02	
Dichloroethene[cis/trans-1,2-]	---	4.00E-02	2.00E-01	2.40E+01	4.00E-02	
Dieldrin	1.90E-03	2.90E-03	1.90E-03	4.50E-03	1.90E-03	
Diethyl Phthalate	6.30E-01	2.50E-01	4.00E+03	1.00E+02	2.50E-01	
Dimethyl Phthalate	6.78E-01	3.50E-01	9.00E+01	1.00E+01	3.50E-01	
Di-n-Butyl Phthalate	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	
Dinitrobenzene[1,3-]	4.00E-02	3.40E-02	1.10E+00	7.20E-02	3.40E-02	
Dinitrotoluene[2,4-]	2.90E-01	6.00E+00	2.90E-01	6.00E+00	2.90E-01	
Dinitrotoluene[2,6-]	2.96E-01	4.00E+00	8.60E+00	4.00E+00	2.96E-01	
Di-n-octylphthalate	3.90E-02	9.10E-01	1.00E+00	9.10E-01	3.90E-02	
Diphenylamine	---	1.01E+00	1.30E+01	1.00E+01	1.01E+00	
Endosulfan	1.00E-05	9.00E-04	1.00E-05	6.40E-01	1.00E-05	
Endrin	8.00E-03	1.90E-03	1.80E-03	1.40E-03	1.40E-03	wildlife based
Europium-152	----	---	3.40E+01	5.20E+02	3.40E+01	
Fluoranthene	4.23E-01	1.10E+00	4.20E-01	1.00E+01	4.20E-01	Total HMW-PAHs
Fluorene	7.70E-02	2.90E+01	7.70E-02	3.70E+00	7.70E-02	
Fluoride	---	3.20E+01	3.50E+02	1.20E+02	3.20E+01	
Heptachlor	6.00E-04	1.60E-03	2.40E-03	5.90E-02	6.00E-04	
Hexachlorobenzene	2.00E-02	7.90E-02	1.00E-01	7.90E-02	2.00E-02	
Hexanone[2-]	4.50E-02	3.60E-01	4.70E-01	3.60E-01	4.50E-02	
HMX	1.08E-01	1.60E+01	1.30E+02	1.60E+01	1.08E-01	
Indeno[1,2,3-cd]pyrene	2.00E-01	1.10E+00	2.00E-01	7.10E+01	2.00E-01	Total HMW-PAHs
Iodomethane	---	---	8.10E-02	3.80E-02	3.80E-02	
Iron	2.00E+04	---	2.00E+04	---	2.00E+04	
Kepone	---	1.70E-02	2.40E-02	2.20E-02	1.70E-02	
Lead	3.58E+01	1.10E+01	2.60E+01	1.10E+01	1.10E+01	
Lead-210	---	---	2.10E+03	1.20E+03	1.20E+03	
LINDANE (Gamma-BHC)	2.40E-03	3.10E-03	2.30E-03	9.50E-03	2.30E-03	aquatic life
Lithium	---	2.00E+00	1.30E+02	7.50E+01	2.00E+00	
Manganese	4.60E+02	2.20E+02	4.60E+02	2.20E+02	2.20E+02	
Mercury (inorganic)	1.70E-01	1.30E-02	1.70E-02	1.30E-02	1.30E-02	Inorganic - wildlife based
Mercury methyl	4.50E-04	3.50E-04	4.50E-04	3.50E-04	3.50E-04	Mercury (methyl) wildlife based
Methoxychlor[4,4'-]	3.00E-02	2.10E-03	3.00E-02	5.10E+00	2.10E-03	Methoxychlor
Methyl-2-pentanone[4-]	7.30E-02	---	1.70E+01	9.70E+00	7.30E-02	
Methylene Chloride	1.80E-01	2.10E-01	1.80E-02	2.60E+00	1.80E-02	
Methyl ethyl Ketone	7.60E+00	1.00E+00	7.60E+00	---	1.00E+00	
Methylnaphthalene[2-]	2.02E-02	2.90E+01	7.60E-02	1.60E+01	2.02E-02	

Derivation of ESVs and RSVs
II. SEDIMENT MEDIA
A. Screening Level (No Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Sediment[1]	EPA R4 Soil[2]	LANL Sediment[3]	LANL Soil[4]	ESV[5]	Notes
Methylphenol[2-]	1.19E-01	1.00E-01	1.70E+03	6.70E-01	1.00E-01	
Methylphenol[3-]	1.12E-01	9.00E-02	---	6.90E-01	9.00E-02	
Molybdenum	---	2.00E+00	2.60E+01	1.50E+01	2.00E+00	
Naphthalene	1.76E-01	2.90E+01	1.70E-01	1.00E+00	1.70E-01	Total LMW-PAHs
Neptunium-237	---	---	5.60E+01	5.00E+01	5.00E+01	
Nickel	2.27E+01	3.80E+01	1.20E+01	1.00E+01	1.00E+01	
Nitroaniline[2-]	---	2.00E-02	7.30E+00	5.30E+00	2.00E-02	
Nitrobenzene	4.07E-01	2.20E+00	2.40E+01	2.20E+00	4.07E-01	
Nitroglycerine	1.00E-02	1.30E+01	1.50E+03	1.30E+01	1.00E-02	
Nitrotoluene[2-]	2.07E-01	1.90E-01	2.50E+01	9.80E+00	1.90E-01	
Nitrotoluene[3-]	1.45E-01	1.30E-01	2.10E+01	1.20E+01	1.30E-01	
Nitrotoluene[4-]	1.45E-01	1.40E-01	4.60E+01	2.10E+01	1.40E-01	
Pentachloronitrobenzene	---	9.00E-02	9.00E-01	7.00E-01	9.00E-02	
Pentachlorophenol	1.00E-02	2.10E+00	1.00E-02	3.60E-01	1.00E-02	(aquatic life)
PETN	---	2.20E+00	1.30E+03	1.00E+02	1.00E+02	
PCE	2.00E-03	6.00E-02	2.00E+00	---	2.00E-03	
Phenanthrene	2.04E-01	2.90E+01	2.00E-01	6.00E-02	6.00E-02	Total HMW-PAHs
Phenol	1.75E-01	7.90E-01	7.50E+02	7.90E-01	1.75E-01	
Plutonium-238	---	---	5.00E+02	8.20E+02	5.00E+02	
Plutonium-239, 240	---	---	5.20E+02	8.70E+02	5.20E+02	
Plutonium-241	---	---	2.70E+05	1.70E+04	1.70E+04	
Pyrene	1.95E-01	1.10E+00	1.90E-01	1.00E+01	1.90E-01	Total HMW-PAHs
Radium-226	---	---	9.40E-01	1.50E+00	9.40E-01	
Radium-228	---	---	8.50E-01	1.20E+00	8.50E-01	
RDX	6.50E-02	2.30E+00	3.20E+00	2.30E+00	6.50E-02	
Selenium	8.00E-01	5.20E-01	7.20E-01	5.20E-01	5.20E-01	
Silver	1.00E+00	4.20E+00	5.00E-01	2.60E+00	5.00E-01	
Sodium-22	---	---	1.10E+04	4.60E+03	4.60E+03	
Strontium (stable)	---	9.60E+01	1.60E+03	9.50E+01	9.50E+01	
Strontium-90 + Yittrium-90	---	---	6.30E+02	3.40E+02	3.40E+02	Sr-90 + Yittrium-90
Styrene	1.26E-01	1.20E+00	---	1.20E+00	1.26E-01	
Tetrachlorodibenzodioxin [2,3,7,8-]	5.00E-06	---	1.40E+01	1.20E+01	5.00E-06	aquatic life)
Tetrachloroethene (PCE)	2.00E-03	6.00E-02	2.00E-03	1.80E-01	2.00E-03	
Tetryl	---	---	9.10E+01	1.50E+00	1.50E+00	
Thallium	---	5.00E-02	7.30E-01	5.00E-02	5.00E-02	
Thorium-228	---	---	6.40E+02	4.30E+01	4.30E+01	
Thorium-229	---	---	5.40E+02	4.70E+01	4.70E+01	
Thorium-230	---	---	5.80E+02	5.20E+01	5.20E+01	
Thorium-232	---	---	6.90E+01	6.20E+00	6.20E+00	
Titanium	---	---	8.80E+01	7.70E+01	7.70E+01	
Toluene	1.00E-02	1.50E-01	1.00E-02	2.30E+01	1.00E-02	
Toxaphene (Technical Grade)	1.00E-04	1.50E-04	1.00E-04	4.10E+00	1.00E-04	
Trichlorobenzene[1,2,4-]	1.10E-01	2.70E-01	1.10E-02	2.70E-01	1.10E-02	
Trichloroethane[1,1,1-]	7.00E-01	1.27E-01	7.00E-02	2.60E+02	7.00E-02	
Trichloroethene	---	---	7.80E-02	4.20E+01	7.80E-02	
Trichlorofluoromethane	---	1.64E+01	5.80E+01	5.20E+01	1.64E+01	
Trinitrobenzene[1,3,5-]	1.50E-02	3.00E-01	1.10E+00	1.00E+01	1.50E-02	
Trinitrotoluene[2,4,6-]	2.70E-01	7.50E+00	2.50E+01	7.50E+00	2.70E-01	
Tritium	---	---	6.60E+05	3.60E+04	3.60E+04	
Uranium	1.00E+02	2.50E+01	1.00E+02	2.50E+01	2.50E+01	

Derivation of ESVs and RSVs
II. SEDIMENT MEDIA
A. Screening Level (No Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Sediment[1]	EPA R4 Soil[2]	LANL Sediment[3]	LANL Soil[4]	ESV[5]	Notes
Uranium-233	---	---	6.10E+02	4.40E+02	4.40E+02	
Uranium-234	---	---	6.10E+02	4.40E+02	4.40E+02	
Uranium-235	---	---	6.60E+02	4.40E+02	4.40E+02	
Uranium-236	---	---	6.60E+02	4.70E+03	6.60E+02	
Uranium-238	---	---	6.70E+02	2.00E+03	6.70E+02	
Vanadium	---	7.80E+00	2.90E+01	4.70E+00	4.70E+00	
Vinyl Chloride	4.82E-01	3.00E-02	1.40E-01	1.20E-01	3.00E-02	
m,p-Xylene	1.30E-01	1.00E-01	1.30E-01	1.40E+00	1.00E-01	Xylene (Total)
Zinc	1.21E+02	4.60E+01	6.30E+01	4.70E+01	4.60E+01	

1 - Tables 2a, 2b, and 2c in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018) (ESV, Attachment D-2)
2 - Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018) (Attachment D-2)
3 - Los Alamos National Laboratory Low Effect ESL for Sediment Media (Attachment D-3)
4 - Los Alamos National Laboratory Low Effect ESL for Soil Media (Attachment D-3)
5 - Refinement Screening Value= lowest (most conservative) screening value highlighted in yellow

Derivation of ESVs and RSVs
II. SEDIMENT MEDIA
B. Refinement Level (Low Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Sediment[1]	EPA R4 Soil[2]	LANL Sediment[3]	LANL Soil[4]	RSV[5]	Notes
Acenaphthene	6.00E+00	---	7.60E-01	2.00E+00	7.60E-01	Total LMW-PAHs
Acenaphthylene	6.00E-01	---	7.60E-01	1.20E+03	6.00E-01	Total LMW-PAHs
Acetone	3.81E+01	---	6.50E-01	6.30E+00	6.50E-01	
Aldrin	8.00E-02	---	2.10E-01	1.80E-01	8.00E-02	
Aluminum	5.80E+04	---	2.50E+05	---	5.80E+04	
Americium-241	---	---	1.00E+04	4.30E+05	1.00E+04	
Amino-2,6-dinitrotoluene[4-]	1.40E-01	---	1.40E+02	1.20E+02	1.40E-01	
Amino-4,6-dinitrotoluene[2-]	7.00E-02	---	1.70E+02	1.40E+02	7.00E-02	
Anthracene	6.00E-01	---	5.70E-01	9.00E+00	5.70E-01	
Antimony	2.50E+01	---	4.50E+02	2.30E+01	2.30E+01	
Aroclor 1016	---	---	5.90E-01	3.10E+00	5.90E-01	
Aroclor 1242	---	---	5.30E-01	4.10E-01	4.10E-01	
Aroclor 1248	---	---	8.10E-02	7.30E-02	7.30E-02	
Aroclor 1254	---	---	3.40E-01	4.10E-01	3.40E-01	
Aroclor 1260	---	---	5.90E-01	8.80E+00	5.90E-01	
Arsenic	3.30E+01	---	3.10E+01	6.80E+01	3.10E+01	
Barium	6.00E+01	---	3.00E+02	2.60E+02	6.00E+01	
Benzene	2.19E+00	---	1.00E-01	2.40E+02	1.00E-01	
Benzo[a]anthracene	1.00E+00	---	1.00E+00	7.30E+00	1.00E+00	Total HMW-PAHs
Benzo[a]pyrene	1.00E+00	---	1.40E+00	1.90E+02	1.00E+00	Total HMW-PAHs
Benzo[b]fluoranthene	1.00E+00	---	1.90E+00	1.80E+02	1.00E+00	Total HMW-PAHs
Benzo(g,h,i)perylene	1.00E+00	---	1.70E+00	2.50E+02	1.00E+00	Total HMW-PAHs
Benzo[k]fluoranthene	1.00E+00	---	2.40E+00	7.10E+02	1.00E+00	Total HMW-PAHs
Benzoic Acid	2.00E+00	---	1.20E+01	1.00E+01	2.00E+00	
Benzyl Alcohol	6.73E+00	---	3.00E+03	1.20E+03	6.73E+00	
Beryllium	---	---	6.60E+02	2.50E+01	2.50E+01	
BHC[alpha-]	6.00E-03	---	6.60E+02	5.90E+02	6.00E-03	
BHC[beta-]	7.20E-03	---	5.00E-02	1.30E+00	7.20E-03	aquatic life
BHC[gamma-] (Lindane)	5.00E-03	---	2.30E-02	9.50E-02	5.00E-03	aquatic life
Bis(2-ethylhexyl)phthalate (DEHP)	2.60E+00	---	2.60E-01	2.00E-01	2.00E-01	
Boron	---	---	5.20E+01	1.00E+01	1.00E+01	
Butanone[2-]	2.27E+01	---	7.80E+03	9.20E+02	2.27E+01	
Butyl Benzyl Phthalate	4.81E-01	---	1.00E+00	9.00E+02	4.81E-01	
Cadmium	5.00E+00	---	3.00E+00	3.00E+00	3.00E+00	
Carbazole	4.56E+00	---	1.30E+03	7.90E+02	4.56E+00	
Carbon Disulfide	1.58E+00	---	1.30E+01	8.10E+00	1.58E+00	
Cesium-134	---	---	3.20E+03	6.80E+03	3.20E+03	
Cesium-137	---	---	7.20E+03	1.40E+04	7.20E+03	Cesium-137 + Barium-137
Alpha-chlordane	1.70E+00	---	1.70E-02	1.30E+00	1.70E-02	
Gamma-chlordane	1.70E+00	---	1.70E-02	1.10E+01	1.70E-02	Chlordane[gamma-]
Chloroaniline[4-]	2.10E-02	---	---	1.00E+01	2.10E-02	
Chlorobenzene	9.39E-01	---	3.00E-01	2.40E+01	3.00E-01	
Chloroform	3.35E+00	---	2.50E+01	2.10E+01	3.35E+00	
Chlorophenol[2-]	5.50E-01	---	5.50E-01	3.90E+00	5.50E-01	
Chromium	1.11E+02	---	1.10E+02	7.30E+01	7.30E+01	Chromium (total)
Chromium(+6)	---	---	6.60E+03	3.40E+00	3.40E+00	
Chrysene	1.00E+00	---	1.20E+00	3.10E+01	1.00E+00	Total HMW-PAHs
Cobalt	---	---	2.20E+03	1.30E+02	1.30E+02	

Derivation of ESVs and RSVs
II. SEDIMENT MEDIA
B. Refinement Level (Low Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Sediment[1]	EPA R4 Soil[2]	LANL Sediment[3]	LANL Soil[4]	RSV[5]	Notes
Cobalt-60	---	---	2.00E+03	7.60E+03	2.00E+03	
Copper	1.49E+02	---	6.90E+01	4.30E+01	4.30E+01	
Cyanide	---	---	1.00E+00	9.80E-01	9.80E-01	Cyanide (total)
DDD	8.50E-03	---	4.20E-02	3.20E-02	8.50E-03	DDD[4,4'-]
DDE	6.80E-03	---	3.10E-02	5.50E-01	6.80E-03	DDE[4,4'-]
DDT	7.00E-03	---	4.10E-02	2.20E-01	7.00E-03	DDT[4,4'-]
Dibenzo(a,h)anthracene	1.00E+00	---	3.30E-01	1.40E+02	3.30E-01	Total HMW-PAHs
Dibenzofuran	2.31E+00	---	5.10E+00	6.10E+01	2.31E+00	
1,2-Dichlorobenzene	4.77E-01	---	1.00E+01	9.20E+00	4.77E-01	
1,3-Dichlorobenzene	4.68E-01	---	8.20E+00	7.40E+00	4.68E-01	
1,4-Dichlorobenzene	4.68E-01	---	3.00E-01	3.50E+00	3.00E-01	
Dichloroethane[1,1-]	1.67E+00	---	2.00E-01	2.10E+03	2.00E-01	
Dichloroethane[1,2-]	8.76E-01	---	1.20E+01	1.60E+00	8.76E-01	
Dichloroethene[1,1-]	7.53E-01	---	1.00E+00	1.10E+02	7.53E-01	
Dichloroethene[cis/trans-1,2-]	---	---	2.00E+00	2.40E+02	2.00E+00	
Dieldrin	6.20E-02	---	1.90E-02	9.00E-03	9.00E-03	
Diethyl Phthalate	1.11E+00	---	4.00E+04	1.00E+03	1.11E+00	
Dimethyl Phthalate	2.03E+00	---	1.10E+03	1.00E+02	2.03E+00	
Di-n-Butyl Phthalate	3.19E-01	---	1.10E-01	1.10E-01	1.10E-01	
Dinitrobenzene[1,3-]	1.05E-01	---	2.50E+00	1.60E-01	1.05E-01	
Dinitrotoluene[2,4-]	2.90E+00	---	2.90E+00	6.00E+01	2.90E+00	
Dinitrotoluene[2,6-]	1.31E-01	---	8.60E+01	4.00E+01	1.31E-01	
Di-n-octylphthalate	1.10E+00	---	1.00E+01	9.10E+00	1.10E+00	
Diphenylamine	---	---	2.20E+01	1.30E+01	1.30E+01	
Endosulfan	1.00E-03	---	1.00E-04	6.40E+00	1.00E-04	
Endrin	1.80E-02	---	1.80E-02	1.40E-02	1.40E-02	wildlife based
Europium-152	---	---	3.40E+02	5.20E+03	3.40E+02	
Fluoranthene	1.00E+00	---	2.20E+00	2.30E+01	1.00E+00	Total HMW-PAHs
Fluorene	1.00E+00	---	5.30E-01	1.90E+01	5.30E-01	
Fluoride	---	---	3.50E+03	1.20E+03	1.20E+03	
Heptachlor	7.50E-02	---	1.60E-02	5.90E-01	1.60E-02	
Hexachlorobenzene	2.40E-01	---	1.00E+00	7.90E-01	2.40E-01	
Hexanone[2-]	7.60E+00	---	4.70E+00	3.60E+00	3.60E+00	
HMX	6.47E+01	---	1.70E+02	1.60E+02	6.47E+01	
Indeno[1,2,3-cd]pyrene	1.00E+00	---	2.00E+00	7.10E+02	1.00E+00	wildlife based
Iodomethane	---	---	1.60E-01	7.60E-02	7.60E-02	
Iron	4.00E+04	---	4.00E+04	---	4.00E+04	Total HMW-PAHs
Kepone	---	---	1.20E-01	1.10E-01	1.10E-01	
Lead	1.28E+02	---	5.20E+01	2.30E+01	2.30E+01	
Lead-210	---	---	2.10E+04	1.20E+04	1.20E+04	
LINDANE (Gamma-BHC)	5.00E-03	---	4.90E-03	9.50E-02	4.90E-03	aquatic life
Lithium	---	---	6.50E+02	3.50E+02	3.50E+02	
Manganese	1.10E+03	---	1.10E+03	1.10E+03	1.10E+03	
Mercury (inorganic)	1.70E-01	---	1.70E-01	1.30E-01	1.30E-01	(inorganic - wildlife based)
Mercury methyl	4.50E-03	---	4.50E-03	3.50E-03	3.50E-03	Mercury (methyl) wildlife based
Methoxychlor[4,4'-]	5.90E-02	---	3.00E-01	1.00E+01	5.90E-02	Methoxychlor
Methyl-2-pentanone[4-]	8.17E+00	---	1.70E+02	9.70E+01	8.17E+00	
Methylene Chloride	2.40E+00	---	1.80E-01	2.20E+01	1.80E-01	

Derivation of ESVs and RSVs
II. SEDIMENT MEDIA
B. Refinement Level (Low Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Sediment[1]	EPA R4 Soil[2]	LANL Sediment[3]	LANL Soil[4]	RSV[5]	Notes
Methylethylketone	2.27E+01	---	2.27E+01		2.27E+01	
2-Methylnaphthalene	6.00E-01	---	7.60E-01	1.60E+02	6.00E-01	Methylnaphthalene[2-]
Methylphenol[2-]	1.77E+00	---	1.70E+04	7.00E+00	1.77E+00	
Methylphenol[3-]	1.79E+00	---	---	7.00E+00	1.79E+00	
Molybdenum	---	---	2.60E+02	1.50E+02	1.50E+02	
Naphthalene	6.00E-01	---	5.60E-01	1.00E+01	5.60E-01	Total LMW-PAHs
Neptunium-237	---	---	5.60E+02	5.00E+02	5.00E+02	
Nickel	4.86E+01	---	2.40E+01	2.10E+01	2.10E+01	
Nitroaniline[2-]	---	---	1.40E+01	1.00E+01	1.00E+01	
Nitrobenzene	9.01E+00	---	2.40E+02	2.20E+01	9.01E+00	
Nitroglycerine	1.27E+01	---	1.60E+04	1.30E+02	1.27E+01	
Nitrotoluene[2-]	5.04E+00	---	2.50E+02	9.80E+01	5.04E+00	
Nitrotoluene[3-]	6.00E+00	---	2.10E+02	1.20E+02	6.00E+00	
Nitrotoluene[4-]	5.46E+00	---	4.60E+02	2.10E+02	5.46E+00	
Pentachloronitrobenzene	---	---	9.00E+00	7.00E+00	7.00E+00	
Pentachlorophenol	1.20E+00	---	1.00E-01	3.60E+00	1.00E-01	(aquatic life)
PETN	---	---	1.30E+04	1.00E+03	1.00E+03	
PCE	4.15E-01	---	4.15E+02		4.15E-01	
Phenanthrene	1.00E+00	---	1.10E+00	---	1.00E+00	Total HMW-PAHs
Phenol	2.10E-01	---	7.50E+03	8.00E+00	2.10E-01	
Plutonium-238	---	---	5.00E+03	8.20E+03	5.00E+03	
Plutonium-239, 240	---	---	5.20E+03	8.70E+03	5.20E+03	
Plutonium-241	---	---	2.70E+06	1.70E+05	1.70E+05	
Pyrene	1.00E+00	---	1.50E+00	2.00E+01	1.00E+00	Total HMW-PAHs
Radium-226	---	---	9.40E+00	1.50E+01	9.40E+00	
Radium-228	---	---	8.50E+00	1.20E+01	8.50E+00	
RDX	3.12E-01	---	6.20E+00	4.40E+00	3.12E-01	
Selenium	1.20E+00	---	1.20E+00	1.00E+00	1.00E+00	
Silver	2.20E+00	---	5.00E+00	2.60E+01	2.20E+00	
Sodium-22	---	---	1.10E+05	4.60E+04	4.60E+04	
Strontium (stable)	---	---	1.60E+04	9.50E+02	9.50E+02	
Strontium-90 + Yittrium-90	---	---	6.30E+03	3.40E+03	3.40E+03	Sr-90 + Yittrium-90
Styrene	1.62E+00	---	---	1.20E+01	1.62E+00	
Tetrachlorodibenzodioxin[2,3,7,8-]	8.50E-05	---	1.40E+02	1.20E+02	8.50E-05	aquatic life
Tetrachloroethene (PCE)	4.15E-01	---	2.00E-02	9.40E-01	2.00E-02	
Tetryl	---	---	4.30E+02	7.20E+00	7.20E+00	
Thallium	---	---	7.30E+00	5.00E-01	5.00E-01	
Thorium-228	---	---	6.40E+03	4.30E+02	4.30E+02	
Thorium-229	---	---	5.40E+03	4.70E+02	4.70E+02	
Thorium-230	---	---	5.80E+03	5.20E+02	5.20E+02	
Thorium-232	---	---	6.90E+02	6.20E+01	6.20E+01	
Titanium	---	---	8.80E+02	7.70E+02	7.70E+02	
Toluene	2.07E+00	---	1.00E-01	2.30E+02	1.00E-01	
Toxaphene (Technical Grade)	3.20E-02	---	1.00E-03	4.10E+01	1.00E-03	
Trichlorobenzene[1,2,4-]	4.85E-01	---	1.10E-01	2.70E+00	1.10E-01	
Trichloroethane[1,1,1-]	3.67E-01	---	7.00E-01	2.60E+03	3.67E-01	
Trichloroethene	---	---	7.80E-01	4.20E+02	7.80E-01	
Trichlorofluoromethane	---	---	3.90E+02	3.50E+02	3.50E+02	

Derivation of ESVs and RSVs
II. SEDIMENT MEDIA
B. Refinement Level (Low Effect Screening Level)

Analyte *(mg/kg, pCi/g)*	EPA R4 Sediment[1]	EPA R4 Soil[2]	LANL Sediment[3]	LANL Soil[4]	RSV[5]	Notes
Trinitrobenzene[1,3,5-]	1.16E-01	---	1.50E+00	2.80E+01	1.16E-01	
Trinitrotoluene[2,4,6-]	1.12E-01	---	3.20E+01	1.30E+01	1.12E-01	
Tritium	---	---	6.60E+06	3.60E+05	3.60E+05	
Uranium	1.00E+03	---	1.00E+03	2.50E+02	2.50E+02	
Uranium-233	---	---	6.10E+03	4.40E+03	4.40E+03	
Uranium-234	---	---	6.10E+03	4.40E+03	4.40E+03	
Uranium-235	---	---	6.60E+03	4.40E+03	4.40E+03	
Uranium-236	---	---	6.60E+03	4.70E+04	6.60E+03	
Uranium-238	---	---	6.70E+03	2.00E+04	6.70E+03	
Vanadium	---	---	5.90E+01	9.50E+00	9.50E+00	
Vinyl Chloride	1.18E+00	---	1.40E+00	1.20E+00	1.18E+00	
m,p-Xylene	1.07E+00	---	1.30E+00	1.80E+00	1.07E+00	Xylene (Total)
Zinc	4.59E+02	---	6.30E+02	1.20E+02	1.20E+02	

1 - Tables 2a, 2b, and 2c in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (Attachment D-2)
2 - Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018) (Attachment D-2)
3 - Los Alamos National Laboratory No Effect ESL for Sediment Media (Attachment D-3)
4 - Los Alamos National Laboratory No Effect ESL for Soil Media (Attachment D-3)
5 - Ecological Screening Value= lowest (most conservative) screening value highlighted in yellow

Derivation of ESVs and RSVs
III. SURFACE WATER MEDIA
A. Screening Level (Chronic/No Effect Screening Level)

Analyte *(µg/L, pCi/L)*	SCDHEC WQS[1]	EPA R4 Surface Water[2]	LANL Surface Water[3]	ESV[4]	Notes
Acetone	---	1.70E+03	1.50E+03	1.50E+03	EPA Chronic
Alpha-BHC	---	1.00E-02	---	1.00E-02	
Alpha-chlordane	4.30E-03	4.00E-03	4.30E-03	4.00E-03	WQS 5, LANL 5
Aluminum	---	8.70E+01	5.30E+02	8.70E+01	
Antimony	---	1.90E+02	3.00E+01	3.00E+01	
Arsenic		1.50E+02	1.50E+02	1.50E+02	
Barium	---	2.20E+02	3.90E+00	3.90E+00	
Beryllium	---	1.10E+01	6.60E-01	6.60E-01	
Beta-BHC	---	1.00E-02	2.20E+00	1.00E-02	EPA BHC (beta)
Bismuth-214	---	---	---	---	
Cadmium	1.00E-01	4.50E-01	2.30E+02	1.00E-01	EPA Cadmium (filtered) assuming a hardness of 50 mg/L as CaCO3
Calcium	---	1.160E+05	---	1.160E+05	
Caprolactam	---	---	---	---	
Chromium	1.10E+01	1.10E+01	1.10E+01	1.10E+01	EPA Chromium VI (filtered); WQS Chromium VI; LANL Chromium VI
Hexavalent Chromium		1.10E+01	1.10E+01	1.10E+01	EPA Chromium VI (filtered)
Cobalt	---	1.90E+01	3.00E+00	3.00E+00	
Copper	2.90E+00	4.95E+00	5.00E+00	2.90E+00	EPA Copper (filtered) assuming a hardness of 50 mg/L as CaCO3
Cyanide	5.20E+00	5.20E+00	5.20E+00	5.20E+00	LANL Copper (total)
DDD	---	1.00E-02	---	1.00E-02	
DDE	---	3.00E-01	1.00E+02	3.00E-01	LANL DDE[4,4'-]
DDT	1.00E-03	1.00E-03	1.00E-03	1.00E-03	EPA 4,4'-DDT (Aquatic Life); LANL 4,4'-DDT (Wildlife-Based)
Dieldrin	5.60E-02	6.00E-02	5.60E-02	5.60E-02	EPA (Aquatic Life) AND (Wildlife-Based)
Gamma-chlordane	4.30E-03	4.00E-03	4.30E-03	4.00E-03	EPA Chlordane (Wildlife based); WQS 5; EPA 5
Iron	---	1.00E+03	1.00E+03	1.00E+03	
Lead	5.40E-01	1.25E+00	1.00E+00	5.40E-01	EPA Lead (filtered) assuming a hardness of 50 mg/L as CaCO3
Magnesium	---	8.20E+04	---	8.20E+04	
Manganese	---	9.30E+01	1.30E+03	9.30E+01	
Mercury	9.10E-01	1.30E-03	2.80E-03	1.30E-03	EPA Mercury (wildlife based); EPA 6; LANL 7; LANL Mercury (inorganic)
Mercury methyl		2.80E-03	2.80E-03	2.80E-03	EPA Methylmercury (aquatic life)
Nickel	1.60E+01	2.89E+01	2.90E+01	1.60E+01	EPA Nickel (filtered) assuming a hardness of 50 mg/L as CaCO3
Potassium	---	5.30E+04	---	5.30E+04	
Silver	---	6.00E-02	1.00E-01	6.00E-02	EPA Silver (filtered) assuming a hardness of 50 mg/L as CaCO3
Sodium	---	6.80E+05	---	6.80E+05	
Toluene	---	6.20E+01	9.80E+00	9.80E+00	
Tritium	---	---	1.60E+08	1.60E+08	
Vanadium	---	2.70E+01	1.90E+01	1.90E+01	
Zinc	3.70E+01	6.60E+01	6.50E+01	3.70E+01	EPA Zinc (filtered) assuming a hardness of 50 mg/L as CaCO3

1 - SCDHEC, R61-68, Water Classifications and Standards, chronic values for freshwater aquatic life (2020) (Attachment D-4)
2 - Table 1a in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018) (Attachment D-2)
3 - Los Alamos National Laboratory for No Effect ESL for Surface Water Media (Attachment D-3)
4 - Ecological Screening Value= lowest (most conservative) screening value highlighted in yellow
5 - Value is for chlordane (gamma chlordane not specified)
6 - Value is the lowest of the available mercury screening values (wildlife based)
7 - Value is the lowest of the available mercury screening values (methylmercury)

Derivation of ESVs and RSVs
III. SURFACE WATER MEDIA
B. Refinement Level (Chronic/Low Effect Screening Level)

Analyte *(µg/L, pCi/L)*	SCDHEC WQS[1]	EPA R4 Surface Water[2]	LANL Surface Water[3]	RSV[4]	Notes
Acetone	---	1.70E+03	1.50E+04	1.70E+03	
Alpha-chlordane	4.30E-03	4.00E-03	4.30E-02	4.00E-03	WQS Chlordane, WQS 5; EPA 5; LANL Chlordane
Aluminum	---	8.70E+01	5.30E+02	8.70E+01	
Antimony	---	1.90E+02	3.00E+01	3.00E+01	
Arsenic	1.50E+02	1.50E+02	3.40E+02	1.50E+02	EPA filtered and unfiltered
Barium	---	2.20E+02	3.90E+01	3.90E+01	
Beryllium	---	1.10E+01	6.60E+00	6.60E+00	
Beta-BHC	---	---	2.20E+01	2.20E+01	EPA BHC (beta)
Bismuth-214	---	---	---	---	
Cadmium	1.00E-01	4.50E-01	8.60E+02	1.00E-01	EPA Cadmium (filtered) assuming a hardness of 50 mg/L as CaCO3
Calcium	---	1.16E+05	---	1.16E+05	
Chromium	1.10E+01	1.10E+01	1.60E+01	1.10E+01	EPA Chromium VI (filtered); WQS Chromimum VI; LANL Chromium VI
Cobalt	---	1.90E+01	3.00E+01	1.90E+01	
Copper	2.90E+00	4.95E+00	7.00E+00	2.90E+00	EPA Copper (filtered) assuming a hardness of 50 mg/L as CaCO3
Cyanide	5.20E+00	5.20E+00	2.20E+01	5.20E+00	LANL Copper (total)
DDD	---	1.00E-02	---	1.00E-02	
DDE	---	3.00E-01	1.00E+03	3.00E-01	LANL DDE[4,4'-]
DDT	1.00E-03	1.00E-03	1.00E-03	1.00E-03	EPA 4,4'-DDT (Aquatic Life Only) and 4,4'-DDT (Wildlife-Based); LANL 4,4'
Dieldrin	5.60E-02	6.00E-02	2.40E-01	5.60E-02	EPA (Aquatic Life) and (Wildlife-Based)
Gamma-chlordane	4.30E-03	4.00E-03	4.30E-02	4.00E-03	EPA Chlordane (Wildlife based), 5; WQC 5
Hexavalent Chromium 7196A	---	1.10E+01	1.60E+01	1.10E+01	EPA Chromium VI (filtered)
Iron	---	1.00E+03	1.00E+04	1.00E+03	
Lead	5.40E-01	3.01E+01	1.00E+01	5.40E-01	EPA Lead (filtered) assuming a hardness of 50 mg/L as CaCO3
Magnesium	---	8.20E+04	---	8.20E+04	
Manganese	---	9.30E+01	2.30E+03	9.30E+01	
Mercury	9.10E-01	1.30E-03	1.40E+00	1.30E-03	EPA Mercury (wildlife based), 6; LANL 7, Mercury (inorganic)
Mercury methyl	---	2.80E-03	2.80E-02	2.80E-03	EPA Methylmercury (aquatic life)
Nickel	1.60E+01	2.89E+01	2.60E+02	1.60E+01	EPA Nickel (filtered) assuming a hardness of 50 mg/L as CaCO3
Potassium	---	5.30E+04	---	5.30E+04	
Silver	---	6.00E-02	1.00E+00	6.00E-02	EPA Silver (filtered) assuming a hardness of 50 mg/L as CaCO3
Sodium	---	6.80E+05	---	6.80E+05	
Toluene	---	6.20E+01	9.80E+01	6.20E+01	
Tritium	---	---	1.60E+09	1.60E+09	
Vanadium	---	2.70E+01	1.90E+02	2.70E+01	
Zinc	3.70E+01	6.60E+01	8.50E+01	3.70E+01	EPA Zinc (filtered) assuming a hardness of 50 mg/L as CaCO3

1 - SCDHEC, R61-68, Water Classifications and Standards, chronic values for freshwater aquatic life (2020) (Attachment D-4)
2 - Table 1a in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018) (Attachment D-2)
3 - Los Alamos National Laboratory for No Effect ESL for Surface Water Media (2017) (Attachment D-3)
4 - Refinement Screening Value= lowest (most conservative) screening value highlighted in yellow

This page intentionally left blank.

Attachment D-2

EPA Region 4 Screening Tables for Soil, Sediment, and Surface Water (March 2018)

Link: https://www.epa.gov/sites/default/files/2018-03/documents/era_regional_supplemental_guidance_report-march-2018_update.pdf

This page intentionally left blank.

Table 1a
Region 4 Surface Water Screening Values for Hazardous Waste Sites

Chemical	CAS	Freshwater Screening Values (µg/L)			Saltwater Screening Values (µg/L)		
		Chronic	Acute	Source	Chronic	Acute	Source
Inorganic Compounds							
Metals							
Aluminum (pH 6.5 -9.0)	7429-90-5	87	750	a	1,500		d
Antimony	7440-36-0	190	900	b	4,300		d
Arsenic (filtered and unfiltered) ^	7440-38-2	150	340	a	36	69	a
Arsenic III (unfiltered) ^	22541-54-4	148	340	b	36	69	f
Barium	7440-39-3	220	2,000	b	4	110	a
Beryllium	7440-41-7	11	93	b	0.13		d
Boron	7440-42-8	7,200	34,000	b	1,000		l
Cadmium (filtered) ^ *	7740-43-9	0.45	0.94	a	7.9	33	a
Calcium	7440-70-2	116,000		c			
Chromium III (filtered) ^ *	16065-83-1	42	323	a	103	515	s
Chromium VI (filtered) ^	18540-29-9	11	16	a	50	1,100	a
Cobalt	7440-48-4	19	120	b			
Copper (filtered) ^ *	7740-50-8	4.95	7.0	a	3.1	4.8	a
Iron	7439-89-6	1,000		a	300		d
Lead (filtered) ^ *	7439-92-1	1.25	30.1	a	8.1	210	a
Lithium	7439-93-2	440	910	b			
Magnesium	7439-95-4	82,000		c			
Manganese	7439-96-5	93	1,680	b	100		d
Mercury (filtered & unfiltered) ^ (aquatic)	7439-97-6	0.77	1.4	a	0.94	1.8	a
Mercury (wildlife based)	7439-97-6	0.0013	0.012	b, a	0.94	1.8	a
Methylmercury (aquatic life)	22967-92-6	0.0028	0.099	c			
Molybdenum	7439-98-7	800	7,200	b			
Nickel (filtered) ^ *	7440-02-0	28.9	260	a	8.2	74	a
Phosphorus (elemental)	7723-14-0	1,000		m	100		d
Potassium	7440-09-7	53,000		c			
Selenium (unfiltered) ^ (aquatic) **	7782-49-2	5	20	a, aa	71	290	a
Silver (filtered) ^ *	7740-22-4	0.06	0.98	b, a	0.1	1.9	e, a
Sodium	7440-23-5	680,000		c			
Strontium	7440-24-6	5,300	48,000	b			
Thallium	7440-28-0	6	54	b	6.3	710	d, g
Tin	7440-31-5	180	1,600	b			
Uranium	7440-61-1	2.6	46	c			
Vanadium	7440-62-2	27	79	b			
Zinc (filtered) ^ *	7740-66-6	66	66	a	81	90	a
Zirconium	7440-67-7	17	310	c			
Other Inorganics							
Chloride	16887-00-6	230,000	860,000	a, a			
Chlorine	7782-50-5	11	19	a, a	7.5	13	a, a
Cyanide (free)	57-12-5	5.2	22	a, a	1	1	a, a
Fluoride	16984-48-8	2,700	9,800	b, b	5,000		d
Hydrogen sulfide (S^{2-}, HS^-)	7783-06-4	2	3.2	a, n	2		a
Sulfite	14265-45-3	200		b			
Volatile Organic Compounds (VOCs)							
Chlorinated and Brominated Alkanes							
1,1,1,2-Tetrachloroethane	630-20-6	85	770	b, b	360	1,376	i, i
1,1,2,2-Tetrachloroethane	79-34-5	200	910	b, b	10.8	902	d, s
1,1,1-Trichloroethane	71-55-6	76	690	b, b	1,560	3,120	s, s
1,1,2-Trichloroethane	79-00-5	730	3,200	b, b	2,097	8,026	i, i
1,1-Dichloroethane	75-34-3	410	3,700	b, b	2,692	10,310	i, i
1,2-Dichloroethane	107-06-2	2,000	8,200	b, b	5,650	11,300	s, s
1,2-Dichloropropane	78-87-5	520	3,300	b, b	1,064	3,400	i, g
Bromoform (tribromomethane)	75-25-2	230	1,100	b, b	360	1,790	d, s
Bromomethane (methyl bromide)	74-83-9	16	38	b, b	265	1,100	u, u

Table 1a
Region 4 Surface Water Screening Values for Hazardous Waste Sites

Chemical	CAS	Freshwater Screening Values (µg/L)			Saltwater Screening Values (µg/L)		
		Chronic	Acute	Source	Chronic	Acute	Source
Dibromochloromethane	124-48-1	320	2,900	b, b	34	13,416	d, u
Dichlorobromomethane	75-27-4	340	3,100	b, b	3,510	14,567	u, u
Dichloromethane (Methylene chloride)	75-09-2	1,500	8,500	b, b	1,580	25,600	d, s
Hexachloroethane	67-72-1	12	210	c, c	33	310	j, g
Trichloromethane (Chloroform)	67-66-3	140	1,300	b, b	471	8,150	d, s
Tetrachloromethane (Carbon tetrachloride)	56-23-5	77	690	b, b	4.4	15,000	d, s
Chlorinated Alkenes							
1,1-Dichloroethene (1,1-Dichloroethylene)	75-35-4	130	1,200	b, b	3.2	22,400	d, s
1,2-Dichloroethene (1,2-Dichloroethylene)	540-59-0	970	8,800	b, b	818	3,393	u, u
1,2-cis-Dichloroethyene	156-59-2	620	5,500	b, b	1,629	6,236	i, i
1,2-trans-Dichloroethylene	156-60-5	558	10,046	b, b	1,629	6,236	i, i
1,3-Dichloropropene (cis and trans)	542-75-6	1.7	15	b, b	39.5	79	s, s
1,1,2,2-Tetrachloroethylene (PCE)	127-18-4	53	430	b, b	8.85	1,020	d, s
1,1,2-Trichloroethylene (TCE)	79-01-6	220	2,000	b, b	81	200	d, s
Chloroethene (Vinyl chloride)	75-01-4	930	8,400	b, b	2,276	8,717	i, i
Chlorobenzenes							
Chlorobenzene	108-90-7	25	220	b, b	25	1,360	h, i
1,2-Dichlorobenzene	95-50-1	23	130	b, b	42	660	h, g
1,3-Dichlorobenzene	541-73-1	22	79	b, b	390	660	e, g
1,4-Dichlorobenzene	106-46-7	9.4	57	b, b	115	660	i, g
1,2,3-Trichlorobenzene	87-61-6	8	134	h, i	5	134	l, i
1,2,4-Trichlorobenzene	120-82-1	130	420	b, b	5.4	134	h, i
1,3,5-Trichlorobenzene	108-70-3	5	134	l, i	5	134	l, i
Trichlorobenzene (mixed isomers)	12002-48-1	5	134	b, i	5	134	l, i
Monoaromatic Hydrocarbons							
1,2,4-Trimethylbenzene	95-63-6	15	140	b, b	56	366	j, i
1,3,5-Trimethylbenzene	108-67-8	26	230	b, b	56	366	j, i
Benzene	71-43-2	160	700	b, b	110	1,700	h, g
Cymene, p- (4-Isopropyltoluene)	99-87-6	16	150	b, b	21	187	j, i
Ethylbenzene	100-41-4	61	550	b, b	25	8,760	h, s
Isopropylbenzene (Cumene)	98-82-8	4.8	43	b, b	98	547	j, i
Styrene (vinyl benzene)	100-42-5	32	290	b, b	412	1,575	i, i
Toluene	108-88-3	62	560	b, b	215	950	h, s
Xylenes (total)	1330-20-7	27	240	b, b	260	1,057	j, i
Energetic VOCs							
Acetonitrile	75-05-8	12,000	100,000	b, b	73,429	217,936	j, j
Acrylonitrile	107-13-1	78	650	b, b	391	858	j, j
1,2-Diphenylhydrazine	122-66-7	1.1	10	b, b	30	110	j, j
Hydrazine	302-01-2	2	16	b, b	34	140	u, u
Ketones							
2-Butanone (methyl ethyl ketone)	78-93-3	22,000	200,000	b, b	65,695	201,828	j, j
2-Hexanone (methyl butyl ketone)	591-78-6	99	1,800	c, c	16,871	58,590	j, j
2-Octanone (methyl hexyl ketone)	111-13-7	8.3	150	c, c	2,807	10,740	i, i
4-Methyl-2-pentanone (MIBK)	108-10-1	170	2,200	c, c	19,142	65,872	j, j
Acetone	67-64-1	1,700	15,000	b, b	117,629	355,606	j, j
Alcohols							
1-Pentanol	71-41-0	110	2,000	c, c	12,637	44,404	j, j
2-Propanol	67-63-0	7.5	130	c, c	52,874	162,854	j, j
Ethylene glycol	107-21-1	140,000	1,300,000	b, b	4,200	1,768,104	u, j
Methanol	67-56-1	330	3,000	b, b	112,652	369,551	j, j
Propylene glycol	57-55-6	71	640	b, b	329,329	1,114,122	j, j
Other VOCs							
1,4-Dioxane	123-91-1	22,000	200,000	n, n	200,733	617,500	j, j
Acetaldehyde	75-07-0	130	1,200	b, b	20	1,680	u, u
Acrolein	107-02-8	3	3	a, a	1.8	7.6	u, u

Table 1a
Region 4 Surface Water Screening Values for Hazardous Waste Sites

Chemical	CAS	Freshwater Screening Values (µg/L)			Saltwater Screening Values (µg/L)		
		Chronic	Acute	Source	Chronic	Acute	Source
Carbon disulfide	75-15-0	15	130	b, b	253	1,050	u, u
Cyclohexane	110-82-7	158	890	j, i	158	890	j, i
Hexane	110-54-3	0.6	10	c, c	115	715	j, i
Methylcyclohexane	108-87-2	52	421	j, i	52	421	j, i
Methylamine	74-89-5	860	7,700	b, b	1,727	14,164	j, j
Methyl tert-butyl ether (MTBE)	1634-04-4	730	6,500	b, b	5,000	38,037	h, j
Vinyl acetate	108-05-4	16	280	c, c	2,892	12,000	u, u
Semivolatile Organic Compounds							
Chloroanilines							
4-Chloroaniline	106-47-8	0.8	24	u, u	0.8	24	u, u
2,4-Dichloroaniline	554-00-7	15	575	j, j	15	575	j, j
Pentachloroaniline	527-20-8	5	88	j, i	5	88	j, i
Chlorobenzenes							
1,2,3,4-Tetrachlorobenzene	634-66-2	3	18	b, b	6	39	j, i
1,2,4,5-Tetrachlorobenzene	95-94-3	8.3	75	b, b	6	39	j, i
Hexachlorobenzene (aquatic only)	118-74-1	0.15	2.8	j, u	0.15	2.8	j, u
Hexachlorobenzene (wildlife based)	118-74-1	0.0003		n			
Pentachlorobenzene (aquatic only)	608-93-5	3.1	16	b, b	1	11	j, i
Pentachlorobenzene (wildlife based)	608-93-5	0.02		n			
Chlorophenols							
2-Chlorophenol	95-57-8	18	160	b, b	400	1,037	d, u
2,4-Dichlorophenol	120-83-2	11	92	b, b	790	1,352	d, j
2,4,5-Trichlorophenol	95-95-4	1.9	17	b, b	12	259	o, o
2,4,6-Trichlorophenol	88-06-2	4.9	39	b, b	6.5	414	d, i
2,3,4,6-Tetrachlorophenol	58-90-2	1	11	h, n	32	120	i, i
3-Methyl-4-Chlorophenol	59-50-7	1	67	h, n	241	1,000	u, u
Pentachlorophenol # (aquatic)	87-86-5	15	19	a, a	7.9	13	a, a
Other Phenols							
2-Methylphenol (Cresol, o-)	95-48-7	67	600	b, b	995	2,615	j, j
3-Methylphenol (Cresol, m-)	108-39-4	62	560	b, b	995	2,615	j, j
4-Methylphenol (Cresol, p-)	106-44-5	53	480	b, b	405	1,680	u, u
2,3-Dimethylphenol	526-75-0	120	1,100	n, n	550	1,446	j, j
2,4-Dimethylphenol	105-67-9	15	140	b, b	193	800	u, u
2-Nitrophenol	88-75-5	73	650	b, b	900	4,101	u, j
4-Nitrophenol	100-02-7	58	530	b, b	600	3,585	u, u
2,4-Dinitrophenol	51-28-5	71	379	b, b	14	2,425	d, u
2,4,6-Tribromophenol	118-79-6	5.6	50	b, b	37	140	i, i
Nonylphenol (branched)	84852-15-3	1	6	h, j	0.7	6	h, j
Phenol	108-95-2	160	4,700	b, b	58	300	p, p
Energetic SVOAs							
2-Amino-4,6-dinitrotoluene	35572-78-2	18	160	b, b	20	175	k
4-Amino-2,6-dinitrotoluene	19406-51-0	11	98	b, b	27	707	j, j
1,3-Dinitrobenzene (DNB)	99-65-0	22	100	b, b	20	108	k
2,3-Dinitrotoluene	602-01-7	2.3	21	b, b	36	295	j, u
2,4-Dinitrotoluene	121-14-2	44	390	b, b	9.1	200	d, g
2,5-Dinitrotoluene	619-15-8	5.6	50	b, b	36	367	j, j
2,6-Dinitrotoluene	606-20-2	81	730	b, b	36	200	j, g
3,5-Dinitrotoluene	618-85-9	95	860	b, b	36	367	j, j
3,5-Dinitroanaline (DNA)	618-87-1	70	210	b, b	60	230	k
HMX (Octahydro-tetranitro-1,3,5,7-tetrazocine)	2691-41-0	220	1,200	b, b	330	1,875	k
Nitroglycerine	55-63-0	18	160	b, b	239	991	u, u
2-Nitrotoluene	88-72-2	71	640	b, b	1,185	4,919	u, u
3-Nitrotoluene	99-08-1	42	380	b, b	1,384	5,745	u, u
4-Nitrotoluene	99-99-0	46	410	b, b	1,438	5,969	u, u
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	121-82-4	79	520	b, b	190	700	k

Table 1a
Region 4 Surface Water Screening Values for Hazardous Waste Sites

Chemical	CAS	Freshwater Screening Values (µg/L)			Saltwater Screening Values (µg/L)		
		Chronic	Acute	Source	Chronic	Acute	Source
1,3,5-Trinitrobenzene (TNB)	99-35-4	11	27	b, b	11	36	k
2,4,6-Trinitrotoluene (TNT)	118-96-7	13	120	b, b	54	252	j, u
Phthalates							
bis(2-Ethylhexyl) Phthalate	117-81-7	8	1,100	b, b	6	605	u, u
Butylbenzyl Phthalate	85-68-7	23	130	b, b	18	38	i, i
Diethyl Phthalate	84-66-2	220	980	b, b	59	2,139	u, u
Dimethyl Phthalate	131-11-3	1,100	3,200	b, b	3,295	16,500	j, u
Di-n-Butyl Phthalate	84-74-2	19	34	b, b	27	102	i, i
Di-n-Octyl Phthalate	117-84-0	215	893	u, u	215	893	u, u
Polycyclic Aromatic Hydrocarbons (PAHs)							
1-Methylnaphthalene	90-12-0	6.1	109	b, b	52	157	j, i
2-Methylnaphthalene	91-57-6	4.7	42	b, b	52	150	j, i
Acenaphthene	83-32-9	15	19	b, b	15	320	j, g
Acenaphthylene	208-96-8	13	120	b, b	28	291	j, j
Anthracene	120-12-7	0.02	0.18	b, b	0.43	1.8	u, u
Benz(a)anthracene	56-55-3	4.7	42	b, b	0.35	4.6	j, i
Benzo(a)pyrene	50-32-8	0.06	0.54	b, b	0.02	0.64	u, u
Benzo(b)fluoranthene	205-99-2	2.6	23	b, b	0.06	1.4	j, i
Benzo(g,h,i)perylene	191-24-2	0.012	0.19	j, u	0.012	0.19	j, u
Benzo(k)fluoranthene	207-08-9	0.06	1.3	j, i	0.06	1.3	j, i
Chrysene	218-01-9	4.7	42	b, b	0.35	4.2	j, i
Dibenz(a,h)anthracene	53-70-3	0.012	0.28	j, j	0.01	0.28	j, j
Fluoranthene	206-44-0	0.8	3.7	b, b	0.82	3.4	u, u
Fluorene	86-73-7	19	110	b, b	24	82	j, i
Indeno(1,2,3-cd)pyrene	193-39-5	0.012	0.27	j, j	0.012	0.27	j, j
Naphthalene	91-20-3	21	170	b, b	1.4	780	h, g
Phenanthrene	85-01-8	2.3	31	b, b	4.6	7.7	o, o
Pyrene	129-00-0	4.6	42	b, b	0.11	0.45	u, u
PAH-like Compounds							
1,1-Biphenyl	92-52-4	6.5	26	b, b	49	198	j, u
Carbazole	86-74-8	4.0	36	n, n	112	465	u, u
Dibenzofuran	132-64-9	4.0	36	b, b	61	242	j, i
Quinoline	91-22-5	3.4	5,682	h, i	1,634	5,682	u, i
Tetrahydrofuran	109-99-9	11,000	74,000	b, b	19,606	68,203	i, j
Other SVOCs							
2,2-Dibromo-3-nitrilopropionamide	10222-01-2	20	50	b, b	10	40	u, j
3,3'-Dichlorobenzidine	91-94-1	4.5	41	n, n	13	505	j, i
4-Bromophenyl Phenyl Ether	101-55-3	1.5	12	c, i	2	12	j, i
Aniline	62-53-3	4.1	30	b, b	10	76	u, u
Benzaldehyde	100-52-7	143	592	u, u	143	592	u, u
Benzidine	92-87-5	1.5	14	b, b	23	660	j, j
Benzoic Acid	65-85-0	42	740	c, c	--	--	--
Benzyl alcohol	100-51-6	8.6	150	c, c	1,205	5,000	u, u
Decane	124-18-5	49	880	c, c	4	17	i, i
Hexachlorobutadiene (Aquatic Life)	87-68-3	1	10	b, b	0.3	1.6	l, s
Hexachlorobutadiene (Wildlife Based)	87-68-3	1	10	b, b	0.3	1.6	l, s
Hexachlorocyclopentadiene	77-47-4	0.45	4.5	b, b	0.07	0.7	l, i
Hydroquinone	123-31-9	2.2	4.4	b, b	6	25	u, u
Isodecyl diphenyl phosphate	29761-21-5	1.7	22	b, b	--	--	--
Isophorone	78-59-1	920	7,500	b, b	996	4,300	i, g
N-Nitrosodiphenylamine	86-30-6	25	220	b, b	48	283	u, j
2-Nitroaniline	88-74-4	17	494	j, j	17	494	j, j
Nitrobenzene	98-95-3	230	1,000	b, b	1,046	2,000	u, g
Triphenyl phosphate	115-86-6	4	40	b, b	--	--	--

Table 1a
Region 4 Surface Water Screening Values for Hazardous Waste Sites

Chemical	CAS	Freshwater Screening Values (µg/L)			Saltwater Screening Values (µg/L)		
		Chronic	Acute	Source	Chronic	Acute	Source
Pesticides							
4,4'-DDT (Aquatic Life Only)	50-29-3	0.001	1.1	a, a	0.01	0.13	j, a
4,4'-DDT (Wildlife-Based)	50-29-3	0.001	1.1	a, a	0.01	0.13	j, a
4,4'-DDE	72-55-9	0.3	1.3	u, u	0.14	0.7	s, s
4,4'-DDD	72-54-8	0.01	0.19	c, c	0.084	0.35	u, u
Acephate	30560-19-1	150	550	r, r	1.5	28	j, j
Aldrin	309-00-2	0.04	3.0	b, a	0.0001	1.3	d, a
Atrazine	1912-24-9	0.03	0.05	u, u	--	--	--
Azinphos-methyl (Guthion)	86-50-0	0.01	0.08	a, r	0.01	0.19	a, u
BHC (alpha)	319-84-6	0.01	--	h	0.046	--	d
BHC (beta)	319-84-6	0.01	--	h	0.046	--	d
BHC-gamma (Lindane) (Aquatic Life)	58-89-9	0.11	0.95	b, a	0.02	0.16	u, a
BHC-gamma (Lindane) (Wildlife Based)	58-89-9	0.11	0.95	b, a	0.02	0.16	u, a
Carbaryl	63-25-2	0.2	0.85	h, r	0.29	1.6	h, a
Carbofuran	1563-66-2	0.75	1.1	r, r	0.29	1.2	u, u
Chlordane	57-74-9	0.004	2.4	a, a	0.004	0.09	a, a
Chloropyrifos	2921-88-2	0.04	0.08	a, a	0.006	0.011	a, a
Cyanazine	21725-46-2	18.2	328	b, b	--	61	j, j
Demeton	126-75-0	0.10	5.2	a, j	0.1	5.2	a, j
Diazinon	333-41-5	0.17	0.17	a, a	0.82	0.82	a, a
Dieldrin (Aquatic Life)	60-57-1	0.06	0.24	a	0.002	0.71	a, a
Dieldrin (Wildlife Based)	60-57-1	0.06	0.24	a	0.002	0.71	a, a
Dimethoate	60-51-5	0.50	22	r, r	--	2	j, j
Endosulfan (alpha + beta)	115-29-7	0.06	0.22	a, a	0.009	0.03	a, a
Endosulfan Sulfate	1031-07-8	0.06	1.9	p, r	0.009	0.03	p, p
Endrin	72-20-8	0.04	0.09	a, a	0.002	0.04	a, a
Heptachlor	76-44-8	0.004	0.5	a, a	0.004	0.05	a, a
Heptachlor Epoxide	1024-57-3	0.004	0.5	a, a	0.004	0.05	a, a
Malathion	121-75-5	0.1	0.3	a, r	0.1	1	a, u
Methoxychlor	72-43-5	0.03	0.7	a, r	0.03	--	a
Mirex (Aquatic Life)	2385-85-5	0.001	0.001	a, b	0.001	0.001	a, l
Mirex (Wildlife Based)	2385-85-5	0.001	0.001	a, b	0.001	0.001	a, l
Parathion	56-38-2	0.01	0.065	a, a	0.04	0.06	d, u
Toxaphene	8001-35-2	0.0002	0.73	a, a	0.0002	0.21	a, a
Herbicides, Fungicides							
2,4-D	94-75-7	79.2	130	r, r	70	--	f, i
Captan	133-06-2	16.5	13	r, r	18	30	j, j
Chlorothalonil	1897-45-6	0.6	1.8	r, r	0.36	16	h, u
Dicamba	1918-00-9	14.7	61	b, r	--	--	--
Dinoseb	88-85-7	0.48	4.8	n	--	--	--
Diquat	2764-72-9	6	54	b, b	11	21	u, u
MCPA (2-methyl-4-chlorophenoxyacetic acid)	94-74-6	2.6	90	h, r	4.2	40	h, u
Metolachlor	51218-45-2	7.8	110	h, n	0.6	2	j, j
Silvex (2,4,5-TP)	93-72-1	30	270	n	50	--	f, i
Simazine	122-34-9	9	--	b, r		57	j, j
Trifluralin	1582-09-8	0.48	8.6	b, b	3	12	j, i
Polychlorinated Biphenyls (PCBs) and Dioxin/Furans							
2,3,7,8-TCDD (Dioxin) (Wildlife Based)	1746-01-6	3.10E-09		b			
Total PCBs (Aquatic Life)	1336-36-3	0.014	0.014	a, d	0.03	0.03	a
Total PCBs (Wildlife Based)	1336-36-3	0.00012		b	0.03		a
Other							
Alkalinity	-	20,000	--	a	--	--	--
Ammonia ^^	7664-41-7	Varies	Varies	a	varies	varies	a, a
Formaldehyde	50-00-0	180	790	b	216	826	u, j
Nitrite (warm water)	14797-65-0	20	100	b	--	--	--

Table 1a
Region 4 Surface Water Screening Values for Hazardous Waste Sites

Chemical	CAS	Freshwater Screening Values (µg/L)			Saltwater Screening Values (µg/L)		
		Chronic	Acute	Source	Chronic	Acute	Source
pH	-	20,000	--	a	--	--	--
Selenate	14124-68-6	9	13	b	--	--	--
Selenite	14124-67-5	28	186	b	--	--	--
Tributyltin	688-73-3	0.072	0.46	a	0.0074	0.42	a, a
Urea	57-13-6	17,000	150,000	b	--	--	--

Table 1a Notes:

Red font indicates a bioaccumulative chemical.

^ - Screening value is for **filtered (dissolved)** metals. A conversion factor (CF) was used to convert the screening value for total metals in surface water to a screening value for dissolved metals in surface water. CMC (dissolved) = CMC (total) × CF. See Table 1c for screening values for **total (unfiltered)** metals.

* - The freshwater screening value is hardness dependent. The screening value shown in Table 1a is for **dissolved metals assuming a hardness of 50 mg/L as $CaCO_3$**. A correction for site-specific hardness was based on equations listed in Tables 1b and 1c. If hardness data are unavailable hardness may be estimated as: H = 2.497 × Ca (mg/L) + 4.118 × Mg (mg/L).

- Freshwater criteria for pentachlorophenol are pH Dependent. Values displayed are for a pH of 7.8.

^^ - Criteria for ammonia are pH, temperature, and lifestage dependent.

** - Selenium concentrations in water do not reflect dietary sources to aquatic life and screening against these numbers may not be adequately protective.

Table 1a Sources:

a - National Recommended Water Quality Criteria http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm

a~ - Per the NRWQC, when comparing the maximum detected value, the higher number should be used; but if comparing to an average or 95%UCL, the lower number should be used.

aa - Tier 2 value.

b - Great Lakes Initiative (GLI) Clearinghouse resources Tier II criteria revised 2013 http://www2.epa.gov/gliclearinghouse/

c - Suter, G.W. II, and Tsao, C.L. 1996. Toxicological benchmarks for screening potential contaminants of concern for effects on aquatic biota: 1996 Revision. ES/ER/TM-96/R2. https://rais.ornl.gov/documents/tm96r2.pdf

d - Florida State Criteria for Surface Water Quality Classifications http://www.dep.state.fl.us/legal/Rules/shared/62-302/302-Table.pdf

e - North Carolina Water Quality Standards https://www.epa.gov/sites/production/files/2014-12/documents/nc-classifications-wqs.pdf

f - Georgia Department of Natural Resources (GADNR) Water Use Classifications and Water Quality Standards https://epd.georgia.gov/georgia-water-quality-standards

g - Hawaii Department of Health (HDOH) Environmental Action Levels, Chronic and Acute Surface Water (Aquatic Habitat) Standards http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/environmental-hazard-evaluation-and-environmental-action-levels

h - CCME (Canadian Council of Ministers of the Environment). 2003. Canadian Environmental Quality Guidelines: Summary Table December 2003. Canadian Council of Ministers of the Environment, Winnipeg, Manitoba. Available at: http://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/index.html

i - McGrath and Di Toro (2009) Model - See text Section 6.1.4 Equation 1. Model. May be used for freshwater and saltwater.

j - ECOSAR program predicted lowest chronic or acute value. See Section 6.1.4 in text. Model may be used for freshwater or saltwater.

k - Talmadge et al. (1999)

l - New York Ambient Water Quality Criteria and Guidance Values: http://www.dec.ny.gov/docs/water_pdf/togs111.pdf

m - New Jersey Department of Environmental Protection (NJDEP) Ecological Screening Criteria http://www.nj.gov/dep/srp/guidance/ecoscreening/esc_table.pdf

n - Michican Water Quality Values - Rule 57: http://www.michigan.gov/deq/0,4561,7-135-3313_3686_3728-11383--,00.html

o - Texas Surface Water Quality Standards: https://www.tceq.texas.gov/waterquality/standards/2014standards.html

p - Mississippi Water Quality Standards: https://www.epa.gov/sites/production/files/2014-12/documents/ms-wqs.pdf

q - U.S. EPA. 2003a. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. Office of Research and Development, Washington, DC. EPA/600/R-02/013. Available at: http://www.udel.edu/udaily/2010/jun/images/PAHESB.pdf

r - Office of Pesticide Programs (OPP) Aquatic Life Benchmarks: http://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/aquatic-life-benchmarks-pesticide-registration

s - Louisiana DEQ Water Quality Standards: http://deq.louisiana.gov/page/water-quality

Table 2a
Region 4 Sediment Screening Values for Hazardous Waste Sites
Non-Narcotic Modes of Action

Chemical		CAS	Freshwater Sediment Screening Value		Source	Marine/Estuarine Sediment Screening Value		Source
			ESV	RSV		ESV	RSV	
Inorganic Compounds - mg/kg dry weight								
Metals - mg/kg dw								
Aluminum		7429-90-5	25,000	58,000	i			
Antimony		7440-36-0	2	25	a	2	25	a
Arsenic		7440-38-2	9.8	33	b	7.24	41.6	c
Barium		7440-39-3	20	60	b			
Cadmium		7440-43-9	1	5	b	0.68	4.21	c
Chromium (Total)		7440-47-3	43.4	111	b	52.3	160	c
Cobalt		7440-48-4	50		b			
Copper		7440-50-8	31.6	149	b	18.7	108	c
Iron		7439-89-6	20,000	40,000	g			
Lead		7439-92-1	35.8	128	b	30.2	112	c
Manganese		7439-96-5	460	1,100	g			
Mercury (inorganic - aquatic life)		7439-97-6	0.18	1.1	b	0.13	0.7	c
Mercury (inorganic - wildlife based)		7439-97-6	0.17	0.17	i			
Methylmercury (wildlife based)		22967-92-6	0.00045	0.0045	i			
Nickel		7440-02-0	22.7	48.6	b	15.9	42.8	c
Selenium		7782-49-2	0.72	2.9	i			
Selenium (wildlife)		7782-49-2	0.8	1.2	i			
Silver		7440-22-4	1	2.2	b	0.73	1.77	c
Uranium		7440-61-1	100	1,000	i			
Zinc		7440-66-6	121	459	b	124	271	c
Other Inorganics - mg/kg dw								
Ammonia		7664-41-7	230	300	h			
Sulfides (Total)		18946-25-8	39	61	h			
Volatile Organic Compounds (VOCs) - µg/kg @1% OC								
Acetaldehyde	R	75-07-0	40	1,291	d, e	6.2	1,291	d, e
Acrolein		107-02-8	0.93	3.4	d, e	0.6	3.4	d, e
Acrylonitrile	R	107-13-1	30	151	d, e		151	e
Bromoform (tribromomethane)		75-25-2	142		d	223		d
Bromomethane (methyl bromide)		74-83-9	6.5		d	108		d
Cyclohexane		110-82-7		278	e		278	e
1,3-Dichloropropene (cis and trans)		542-75-6	1.5	75	d, e	34.7	75	d, e
1,2-Diphenylhydrazine	R	122-66-7	3.9	106	d, e		106	e
Dibromochloromethane		124-48-1	198		d	21		d
Dichlorobromomethane		75-27-4	210		d	2,172		d
Hexane		110-54-3	0.94	186	d, e		186	e
Hydrazine	R	302-01-2	0.87		d	14.6		d
Methylamine	R	74-89-5	292	586	d, e		586	e
Vinyl acetate	N3	108-05-4	5.7	2,230	d, e	1,030	2,230	d, e
Semi-volatile Organic Compounds (SVOCs)								
Phenols - µg/kg @1% OC unless denoted by shading								
2-Chlorophenol	N2	95-57-8	55	550	i, i	885	2,302	d, e
2-Methylphenol (o-cresol)	N2	95-48-7	119	1,773	d, e	63	1,773	h, d
2,3-Dimethylphenol	N2	526-75-0	385	1,765	d, e		1,765	e
2,4-Dimethylphenol	N2	105-67-9	39	1,437	d, e	29	504	h, d
3-Methylphenol (Cresol, m-)	N2	108-39-4	112	1,792	d, e		1,792	e
4-Methylphenol (p-Cresol)	N2	106-44-5	93	260	d, h	670	714	h, d
2-Nitrophenol	N2	88-75-5	168	3,589	d, e	2,070	3,589	d, e

Table 2a
Region 4 Sediment Screening Values for Hazardous Waste Sites
Non-Narcotic Modes of Action

Chemical		CAS	Freshwater Sediment Screening Value		Source	Marine/Estuarine Sediment Screening Value		Source
			ESV	RSV		ESV	RSV	
4-Nitrophenol	N2	100-02-7	153	4,105	d, e	1,579	4,105	d, e
2,4-Dinitrophenol	U	51-28-5	223	2,961	d, e	45	2,961	d, e
2-Methyl-4,6-Dinitrophenol	U	534-52-1	1,477	2,304	d, e	1,477	2,304	d, e
2,4,5-Trichlorophenol	N2	95-95-4	34	1,964	d, f	217	1,964	d, f
2,4,6-Trichlorophenol	N2	88-06-2	89	1,964	d, f	117	1,964	d, f
3-Methyl-4-Chlorophenol	N2	59-50-7	5	2,035	d, f	1,257	2,035	d, f
Pentachlorophenol (aquatic life)	U	87-86-5	10	1,200	i, h	360	394	h, d
Pentachlorophenol (wildlife based)	U	87-86-5	65		l			
Phenol	N2	108-95-2	175	210	d, h	63	420	d, h
Energetic SVOAs - µg/kg @ 1% OC unless denoted by shading								
2-Amino-4,6-dinitrotoluene	U	35572-78-2	47	140	d, e	52	140	d, e
4-Amino-2,6-dinitrotoluene	U	19406-51-0	28	70	d, e		70	e
3,5-Dinitroanaline (DNA)		618-87-1	126	140	d, e	120	126	d, e
1,3-Dinitrobenzene (DNB)	U	99-65-0	40	105	d, e	37	105	d, e
2,3-Dinitrotoluene	R	602-01-7	8	122	d, e		122	e
2,4-Dinitrotoluene	R	121-14-2	290	2,900	i, i	29	114	d, e
2,5-Dinitrotoluene	R	619-15-8	22	144	d, e		144	e
2,6-Dinitrotoluene	R	606-20-2	296	131	d, e		131	e
3,5-Dinitrotoluene	R	618-85-9	381	144	d, e		144	e
HMX (Octahydro-tetranitro-1,3,5...)	C	2691-41-0	108	64,709	d, f	162	64,709	d, f
Nitroglycerine	R	55-63-0	10	12,704	d, f	133	12,704	d, f
RDX (Hexahydro-1,3,5-trinitro-1,3,5...)	R	121-82-4	65	312	d, e	155	312	d, e
1,3,5-Trinitrobenzene (TNB)	R	99-35-4	15	116	d, e	15	116	d, e
2,4,6-Trinitrotoluene (TNT)	R	118-96-7	27	112	d, f		112	e
Other SVOCs - µg/kg @ 1% OC								
4-Chloroaniline	N2	106-47-8	0.9	21	d, e	0.9	21	d, e
2,4-Dichloroaniline	N2	554-00-7		32	e		32	e
Pentachloroaniline	U	527-20-8		621	e		621	e
2,2-Dibromo-3-nitrilopropionamide	R	10222-01-2		7.1	e	3.4	7.1	d, e
3,3'-Dichlorobenzidine	N2	91-94-1	31	90	d, e		90	e
Aniline	N2	62-53-3	2.3	12	d, e	5.6	12	d, e
Benzaldehyde	R	100-52-7	59	580	d, e	59	580	d, e
Benzidine	N2	92-87-5	1.1	17	d, e		17	e
bis(2-Chloroethyl) Ether	R	111-44-4		8,163	f		8,163	f
Decane	N2	124-18-5	726		d		65	d
Hexachlorobenzene *		118-74-1	20	240	f, b	10	23	f, h
Hexachlorocyclopentadiene (aquatic life)	R	77-47-4	6.5	810	d, l	1	130	d, l
Hexachlorocyclopentadiene (wildlife based)	R	77-47-4	69		l			
Hydroquinone	R	123-31-9	1.5	8.2	d, e	4.1	8.2	d, e
Pesticides - µg/kg @ 1% OC unless denoted by shading								
4,4'-DDD *	C	72-54-8	3.5	8.5	j, j	1.2	8	c, c
Total DDD *	C	DDD	4.9	28	b, b		13	e
4,4'-DDE *	C	72-55-9	1.4	6.8	j, j	2.1	374	c, c
Total DDE *	C	DDE	3.2	31	b, b		13	e
4,4'-DDT (aquatic life)	C	50-29-3	1.0	7	a, a		5	c
Total DDT *	C	DDT	4.2	63	b, b	0.7	52	c, c
DDT/DDE/DDD (total) *	C	DDTR	5.3	572	b, b		44	l
Total DDTs (Wildlife based)	C	DDTR	10		b			

Table 2a
Region 4 Sediment Screening Values for Hazardous Waste Sites
Non-Narcotic Modes of Action

Chemical		CAS	Freshwater Sediment Screening Value		Source	Marine/Estuarine Sediment Screening Value		Source
			ESV	RSV		ESV	RSV	
Acephate	A	30560-19-1	50		d			
Acrolein		107-02-8	0.9	3.4	d, e	0.6	3	d, e
Aldrin (aquatic life)	C	309-00-2	29	80	d, g	0.1	48	d, e
Aldrin (wildlife based)	C	309-00-2	42	210	i, i			
Atrazine		1912-24-9	0.3	89	b, e			
BHC (alpha)	C	319-84-6	0.3	6	d, g	1.3	567	d, e
BHC (beta) (aquatic life)	C	319-85-7	5.0	7.2	i, h		567	e
BHC (beta) (wildlife based)	C	319-85-7	300	1,500	i			
BHC-gamma (Lindane) (aquatic life)	C	58-89-9	2.4	5	b, b	0.6	0.99	c, c
BHC-gamma (Lindane) (wildlife based)	C	58-89-9	10	100	i			
Carbaryl	A	63-25-2	0.3	6	d, l	0.5	1	d, l
Carbofuran	A	1563-66-2	0.9	4	d, l	0.4	20	d, e
Chlordane *	C	57-74-9	3.2	18	b, b	2.7	5	c, c
Chlordane (Wildlife based)	C	57-74-9	0.06	1,700	b, i			
Chloropyrifos	A	2921-88-2	3	12	d, l	0.4	8	d, l
Cyanazine	H	21725-46-2	30	117	d, e			
Demeton	A	126-75-0	0.2	0.35	d, e	0.2	0.35	d, e
Diazinon	A	333-41-5	0.4	9	b, l	18	91	d, l
Dieldrin *	C	60-57-1	1.9	62	b, b	0.1	4.3	c, c
Dieldrin (Wildlife based)	C	60-57-1	7.7	10	b, i			
Dimethoate	A	60-51-5	0.2	1.7	d, e			
Endosulfan	C	115-29-7	0.01	1	i, l	0.1	3	l, l
Endosulfan-beta	C	33213-65-9	0.9		d	0.14		d
Endosulfan Sulfate	C	1031-07-8	0.7		d	0.11		d
Endrin	C	72-20-8	2.2	207	b, b	0.12	6	a, l
Endrin (wildlife based)	C	72-20-8	8.0	18	b, i			
Guthion	A	86-50-0	0.06		b	0.008	0.1	d, l
Heptachlor *	C	76-44-8	0.6	75	j, l	1.5	71	d, l
Heptachlor epoxide	C	1024-57-3	2.5	16	b, b	0.14	15	d, l
Malathion	A	121-75-5	0.67		b	0.06	0.42	d, l
Methoxychlor *	C	72-43-5	30	59	i, l	2.1	59	d, l
Mirex (aquatic life)	C	2385-85-5	3.6	120	d, l	3.6	120	d, l
Mirex (wildlife based)	C	2385-85-5	37		b	3.6	120	d, l
Parathion	A	56-38-2	0.2	1.2	d, e	0.6	1.2	d, e
Toxaphene *	C	8001-35-2	0.1	32	b, b	0.15	54	d, l
Herbicides, Fungicides - µg/kg @ 1% OC								
2,4-D	H	94-75-7	47	436	d, f	42	436	d, f
Captan	F	133-06-2	47	51	d, e		51	e
Chlorothalonil	R	1897-45-6	6.4	62	d, l	3.9	4	d, l
Dicamba	H	1918-00-9	8.4	180	d, l		630	l
Dinoseb	H	88-85-7	15	1,817	d, e		1,817	e
Diquat	H	2764-72-9	25	2,498	d, f	43	2,498	d, f
MCPA (2-methyl-4-chlorophenoxyacetic acid)	H	94-74-6	1.6		d	2.5		d
Metolachlor	H	51218-45-2	22	240	d, l		290	l
Silvex (2,4,5-TP)	H	93-72-1	62	184	d, f	103	184	d, f
Simazine	H	122-34-9	0.3	72	b, e		72	e
Trifluralin	H	1582-09-8	79	493	d, e		493	e

Table 2a
Region 4 Sediment Screening Values for Hazardous Waste Sites
Non-Narcotic Modes of Action

Chemical		CAS	Freshwater Sediment Screening Value		Source	Marine/Estuarine Sediment Screening Value		Source
			ESV	RSV		ESV	RSV	
Polychlorinated Biphenyls (PCBs) and Dioxins/Furans - µg/kg @ 1% OC unless denoted by shading								
Total PCBs	E	1336-36-3	59.8	676	b, b	21.6	189	b, b
Total PCBs (wildlife based)	E	1336-36-3	14		b	14		b
Dioxins/Furans	E	1746-01-6	0.0025	0.025	k, k	0.0025	0.025	k, k
2,3,7,8-TCDD (Dioxin) (aquatic life)	E	1746-01-6	0.0005	0.0085	l, i		0.0005	l
2,3,7,8-TCDD (Dioxin) (wildlife based)	E	1746-01-6	0.002	0.0022	b, i			
Other - mg/kg dw								
Butyltins - mg/kg dw								
Monobutyltin		78763-54-9	0.54	4.8	h			
Dibutyltin		818-08-6	0.91	130	h			
Tributyltin		688-73-3	0.047	0.32	h			
Tetrabutyltin		1461-25-2	0.097	0.097	h			
Bulk Petroleum Hydrocarbons - mg/kg dw								
Total Petroleum Hydrocarbons - Diesel		68334-30-5	340	510	h			
Total Petroleum Hydrocarbons - Residual		68476-53-9	3,600	4,400	h			

Table 2a Notes:
Red font indicates a bioaccumulative chemical.
* - indicates protective of aquatic and wildlife receptors.
Shaded gray cells indicate units in µg/kg dry weight.
CAS = chemical abstract service registry number
ESV - Ecological Screening Value for Step 2
RSV - Refinement Screening Value for Step 3a
R - Reactive electrophiles/proelectrophiles
N2 - Polar Narcosis
N3 - Diesters
U - Oxidative phosphorylation uncouplers
H - Herbicides
C - Central nervous system seizure agents
A - Acetylcholinesterase inhibitors
F - Fungicide
E - Endocrine disrupters or reproductive and developmental toxicants

Table 2a Sources:

a - Long, Edward R., and Lee G. Morgan. 1991. The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program. NOAA Technical Memorandum NOS OMA 52. Used effects range low (ER-L) for chronic and effecs range medium (ER-M) for acute. (µg/kg dw)

b - MacDonald, D.D.; Ingersoll, C.G.; Smorong, D.E.; Lindskoog, R.A.; Sloane, G; and T. Biernacki. 2003. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters. Florida Department of Environmental Protection, Tallahassee, FL. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters. Used threshold effect concentration (TEC) for the ESV and probable effect concentration (PEC) for the RSV. (µg/kg dw)

c - MacDonald, D.D. 1994. Approach to the Assessment of Sediment Quality in Florida Coastal Waters. Florida Department of Environmental Protection. 1994 Florida Sediment Quality Assessment Guidelines for Florida Coastal Waters. (µg/kg dw)

d - Region 4 Sediment Model based on highest ranked surface water quality ESV from Table 1a. See Equation 3 in text Section 6.2.2. (µg/kg @ 1% OC)

e - Region 4 Sediment Model based on: (ECOSAR minimum chronic value). See text. (µg/kg @ 1% OC)

f - Region 4 Sediment Model based on: (lowest predicted surface water value from McGrath & Di Toro (2009). See text. (µg/kg @ 1% OC)

g - Persaud, D., R. Jaagumagi and A. Hayton. 1993. Guidelines for the protection and management of aquatic sediment quality in Ontario. Ontario Ministry of the Environment. Queen's Printer of Ontario. (µg/kg @ 1% OC)

h - Washington State Sediment Management Standards, Cleanup Objectives. http://www.ecy.wa.gov/programs/tcp/smu/sed_standards.htm (µg/kg dw)

i - Los Alamos National Laboratory ECORISK Database. September 2017. http://www.lanl.gov/environment/protection/eco-risk-assessment.php (µg/kg dw)

j - CCME (Canadian Council of Ministers of the Environment). 2003. Canadian Environmental Quality Guidelines: Summary Table December 2003. Canadian Council of Ministers of the Environment, Winnipeg, Manitoba. (µg/kg dw)

k - USEPA. 1993. Interim Report on Data and Methods for Assessment of 2,3,7,8 - Tetrachlorodibenzo-p-dioxin Risks to Aquatic Life and Associated Wildlife. EPA/600/R-93/055. Available from the National Service Center for Environmental Publications (NSCEP) Document Number 600R93055. http://www.epa.gov/nscep/

l - NYDEC (2014) Screening and Assessment of Contaminated Sediment, New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Bureau of Habitat, June 24, 2014. (µg/kg dw). Wildlife number is µg/kg @ 1% OC.

Table 2b
Region 4 Sediment Screening Values for Hazardous Waste Sites
for Narcotic Mode of Action

Chemical	CAS	Freshwater Sediment Screening Value		Source	Marine/Estuarine Sediment Screening Value		Source
		ESV	RSV		ESV	RSV	
Volatile Organic Compounds (VOCs) - µg/kg @ 1% OC unless denoted by shading							
Chlorinated and Brominated Alkanes							
1,1,1,2-Tetrachloroethane	630-20-6	99	418	a, c		418	c
1,1,2,2-Tetrachloroethane	79-34-5	250	2,230	a, c	13	2,230	a, c
1,1,1-Trichloroethane	71-55-6	70	367	i, c		367	c
1,1,2-Trichloroethane	79-00-5	538	1,545	a, c		1,545	c
1,1-Dichloroethane	75-34-3	20	1,666	i, c		1,666	c
1,2-Dichloroethane	107-06-2	986	1,131	a, c		1,131	c
1,2-Dichloropropane	78-87-5	428	876	a, c		876	c
Dichloromethane (methylene chloride)	75-09-2	18	2,404	i, c	667	2,404	a, c
Hexachloroethane	67-72-1	27	75	a, b		75	b
Trichloromethane (Chloroform)	67-66-3	87	3,352	a, c	291	3,352	a, c
Tetrachloromethane (Carbon tetrachloride)	56-23-5	57	706	a, c	3.3	706	a, c
Chlorinated and Brominated Alkenes							
1,1-Dichloroethene (1,1-Dichloroethylene)	75-35-4	100	753	i, c	2.0	753	a, c
1,2-Dichloroethene (1,2-Dichloroethylene)	540-59-0	200	1,135	i, c	569	1,135	a, c
1,2-cis-Dichloroethyene	156-59-2	432	1,135	a, c		1,135	c
1,2-trans-Dichloroethylene	156-60-5	389	1,135	a, c		1,135	c
1,3-Dichloropropene	542-75-6	1.5	75	a, b	35	75	a, b
1,1,2,2-Tetrachloroethylene (PCE)	127-18-4	2	415	i, c	11	415	a, c
1,1,2-Trichloroethylene (TCE)	79-01-6	78	692	i, c	73	692	a, c
Chloroethene (Vinyl chloride)	75-01-4	482	1,178	a, c		1,178	c
Chlorobenzenes							
Chlorobenzene	108-90-7	30	939	i, c	66	939	a, c
1,2-Dichlorobenzene	95-50-1	95	477	a, c	173	477	a, c
1,3-Dichlorobenzene	541-73-1	89	468	a, c		468	c
1,4-Dichlorobenzene	106-46-7	30	468	i, c		468	c
1,2,3-Trichlorobenzene	87-61-6	113	495	a, b	71	495	a, b
1,2,4-Trichlorobenzene	120-82-1	11	485	i, b	75	485	a, b
1,3,5-Trichlorobenzene	108-70-3	68	476	a, b	68	476	a, b
Trichlorobenzene (mixed isomers)	12002-48-1	68	476	a, b	68	476	a, b
Monoaromatic Hydrocarbons							
1,2,3-Trimethylbenzene	526-73-8		368	a, b		368	b
1,2,4-Trimethylbenzene	95-63-6	97	361	a, b		361	b
1,3,5-Trimethylbenzene	108-67-8	164	354	a, b		354	b
Benzene	71-43-2	10	2,185	i, c	111	2,185	a, c
Cymene, p- (4-Isopropyltoluene)	99-87-6	184	242	a, b		242	b
Ethylbenzene	100-41-4	290	1,467	a, b	119	1,467	a, b
Isopropylbenzene (Cumene)	98-82-8	35	713	a, b		713	b
Styrene (Vinyl benzene)	100-42-5	126	1,621	a, c		1,621	c
Toluene	108-88-3	10	2,074	i, c	568	2,074	a, c
Xylenes (total)	1330-20-7	130	1,074	i, b		1,074	b
Ketones							
2-Butanone (methyl ethyl ketone)	78-93-3	7,604	22,707	a, b		22,707	b
2-Hexanone (methyl butyl ketone)	591-78-6	45	7,598	a, b		7,598	b
2-Octanone (methyl hexyl ketone)	111-13-7	6.6	2,240	a, c		2,240	c
4-Methyl-2-pentanone (MIBK)	108-10-1	73	8,165	a, b		8,165	b
Acetone	67-64-1	65	38,133	i, b		38,133	b

Table 2b
Region 4 Sediment Screening Values for Hazardous Waste Sites
for Narcotic Mode of Action

Chemical	CAS	Freshwater Sediment Screening Value		Source	Marine/Estuarine Sediment Screening Value		Source
		ESV	RSV		ESV	RSV	
Alcohols							
1-Pentanol	71-41-0	40	4,597	a, b		4,597	b
2-Propanol	67-63-0	2.4	16,700	a, b		16,700	b
Ethylene glycol	107-21-1	42,389	145,224	a, b	1,272	145,224	a, b
Methanol	67-56-1	102	34,983	a, b		34,983	b
Propylene glycol	57-55-6	22	100,268	a, b		100,268	b
Other VOCs							
Acetonitrile	75-05-8	4,167	25,498	a, b		25,498	b
4-Bromophenyl phenyl ether	101-55-3	47	62	a, b		62	b
Carbon disulfide	75-15-0	7.8	1,580	a, c	131	1,580	a, c
Methyl tert-butyl ether (MTBE)	1634-04-4	304	4,433	a, c	2,081	4,433	a, c
Semivolatile Organic Compounds (SVOCs) - µg/kg @ 1% OC							
Chlorobenzenes							
1,2,3,4-Tetrachlorobenzene	634-66-2	69	138	a, b		138	b
1,2,4,5-Tetrachlorobenzene	95-94-3	187	135	a, b		135	b
Pentachlorobenzene	608-93-5	116	150	a, j		36	b
Phenols							
2,4-Dichlorophenol	120-83-2	57	1,886	a, c		1,886	c
2,4,6-Tribromophenol	118-79-6	47	308	a, c		308	c
2,3,4,6-Tetrachlorophenol	58-90-2	30	948	a, c		948	c
Nonylphenol	25154-52-3		203	c		203	c
Energetic SVOAs							
2-Nitrotoluene	88-72-2	207	5,042	a, c	3,448	5,042	a, c
3-Nitrotoluene	99-08-1	145	5,995	a, c	4,787	5,995	a, c
4-Nitrotoluene	99-99-0	145	5,465	a, c	4,534	5,465	a, c
Phthalates - µg/kg @ 1% OC unless denoted by shading							
Bis(2-ethylhexyl)phthalate	117-81-7	180	2,600	f	182	2,647	d
Butyl benzyl phthalate	85-68-7	100	481	i, c		481	c
Diethyl phthalate	84-66-2	630	1,105	f, b	80	1,105	a, b
Dimethyl phthalate	131-11-3	678	2,031	a, b	530	2,031	e, b
Di-n-butyl phthalate	84-74-2	11	319	i, c		319	c
Di-n-octyl phthalate	117-84-0	39	1,100	e	580	45,000	e
PAHs - µg/kg @ 1% OC unless denoted by shading							
Low molecular weight PAHs (LMW-PAHs)							
1-Methylnaphthalene	90-12-0	141	*	a		*	
2-Methylnaphthalene	91-57-6	20.2	*	g	20.2	*	d
Acenaphthene	83-32-9	6.7	*	f	6.7	*	d
Acenaphthylene	208-96-8	5.9	*	f	5.9	*	d
Anthracene	120-12-7	57	*	f	47	*	d
Fluorene	86-73-7	77	*	f	21	*	d
Naphthalene	91-20-3	176	*	f	35	*	d
Phenanthrene	85-01-8	204	*	f	87	*	d
Total LMW-PAHs		600		k	312		d
High molecular weight PAHs (HMW-PAHs)							
Benz(a)anthracene	56-55-3	108	*	f	75	*	d
Benzo(a)pyrene	50-32-8	150	*	f	89	*	d
Benzo(b)fluoranthene	205-99-2	190	*	i		*	
Benzo(g,h,i)perylene	191-24-2	170	*	i	310	*	e
Benzo(k)fluoranthene	207-08-9	240	*	i		*	
Chrysene	218-01-9	166	*	f	108	*	d

Table 2b
Region 4 Sediment Screening Values for Hazardous Waste Sites for Narcotic Mode of Action

Chemical	CAS	Freshwater Sediment Screening Value		Source	Marine/Estuarine Sediment Screening Value		Source
		ESV	RSV		ESV	RSV	
Dibenz(a,h)anthracene	53-70-3	33	*	f	6.2	*	d
Fluoranthene	206-44-0	423	*	f	113	*	d
Indeno(1,2,3-cd)pyrene	193-39-5	200	*	i	340	*	e
Phenanthrene	85-01-8	204	*	f	87	*	d
Pyrene	129-00-0	195	*	f	153	*	d
Total HMW-PAHs		**1,000**		k	**655**		d
Total PAHs		**1,610**		f	**1,684**		d
PAH-like Compounds - µg/kg @ 1% OC unless denoted by shading							
1,1-Biphenyl	92-52-4	198	1,494	a, b		1,494	b
Dibenzofuran	132-64-9	510	2,313	i, b		2,313	b
Quinoline	91-22-5	3.0	2,398	a, c	1,435	2,398	a, c
Tetrahydrofuran	109-99-9	4,488	8,000	a, c		8,000	c
Other SVOCs - µg/kg							
4-Bromophenyl Phenyl Ether	101-55-3	47	62	a, b		62	b
Benzoic Acid	65-85-0	19	2,000	a, c		2,000	c
Benzyl alcohol	100-51-6	3.7	6,729	a, b	522	6,729	a, b
Carbazole	86-74-8	69	4,561	a, b	1,928	4,561	a, b
Isodecyl diphenyl phosphate	29761-21-5	89		a			
Isophorone	78-59-1	876	948	a, c		948	c
N-Nitrosodiphenylamine	86-30-6	110	370	a, b	211	370	a, b
Nitrobenzene	98-95-3	407	9,007	a, c	1,853	9,007	a, c
Triphenyl phosphate	115-86-6	70		a		0.55	

Table 2 Notes:
* see Total below.
Red font indicates a bioaccumulative chemical.
* - indicates protective of aquatic and wildlife receptors.
Gray shaded cells indicate concentration in µg/kg dry weight

ESV - Ecological Screening Value for Step 2

RSV - Refinement Screening Value for Step 3a

CAS = chemical abstract service registry number

Table 2a Sources:

a - Region 4 Sediment Model based on highest ranked surface water quality ESV from Table 1a See Equation 3 in text Section 6.2.2. (µg/kg @ 1% OC)

b - Region 4 Sediment Model based on: (ECOSAR minimum chronic value). See text. (µg/kg @ 1% OC)

c - Region 4 Sediment Model based on: (lowest predicted surface water value from McGrath & Di Toro (2009). See text. (µg/kg @ 1% OC)

d- Florida Department of Environmental Quality Numerical Sediment Quality Assessment Guidelines for Florida Coastal Waters

e - Washington State Sediment Management Standards, Cleanup Objectives. http://www.ecy.wa.gov/programs/tcp/smu/sed_standards.htm (µg/kg @ 1% OC)

f - MacDonald, D.D.; Ingersoll, C.G.; Smorong, D.E.; Lindskoog, R.A.; Sloane, G; and T. Biernacki. 2003. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters. Florida Department of Environmental Protection, Tallahassee, FL. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters. Used threshold effect concentration (TEC) for ESV. (µg/kg dw)

g - CCME (Canadian Council of Ministers of the Environment). 2003. Canadian Environmental Quality Guidelines: Summary Table December 2003. Canadian Council of Ministers of the Environment, Winnipeg, Manitoba. Available at http:/www.ccme.ca/publications/ce (µg/kg dw)

h - Persaud, D., R. Jaagumagi and A. Hayton. 1993. Guidelines for the protection and management of aquatic sediment quality in Ontario. Ontario Ministry of the Environment. Queen's Printer of Ontario.

i - Los Alamos National Laboratory ECORISK Database, 2017. http://www.lanl.gov/environment/protection/eco-risk-assessment.php (µg/kg dw)

j - NYDEC (2014) Screening and Assessment of Contaminated Sediment, New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Bureau of Habitat, June 24, 2014.

k - Median of Refinement Screening Values on Table 2c divided by 10.

Table 2c
Region 4 Step 3a Sediment Refinement Screening Values for Polycyclic Aromatic Hydrocarbons (PAHs) at Hazardous Waste Sites

Chemical	*CAS*	*Freshwater and Saltwater Sediment Refinement Screening Values (RSVs) for Sum Toxic Unit Approach (µg/kg @ 1% OC)*	*Source*
		RSV	
Low Molecular Weight PAHs (LMW-PAHs)			
Naphthalene	91-20-3	3,850	a
1-Methylnaphthalene	90-12-0	4,460	a
2-Methylnaphthalene	91-57-6	4,470	a
C1-Naphthalenes	-	4,940	a
2,6-Dimethylnaphthalene	581-42-0	5,130	a
C2-Naphthalenes	-	5,100	a
2,3,5-Trimethylnaphthalene	2245-38-7	5,840	a
C3-Naphthalenes	-	5,810	a
C4-Naphthalenes	-	6,570	a
Acenaphthylene	208-96-8	4,520	a
Acenaphthene	83-32-9	4,910	a
Fluorene	86-73-7	5,380	a
C1-Fluorenes	-	6,110	a
C2-Fluorenes	-	6,860	a
C3-Fluorenes	-	7,690	a
Anthracene	120-12-7	5,940	a
Phenanthrene	85-01-8	5,960	a
1-Methylphenanthrene	832-69-9	6,700	a
C1-Phenatherene/anthracenes	-	6,700	a
C2-Phenatherene/anthracenes	-	7,460	a
C3-Phenatherene/anthracenes	-	8,290	a
C4-Phenatherene/anthracenes	-	9,130	a
Thiophenes			
Benzothiophene	11095-43-5	3,910	b
Dibenzothiophene	132-65-0	5,950	b
C1-Dibenzothiophenes	-	6,720	b
C2-Dibenzothiophenes	-	7,540	b
C3-Dibenzothiophenes	-	8,440	b
C4-Dibenzothiophenes	-	9,400	b
Naphthothiophene	233-02-3	5,950	b
High Molecular Weight PAHs (HMW-PAHs)			
Fluoranthene	206-44-0	7,070	a
Pyrene	129-00-0	6,970	a
C1-Fluoranthene/pyrenes	-	7,700	a
C2-Fluoranthene/pyrenes		8,730	b
C3-Fluoranthene/pyrenes		9,490	b
C4-Fluoranthene/pyrenes		10,700	b
Benzo(a)anthracene	56-55-3	8,410	a
Chrysene	218-01-9	8,440	a
C1-Benzanthracene/chrysenes	-	9,290	a
C2-Benzanthracene/chrysenes	-	10,100	a

Table 2c
Region 4 Step 3a Sediment Refinement Screening Values for Polycyclic Aromatic Hydrocarbons (PAHs) at Hazardous Waste Sites

Chemical	*CAS*	*Freshwater and Saltwater Sediment Refinement Screening Values (RSVs) for Sum Toxic Unit Approach (µg/kg @ 1% OC)*	*Source*
		RSV	
C3-Benzanthracene/chrysenes	-	11,100	a
C4-Benzanthracene/chrysenes	-	12,100	a
Perylene	198-55-0	9,680	a
Benzo(b)fluoranthene	205-99-2	9,790	a
Benzo(k)fluoranthene	207-08-9	9,810	a
Benzo(a)pyrene	50-32-8	9,650	a
Benzo(e)pyrene	192-97-2	9,670	a
Benzo(g,h,i)perylene	191-24-2	10,900	a
Indeno(1,2,3-cd)pyrene	193-39-5	11,200	a
Dibenz(a,h) anthracene	53-70-3	11,200	a

Notes:
a - EPA (2003). Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks(ESBs) for the Protection of Benthic Organisms: PAH Mixtures. EPA/600/R-02/013. Table 3-4.
b - Calculated using equations in EPA (2003) using log octanol-water partition coefficient from KOWWIN.

Table 3
Region 4 Soil Screening Values for Hazardous Waste Sites

CHEMICAL	CAS	Screening Level (mg/kg)	Ref.	Receptor	Plants	Ref.	Soil Invertebrates	Ref.	Mammalian	Ref.	Avian	Ref.
Inorganic Compounds												
Metals												
Aluminum	7429-90-5	Narrative	a	All	Narrative	a	Narrative	a				
Antimony	7440-36-0	0.27	a	All	5	b	78	a	0.27	a		
Arsenic	7440-38-2	18	a	All	18	a	6.8	c	46	a	43	a
Barium	7440-39-3	330	a	All	110	c	330	a	2,000	a	820	c
Beryllium	7440-41-7	2.5	c	All	2.5	c	40	a	21	a		
Boron	7440-42-8	7.5	c	All	36	c			55	c	2	c
Cadmium	7440-43-9	0.36	a	All	32	a	140	a	0.36	a	0.77	a
Chromium - Total	7440-47-3	23	c	M, A					63	c	23	c
Chromium III	16065-83-1	26	a	M, A					34	a	26	a
Chromium VI	18540-29-9	0.34	c	All	0.35	c	0.34	c	130	a	140	c
Cobalt	7440-48-4	13	a	All	13	a			230	a	120	a
Copper	7440-50-8	28	a	All	70	a	80	a	49	a	28	a
Iron	7439-89-6	Narrative	a	All			Narrative	a				
Lead	7439-92-1	11	a	All	120	a	1,700	a	56	a	11	a
Lithium	7439-93-2	2	b	P, M	2	b			75	c		
Manganese	7439-96-5	220	a	All	220	a	450	a	4,000	a	4,300	a
Mercury (total)	7439-97-6	0.013	c	All	0.3	b	0.05	c	1.7	c	0.013	c
Methylmercury	22967-92-6	0.00035	c	All			2.5	c	0.0031	c	0.00035	c
Molybdenum	7439-98-7	2	b	All	2	b			4.8	f	15	c
Nickel	7440-02-0	38	a	All	38	a	280	a	130	a	210	a
Selenium	7782-49-2	0.52	a	All	0.52	a	4.1	a	0.63	a	1.2	a
Silver	7440-22-4	4.2	a	All	560	a			14	a	4.2	a
Strontium	7440-24-6	96	c	M					95	c		
Thallium	7440-28-0	0.05	c	All	0.05	c			0.42	c	4.5	c
Tin	7440-31-5	7.6	g	All	50	b			7.62	g		
Uranium	7440-61-1	25	c	All	25	c			480	c	1,100	c
Vanadium	7440-62-2	7.8	a	All	60	c			280	a	7.8	a
Zinc	7440-66-6	46	a	All	160	a	120	a	79	a	46	a
Other Inorganics												
Ammonia	7664-41-7											
Bromine (total)	7726-95-6	10	b	P	10	b						
Cyanide (total)	57-12-5	0.1	c	M, A					330	c	0.098	c

Table 3
Region 4 Soil Screening Values for Hazardous Waste Sites

CHEMICAL	CAS	Screening Level (mg/kg)	Ref.	Receptor	Plants	Ref.	Soil invertebrates	Ref.	Mammalian	Ref.	Avian	Ref.
Inorganic Compounds												
Other Inorganics												
Fluoride	16984-48-8	32	c	M, A					870	c	120	c
Fluorine[†]	7782-41-4	200	b	P	200	b						
Iodine	7553-56-2	4	b	P	4	b						
Volatile Organic Compounds (VOCs)												
Chlorinated Alkanes												
1,1,1,2-Tetrachloroethane	630-20-6	0.07	d	SI			0.07	d	225	g		
1,1,2,2-Tetrachloroethane	79-34-5	0.127	g	All			0.19	d	0.127	g		
1,1,1-Trichloroethane	71-55-6	0.04	d	All			0.04	d	260	c		
1,1,2-Trichloroethane	79-00-5	0.32	d	All			0.32	d	28.6	g		
1,1-Dichloroethane	75-34-3	0.14	d	All			0.14	d	210	c		
1,2-Dichloroethane	107-06-2	0.4	d	All			0.40	d	27	c	0.85	c
1,2-Dichloropropane	78-87-5	0.28	d	All			0.28	d	32.7	g		
Dichloromethane (Methylene chloride)	75-09-2	0.21	d	All	1,600	c	0.21	d	2.6	c		
Trichloromethane (chloroform)	67-66-3	0.05	d	All			0.05	d	8	c		
Tetrachloromethane (Carbon tetrachloride)	56-23-5	0.05	d	All			0.05	d	2.98	g		
Chlorinated Alkenes												
1,1-Dichloroethene/ethylene	75-35-4	0.04	d	All			0.04	d	11	c		
1,2-Dichloroethene (cis and trans)	540-59-0	0.04	d	All			0.04	d	24	c		
1,2-cis-Dichloroethylene	156-59-2	0.04	d	All			0.04	d				
1,2-trans-Dichloroethylene	156-60-5	0.04	d	All			0.04	d	0.784	g		
1,3-Dichloropropene	542-75-6	0.001	d	All			0.001	d				
Tetrachloroethene (PCE)	127-18-4	0.06	d	All	10	c	0.06	d	0.18	c		
1,1,2-Trichloroethylene (TCE)	79-01-6	0.06	d	All			0.06	d	42	c		
Vinyl chloride	75-01-4	0.03	d	All			0.03	d	0.12	c		
Chlorobenzenes												
Chlorobenzene	108-90-7	2.4	c	All			2.4	c	43	c		
1,2-Dichlorobenzene	95-50-1	0.09	d	All			0.09	d	0.92	c		
1,3-Dichlorobenzene	541-73-1	0.08	d	All			0.08	d	0.74	c		
1,4-Dichlorobenzene	106-46-7	0.88	c	SI, M			1.2	c	0.89	c		
1,2,3-Trichlorobenzene	87-61-6	20	e	SI			20	e				
1,2,4-Trichlorobenzene	120-82-1	0.27	c	All			1.2	c	0.27	c		
1,3,5-Trichlorobenzene	108-70-3	0.07	d	All			0.07	d				
Monoaromatic Hydrocarbons												
1,2,4-Trimethylbenzene	95-63-6	0.09	d	All			0.09	d				
1,3,5-Trimethylbenzene	108-67-8	0.16	d	All			0.16	d				
Benzene	71-43-2	0.12	d	All			0.12	d	24	c		
Cymene, p- (4-isopropyltoluene)	99-87-6	0.18	d	All			0.18	d				
Ethylbenzene	100-41-4	0.27	d	All			0.27	d	5.16	g		
Isopropylbenzene (Cumene)	98-82-8	0.04	d	All			0.04	d				
Styrene (Vinyl benzene)	100-42-5	1.2	c	All	3.2	c	1.2	c				
Toluene	108-88-3	0.15	d	All	200	c	0.15	d	23	c		
Xylenes (total)	1330-20-7	0.1	d	All	100	c	0.1	d	1.4	c	41	c
Ketones												
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1.0	d	All			1.0	d	350	c		
2-Hexanone	591-78-6	0.36	c	SI, M, A			2.5	d	5.4	c	0.36	c
Acetone	67-64-1	1.2	c	M, A			0.04	d	1.2	c	7.5	c
Other VOCs												
Tribromomethane (Bromoform)	75-25-2	0.07	d	All			0.07	d	15.9	g		
Bromomethane (methyl bromide)	74-83-9	0.002	d	All			0.002	d	0.24	g		
Carbon Disulfide	75-15-0	0.005	d	All			0.005	d	0.81	c		
Ethylene glycol	107-21-1	0.31	d	All			0.31	d				
Hexachloroethane	67-72-1	0.024	d	All			0.024	d	0.6	g		
Hexane	110-54-3	0.007	d	All			0.007	d				
Chloroanilines												
3-Chloroaniline	108-42-9	20	b	P, SI	20	b	30	e				
4-Chloroaniline	106-47-8	1	c	P, SI	1	c	1.8	c	1.1	g		
3,4-Dichloroaniline	95-76-1	20	e	SI			20	e				
2,4,5-Trichloroaniline	636-30-6	20	e	P, SI	20	b	20	e				
Pentachloroaniline	527-20-8	100	e	SI			100	e				

Table 3
Region 4 Soil Screening Values for Hazardous Waste Sites

CHEMICAL	CAS	Screening Level (mg/kg)	Ref.	Receptor	Plants	Ref.	Soil Invertebrates	Ref.	Mammalian	Ref.	Avian	Ref.
Semivolatile Organic Compounds (SVOCs)												
Chlorobenzenes												
1,2,3,4-Tetrachlorobenzene	634-66-2	10	e	SI			10	e				
1,2,4,5-Tetrachlorobenzene	95-94-3	0.18	d	All			0.18	d	2.02	g		
Hexachlorobenzene	118-74-1	0.079	c	All	10	c	10	c	0.2	c	0.079	c
Pentachlorobenzene	608-93-5	0.5	g	All			20	e	0.5	g		
Dichlorophenols												
Dichlorophenols (2,3-), (2,4-), (2,5-), (2,6-)	120-83-2	0.05	d	All			0.05	d	87.5	g		
3,4-Dichlorophenols (3,4-), (3,5-)	95-77-2	20	e	P, SI	20	b	20	e				
Trichlorophenols												
2,4,5-Trichlorophenol	95-95-4	4	b	P, SI, M	4	b	9	e	14.1	g		
2,4,6-Trichlorophenol	88-06-2	9.94	g	SI, M			10	e	9.94	g		
Tetrachlorophenols												
2,3,4,5-Tetrachlorophenol	4901-51-3	20	e	SI			20	e				
Tetrachlorophenols (2,3,4,6-), (2,3,5,6-)	58-90-2	0.04	d	All			0.04	d	0.2	g		
Other Phenols												
Chlorophenols (2-), (4-)	95-57-8	0.06	d	All			0.06	d	0.54	c	0.39	c
3-Chlorophenol	108-43-0	7	e	P, SI	7	b	10	e				
2,4-Dimethylphenol	105-67-9	0.04	d	SI			0.04	d				
2,4-Dinitrophenol	51-28-5	0.061	g	All	20	b	0.13	d	0.061	g		
4-Nitrophenol	100-02-7	3.12	g	SI, M			7	e	3.12	g		
2-Methylphenol (Cresol, o-)	95-48-7	0.1	d	All	0.67	c	0.1	d	380	c		
3-Methylphenol (Cresol, m-)	108-39-4	0.09	d	All	0.69	c	0.09	d	3.49	g		
4-Methylphenol (Cresol, p-)	106-44-5	0.08	d	All			0.08	d	163	g		
Nonylphenol	25154-52-3	1.27	d	SI			1.27	d				
Pentachlorophenol (PCP)	87-86-5	2.1	a	All	5	a	31	a	2.8	a	2.1	a
Phenol	108-95-2	0.79	c	All	0.79	c	1.8	c	37	c		
Energetic SVOCs												
2-Amino-4,6-dinitrotoluene	35572-78-2	14	c	SI, M, P	14	c	43	c	16	c		
4-Amino-2,6-dinitrotoluene	19406-51-0	12	c	SI, M, P	33	c	18	c	12	c		
1,3- Dinitrobenzene	99-65-0	0.034	d	All			0.034	d	0.072	c	0.079	c
2,4-Dinitrotoluene	121-14-2	6	c	SI, M, P	6	c	18	c	14	c		
2,6-Dinitrotoluene	606-20-2	4	c	All			30	c	4.0	c	52	c

Table 3
Region 4 Soil Screening Values for Hazardous Waste Sites

CHEMICAL	CAS	Screening Level (mg/kg)	Ref.	Receptor	Plants	Ref.	Soil Invertebrates	Ref.	Mammalian	Ref.	Avian	Ref.
Semivolatile Organic Compounds (SVOCs)												
Energetic SVOCs												
HMX (Octahydro-tetranitro-1,3,5,7-tetrazocine)	2691-41-0	16	c	SI, M, P	2,700	c	16	c	290	c		
Nitroglycerine	55-63-0	13	c	SI, M, P	21	c	13	c	70	c		
2-Nitrotoluene	88-72-2	0.19	d	All			0.19	d	9.8	c		
3-Nitrotoluene	99-08-1	0.13	d	All			0.13	d	12	c		
4-Nitrotoluene	99-99-0	0.14	d	All			0.14	d	21	c		
PETN (Pentaerythrite-tetranitrate)	78-11-5	2.2	d	SI, M			2.2	d	100	c		
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	121-82-4	2.3	c	All	45.9	h	8.4	c	16	c	2.3	c
Tetryl (Methyl-2,4,6-trinitrophenylnitroamine)	479-45-8	0.018	d	All	25	h	0.018	d	1.5	c		
1,3,5-Trinitrobenzene	99-35-4	0.3	h	All	0.3	h	10	c				
2,4,6-Trinitrotoluene (TNT)	118-96-7	7.5	c	All	62	c	32	c	95	c	7.5	c
Other SVOCs												
1,1'-Biphenyl	92-52-4	0.2	d	All	60	b	0.2	d				
3,3'- Dichlorobenzidine	91-94-1	0.03	d	All			0.03	d	0.646	g		
Benzoic acid	65-85-0	0.01	d	All			0.01	d	1	c		
Benzyl Alcohol	100-51-6	0.002	d	All			0.002	d	120	c		
Carbazole	86-74-8	0.07	d	All			0.07	d	79	c		
Dibenzofuran	132-64-9	0.15	d	All	6.1	c	0.15	d				
Hexachlorobutadiene	87-68-3	0.009	d	All			0.009	d	0.04	g		
Hexachlorocyclopentadiene	77-47-4	0.001	d	All	10	b	0.001	d	0.755	g		
N-Nitrosodiphenylamine	86-30-6	0.545	g	All			20	e	0.545	g		
Nitrobenzene	98-95-3	2.2	c	SI, M			2.2	c	4.8	c		
Pentachloronitrobenzene	82-68-8	0.09	d	All			0.09	d	11	c	0.7	c
Phthalates												
Bis(2-ethylhexyl) phthalate	117-81-7	0.02	c	All			8.4	d	0.6	c	0.02	c
Butylbenzyl phthalate	85-68-7	0.59	d	All			0.59	d	90	c		
Diethylphthalate	84-66-2	0.25	d	All	100	c	0.25	d	3,600	c		
Dimethylphthalate	131-11-3	0.35	d	All			10	c	38	c		
Di-n-butyl phthalate	84-74-2	0.011	c	All	160	c	0.22	d	180	c	0.011	c
Di-n-octyl phthalate	117-84-0	0.91	c	All			303	d	0.91	c		

Table 3
Region 4 Soil Screening Values for Hazardous Waste Sites

CHEMICAL	CAS	Screening Level (mg/kg)	Ref.	Receptor	Plants	Ref.	Soil Invertebrates	Ref.	Mammalian	Ref.	Avian	Ref.
Semivolatile Organic Compounds (SVOCs)												
Polycyclic Aromatic Hydrocarbons (PAHs)												
Low Molecular Weight PAHs												
Acenaphthene	83-32-9	See Total			0.25	c	0.38	d	130	c		
Acenaphthylene	208-96-8	See Total					0.34	d	120	c		
Anthracene	120-12-7	See Total			6.8	c	0.0015	d	210	c		
Fluorene	86-73-7	See Total					3.7	c	250	c		
1-Methyl naphthalene	90-12-0	See Total					0.14	d				
2-Methylnaphthalene	91-57-6	See Total					0.11	d	16	c		
2,6-Dimethyl naphthalene	581-42-0	See Total					0.44	d				
2,3,5-Trimethylnaphthalene	2245-38-7	See Total					0.13	d				
Naphthalene	91-20-3	See Total			1.0	c	0.16	d	9.6	c	3.4	c
1-Methyl phenanthrene	832-69-9	See Total					0.5	d				
Phenanthrene	85-01-8	See Total					5.5	c	11	c		
Total LMWPAHs	-	29	a	All			29	a	100	a		
High Molecular Weight PAHs												
Benzo(a)anthracene	56-55-3	See Total			18	c	4.69	d	3.4	c	0.73	c
Benzo(b)fluoranthene	205-99-2	See Total			18	c	2.7	d	44	c		
Benzo(k)fluoranthene	207-08-9	See Total					0.13	d	71	c		
Benzo(ghi)perylene	191-24-2	See Total					0.07	d	25	c		
Benzo(a)pyrene	50-32-8	See Total					0.13	d	62	c		
Benzo(e)pyrene	192-97-2	See Total					0.25	d				
Chrysene	218-01-9	See Total					5.18	d	3.1	c		
Dibenzo(a,h)anthracene	53-70-3	See Total					0.06	d	14	c		
Fluoranthene	206-44-0	See Total					10	c	22	c		
Indeno(1,2,3-cd)pyrene	193-39-5	See Total					0.08	d	71	c		
Perylene	198-55-0	See Total					0.17	d				
Pyrene	129-00-0	See Total					10	c	23	c	33	c
Total HMWPAHs	-	1.1	a	M			18	a	1.1	a		
Pesticides/Herbicides												
Acrolein	107-02-8	0.0003	d	All			0.0003	d	3.27	g		
Aldrin	309-00-2	0.03	c	SI, M			0.030	c	0.037	c		
Atrazine	1912-24-9	0.00005	d	SI			0.000	d				
BHC - alpha	319-84-6	0.0003	d	SI, M			0.00	d	59	c		

Table 3
Region 4 Soil Screening Values for Hazardous Waste Sites

CHEMICAL	CAS	Screening Level (mg/kg)	Ref.	Receptor	Plants	Ref.	Soil Invertebrates	Ref.	Mammalian	Ref.	Avian	Ref.
Pesticides/Herbicides												
BHC - beta	319-85-7	0.0003	d	All			0.0003	d	0.27	c	14	c
BHC - gamma (Lindane)	58-89-9	0.0031	d	All	0.1	c	0.0031	d	0.0095	c	0.21	c
Carbaryl	63-25-2	0.0003	d	All			0.0003	d				
Carbofuran	1563-66-2	0.0008	d	All			0.0008	d				
Chlordane - alpha	5103-71-9	0.0029	d	All	2.2	c	0.0029	d	0.27	c	0.27	c
Chlordane - gamma	12789-03-6	0.02	d	All	2.2	c	0.02	d	2.3	c	2.2	c
Chloropyrifos	2921-88-2	0.003	d	All			0.003	d				
Dinoseb	88-85-7	0.015	d	All			0.015	d	0.022	g		
DDT/DDE/DDD (total)	—	0.021	a	All					0.021	a	0.093	a
Diazinon	333-41-5	0.0037	d	All			0.0037	d				
Dieldrin	60-57-1	0.0029	d	All	10	c	0.0029	d	0.0049	a	0.022	a
Endosulfan - alpha	959-98-8	0.0009	d	All			0.0009	d	0.119	g		
Endosulfan (alpha and beta)	115-29-7	0.0009	d	All			0.0009	d	0.64	c	15	c
Endosulfan sulfate	1031-07-8	0.0065	d	All			0.0007	d	0.036	g		
Endrin	72-20-8	0.0019	c	All	0.0034	c	0.0019	d	0.023	c	0.0014	c
Guthion	86-50-0	0.00006	d	All			0.00006	d				
Heptachlor	76-44-8	0.0016	d	All	0.4	c	0.0016	d	0.059	c	0.3	c
Heptachlor epoxide	1024-57-3	0.00015	d	All			0.00015	d	0.152	g		
Hexachlorocyclopentadiene	77-47-4	0.0064	d	All	10	b	0.0064	d	0.755	g		
Kepone (Chlordecone)	143-50-0	0.017	d	All			0.017	d	0.022	c	1.3	c
Malathion	121-75-5	0.00004	d	All			0.00004	d				
Methoxychlor	72-43-5	0.0021	d	All			0.0021	d	3.1	c	18	c
Mirex	2385-85-5	0.0036	d	All			0.0036	d				
Parathion	56-38-2	0.00019	d	All			0.00019	d				
2,4,5-TP (Silvex)	93-72-1	0.055	d	SI			0.055	d				
Simazine	122-34-9	0.0083	d	All			0.0083	d				
Toxaphene	8001-35-2	0.00015	d	All			0.00015	d	5.9	c	4.1	c
Trifluralin	1582-09-8	0.079	d	All			0.079	d				

Table 3
Region 4 Soil Screening Values for Hazardous Waste Sites

CHEMICAL	CAS	Screening Level (mg/kg)	Ref.	Receptor	Plants	Ref.	Soil Invertebrates	Ref.	Mammalian	Ref	Avian	Ref.
Polychlorinated Biphenyls (PCBs) and Dioxins/Furans												
PCDDs, PCDFs (TEQ)	1746-01-6	0.00000315	f	All			5	c	0.00000315	f	0.000016	f
PCBs (total)	1336-36-3	0.041	c	All	40	b	0.33	d	0.371	f	0.041	c
Other												
2-Nitroaniline	88-74-4	0.02	d	SI, M			0.02	d	3.3	c		
Diphenylamine	122-39-4	1.01	g	All			1.1	d	1.01	g	10	c
Trichlorofluoromethane	75-69-4	16.4	g	M					16.4	g		

Notes:
Screening values in mg/kg
All - ESV for protection of all receptors
A - ESV for protection of Avians
M - ESV for protection of Mammals
P - ESV for protection of Plants
SI - ESV for protection of soil invertebrates
LMWPAHs have less than 4 rings
HMWPAHs have 4 or more rings

Table 3 Sources:

a - USEPA (2007): Ecological Soil Screening Levels. http://www.epa.gov/ecotox/ecossl/

b - Efroymson, R.A., M.E. Will, G.W. Suter, and A.C. Wooten. 1997a. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. Oak Ridge National Laboratory, Oak Ridge, TN. ES/ER/TM-85/R4

c - Los Alamos National Laboratory (LANL). 2017. ECORISK Database Release 4.1. September 2017. http://www.lani.gov/environment/protection/eco-risk-assessment.php (µg/kg dw)

d - ECOSAR & Region 4 soil model. See text Section 6.3.

e - Efroymson, R.A., M.E. Will, and G.W. Suter. 1997b. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. Oak Ridge National Laboratory, Oak Ridge, TN. ES/ER/TM-126/R2. https://rais.ornl.gov/documents/tm126r21.pdf

f - Efroymson, R.A., G.W. Suter, II, B.E. Sample, and D.S. Jones. 1997c. Preliminary Remediation Goals for Ecological Endpoints. Oak Ridge National Laboratory. Oak Ridge, TN. 50 pp. ES/ER/TM-162/R2 http://www.esd.ornl.gov/programs/ecorisk/documents/tm162

g - EPA Region 5 RCRA Ecological Screening Levels (2003).

Attachment D-3.

LANL No Effect and Low Effect ESLs
Ecorisk Database, Release 4.1,
Los Alamos National Laboratory, Los Alamos, NM (2017)

This page intentionally left blank.

Analyte *(mg/kg, pCi/g)*	No Effect ESL		Low Effect ESL		Notes
	Sediment	Soil	Sediment	Soil	
1,2-Dichlorobenzene	1.00E+00	---	1.00E+01	9.20E+00	
1,3-Dichlorobenzene	8.20E-01	---	8.20E+00	7.40E+00	
1,4-Dichlorobenzene	3.00E-02	---	3.00E-01	3.50E+00	
2-Methylnaphthalene	---	1.60E+01	7.60E-01	1.60E+02	
Acetone	6.50E-02	1.20E+00	6.50E-01	6.30E+00	
Aldrin	4.20E-02	3.70E-02	2.10E-01	1.80E-01	
Alpha-chlordane	3.20E-03	2.70E-01	1.70E-02	1.30E+00	chlordane, wildlife based
Aluminum	2.50E+04	---	2.50E+05	---	
Anthracene	5.70E-02	2.10E+02	5.70E-01	9.00E+00	
Antimony	4.50E+01	2.30E+00	4.50E+02	2.30E+01	
Arsenic	9.70E+00	6.80E+00	3.30E+01	3.10E+01	
Barium	1.50E+02	7.20E+02	3.00E+02	2.60E+02	
Benzo(g,h,i)perylene	1.70E-01	2.50E+01	1.70E+00	2.50E+02	Sed, RSV, Total HMW-PAHs
Benzo[a]anthracene	1.00E-01	7.30E-01	1.00E+00	7.30E+00	Sed, RSV, Total HMW-PAHs
Benzo[a]pyrene	1.50E-01	6.20E+01	1.40E+00	1.90E+02	Sed, RSV, Total HMW-PAHs
Benzo[b]fluoranthene	1.90E-01	4.40E+01	1.90E+00	1.80E+02	Sed, RSV, Total HMW-PAHs
BERYLLIUM	6.60E+01	3.50E+01	6.60E+02	2.50E+01	
Bis(2-ethylhexyl)phthalate (DEHP)	2.60E-02	2.00E-02	2.60E-01	2.00E-01	
Cadmium	3.00E-01	2.70E-01	3.00E+00	3.00E+00	
Carbon Disulfide	1.30E+00	8.10E-01	1.30E+01	8.10E+00	
Cesium-137	7.20E+02	1.40E+03	7.20E+03	1.40E+04	
Chlorobenzene	3.00E-02	---	3.00E-01	2.40E+01	
Chromium	4.30E+01	2.30E+01	1.10E+02	7.30E+01	sediment, total chromium
Chrysene	1.60E-01	3.10E+00	1.20E+00	3.10E+01	Sed, RSV, Total HMW-PAHs
Cobalt	2.20E+02	7.60E+01	2.20E+03	1.30E+02	
Copper	2.30E+01	1.40E+01	6.90E+01	4.30E+01	
Cyanide	1.00E-01	9.80E-02	1.00E+00	9.80E-01	
DDD	8.20E-03	6.30E-03	4.20E-02	3.20E-02	sediment ESV/RSV 4,4'-DDD
DDE	3.10E-03	1.10E-01	3.10E-02	5.50E-01	sediment ESV/RSV 4,4'-DDE
DDT	4.10E-03	4.40E-02	4.10E-02	2.20E-01	sediment ESV/RSV 4'-DDT (aquatic life)
Dieldrin	1.90E-03	4.50E-03	1.90E-02	9.00E-03	sediment ESV/RSV Dieldrin *
Dimetyl phthalate	#N/A	#N/A	#N/A	#N/A	
Fluoranthene	4.20E-01	2.20E+01	2.20E+00	2.30E+01	sediment RSV Total HMW-PAHs
Fluorene	7.70E-02	---	5.30E-01	1.90E+01	sediment RSV Total HMW-PAHs
Gamma-chlordane	3.20E-03	2.20E+00	1.70E-02	1.10E+01	chlordane, wildlife based
Heptachlor	2.40E-03	---	1.60E-02	5.90E-01	
Hexavalent Chromium	6.60E+02	3.40E-01	6.60E+03	3.40E+00	sediment ESV/RSV chromium (total)
Indeno[1,2,3-cd]pyrene	2.00E-01	7.10E+01	2.00E+00	7.10E+02	sediment RSV Total HMW-PAHs
Iron	2.00E+04	---	4.00E+04	---	
Lead	2.60E+01	1.10E+01	5.20E+01	2.30E+01	Sediment ESV/RSV Methylmercury (wildlife based)
m,p-Xylene	1.30E-01	1.40E+00	1.30E+00	1.80E+00	sediment ESV/RSV Xylenes (total)
Magnesium	---	---	---	---	
Manganese	4.60E+02	1.10E+03	1.10E+03	1.10E+03	
Mercury	1.70E-02	1.30E-02	1.70E-01	1.30E-01	
Mercury methyl	4.50E-04	3.50E-04	4.50E-03	3.50E-03	
Methyl ethyl ketone	7.60E+00	---	2.27E+01	#N/A	
Nickel	1.20E+01	1.00E+01	2.40E+01	2.10E+01	
Phenanthrene	2.00E-01	1.10E+01	1.10E+00	---	sediment ESV/RSV Total LMW-PAHs
Potassium	---	---	---	---	

Analyte *(mg/kg, pCi/g)*	No Effect ESL		Low Effect ESL		Notes
	Sediment	Soil	Sediment	Soil	
Pyrene	1.90E-01	2.00E+01	1.50E+00	2.00E+01	sediment ESV/RSV Total LMW-PAHs
Selenium	7.20E-01	7.00E-01	1.20E+00	1.00E+00	Selenium (wildlife)
Silver	5.00E-01	2.60E+00	5.00E+00	2.60E+01	
Sodium	---	---	---	---	
Thallium	7.30E-01	5.00E-01	7.30E+00	5.00E-01	
Thorium-228	6.40E+02	4.30E+02	6.40E+03	4.30E+02	
Thorium-230	5.80E+02	5.20E+02	5.80E+03	5.20E+02	
Thorium-232	6.90E+01	6.20E+01	6.90E+02	6.20E+01	
Toluene	1.00E-02	2.30E+01	1.00E-01	2.30E+02	
Uranium	1.00E+02	#N/A	1.00E+03	2.50E+02	
Uranium-233/234	---	4.40E+03	---	---	
Uranium-238	6.70E+02	2.00E+03	6.70E+03	2.00E+04	
Vanadium	2.90E+01	4.70E+00	5.90E+01	9.50E+00	
Zinc	6.30E+01	4.70E+01	6.30E+02	1.20E+02	

Analyte *(µg/L, pCi/L)*	No Effect ESL	Low Effect ESL	Notes
	Water	Water	
Acetone	1.50E+03	1.50E+04	
Alpha-Benzene Hexachloride (BHC)	---	---	
Alpha-chlordane	4.30E-03	4.30E-02	Value for chlordane (gamma not specified)
Aluminum	5.30E+02	5.30E+02	
Antimony	3.00E+01	3.00E+01	
Arsenic	1.50E+02	3.40E+02	
Barium	3.90E+00	3.90E+01	
Beryllium	6.60E-01	6.60E+00	
Beta-Benzene Hexachloride (BHC)	2.20E+00	2.20E+01	
Bismuth-214	---	---	
Cadmium	2.30E+02	8.60E+02	
Calcium	---	---	
Chromium	1.10E+01	1.60E+01	Chromium VI
Chromium hexavalent	1.10E+01	1.60E+01	
Cobalt	3.00E+00	3.00E+01	
Copper	5.00E+00	7.00E+00	
Cyanide	5.20E+00	2.20E+01	Copper (total)
DDD	---	---	
DDE	1.00E+02	1.00E+03	DDE[4,4'-]
DDT	1.00E-03	1.00E-03	4,4'-DDT (Wildlife-Based)
Dieldrin	5.60E-02	2.40E-01	
Gamma-chlordane	4.30E-03	4.30E-02	
Hexavalent Chromium	1.10E+01	#N/A	
Iron	1.00E+03	1.00E+04	
Lead	1.00E+00	1.00E+01	
Magnesium	---	---	
Manganese	1.30E+03	2.30E+03	
Mercury	2.80E-03	1.40E+00	Mercury (inorganic)
Mercury methyl	2.80E-03	2.80E-02	
Nickel	2.90E+01	2.60E+02	
Potassium	---	---	
Silver	1.00E-01	1.00E+00	
Sodium	---	---	
Toluene	9.80E+00	9.80E+01	
Tritium	1.60E+08	1.60E+09	
Vanadium	1.90E+01	1.90E+02	
Zinc	6.50E+01	8.50E+01	

This page intentionally left blank.

Attachment D-4

SCDHEC Standards
R.61-68 Water Classifications and Standards Table for Protection of Freshwater Aquatic Life

This page intentionally left blank.

SCDHEC R.61 68 WATER CLASSIFICATIONS AND STANDARDS TABLE FOR PROTECTION OF FRESHWATER AQUATIC LIFE

APPENDIX: WATER QUALITY NUMERIC CRITERIA FOR THE PROTECTION OF AQUATIC LIFE AND HUMAN HEALTH

This appendix contains three charts (priority pollutants, nonpriority pollutants, and organoleptic effects) of numeric criteria for the protection of human health and aquatic life. The appendix also contains three attachments which address hardness conversions and application of ammonia criteria. Footnotes specific to each chart follow the chart. General footnotes pertaining to all are at the end of the charts prior to the attachments. The numeric criteria developed and published by EPA are hereby incorporated into this regulation. Please refer to the text of the regulation for other general information and specifications in applying these numeric criteria.

PRIORITY TOXIC POLLUTANTS

Priority Pollutant		CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health			FR Cite/ Source
			CMC (µg/L)	CCC (µg/L)	CMC (µg/L)	CCC (µg/L)	For Consumption of: Water & Organism (µg/L)	Organism Only (µg/L)	MCL (µg/L)	
1	Antimony	7440360					5.6 B, ee	640 B, ee	6 ee	65FR66443 SDWA
2	Arsenic	7440382	340 A, D, K	150 A, D, K	69 A, D, Y	36 A, D, Y	10 C	10 C	10 C	65FR31682 57FR60848 SDWA
3	Beryllium	7440417					J, ee	J, ee	4 ee	65FR31682 SDWA
4	Cadmium	7440439	0.53 D, E, K	0.10 D, E, K	43 D, Y	9.3 D, Y	J, ee	J, ee	5 ee	65FR31682 SDWA
5a	Chromium III	16065831	580 D, E, K	28 D, E, K			J, ee	J, ee	100 Total ee	EPA820/B-96-001 65FR31682 SDWA
5b	Chromium VI	18540299	16 D, K	11 D, K	1,100 D, Y	50 D, Y	J, ee	J, ee	100 Total ee	65FR31682 SDWA
6	Copper	7440508	3.8 D, E, K, Z, ll	2.9 D, E, K, Z, ll	5.8 D, Z, Y, cc	3.7 D, Z, Y, cc	1,300 T, ee			65FR31682
7	Lead	7439921	14 D, E, Y	0.54 D, E, Y	220 D, Y	8.5 D, Y				65FR31682
8	Mercury	7439976	1.6 D, K, dd	0.91 D, K, dd	2.1 D, bb, dd	1.1 D, bb, dd	0.050 B, ee	0.051 B, ee	2 ee	65FR31682 SDWA

SCDHEC R.61 68 WATER CLASSIFICATIONS AND STANDARDS TABLE FOR PROTECTION OF FRESHWATER AQUATIC LIFE

9	Nickel	7440020	150 D, E, K	16 D, E, K	75 D, Y	8.3 D, Y	610 B, ee	4, 600 B, ee		65FR31682
10	Selenium	7782492	L, Q, S	5.0 S	290 D, aa	71 D, aa	170 Z, ee	4,200 ee	50 ee	65FR31682 65FR66443 SDWA
11	Silver	7440224	0.37 D, E, G		2.3 D, G					65FR31682
12	Thallium	7440280					0.24	0.47	2 ee	68FR75510 SDWA
13	Zinc	7440666	37 D, E, K	37 D, E, K	95 D, Y	86 D, Y	7,400 T, ee	26,000 T, ee		65FR31682 65FR66443
14	Cyanide	57125	22 K, P	5.2 K, P	1 P, Y	1 P, Y	140 ee, jj	140 ee, jj	200 ee	EPA820/B-96-001 57FR60848 68FR75510 SDWA
15	Asbestos	1332214							7 million fibers/L I, ee	57FR60848
16	2, 3, 7, 8-TCDD (Dioxin)	1746016						0.046 ppq O, C	30ppq O, C	State Standard SDWA
17	Acrolein	107028	3	3			6 ee, nn	9 ee, nn		74FR27535 74FR46587
18	Acrylonitrile	107131					0.051 B, C	0.25 B, C		65FR66443
19	Benzene	71432					2.2 B, C	51 B, C	5 C	IRIS 01/19/00 65FR66443 SDWA
20	Bromate	15541454							10 C	SDWA
21	Bromoform	75252					4.3 B, C	140 B, C	80 Total THMs C	65FR66443 SDWA
22	Bromoacetic acid	79083							60 Total HAA5 C,mm	SDWA
23	Carbon Tetrachloride	56235					0.23 B, C	1.6 B, C	5 C	65FR66443 SDWA
24	Chlorite	67481							100	SDWA

SCDHEC R.61 68 WATER CLASSIFICATIONS AND STANDARDS TABLE FOR PROTECTION OF FRESHWATER AQUATIC LIFE

25	Chlorobenzene	108907			130T, ee	1,600 T, ee	100 T, ee	68FR75510 SDWA
26	Chlorodibromomethane	124481			0.40 B, C	13 B, C	80 Total THMs C	65FR66443 SDWA
27	Chloroform	67663			5.7 B, C, hh	470 B, C, hh	80 Total THMs C	62FR42160 SDWA
28	Dibromoacetic acid	631641					60 Total HAA5 C, mm	SDWA
29	Dichloroacetic acid	79436					60 Total HAA5 C,mm	SDWA
30	Dichlorobromomethane	75274			0.55 B, C	17 B, C	80 Total THMs C	65FR66443 SDWA
31	1, 2-Dichloroethane	107062			0.38 B, C	37 B, C	5 C	65FR66443 SDWA
32	1, 1-Dichloroethylene	75354			330 ee	7,100 ee	7 C	68FR75510 SDWA
33	1, 2-Dichloropropane	78875			0.50 B, C	15 B, C	5 C	65FR66443 SDWA
34	1, 3-Dichloropropene	542756			0.34 ee	21 ee		68FR75510
35	Ethylbenzene	100414			530 ee	2,100 ee	700 ee	68FR75510 SDWA
36	Methyl Bromide	74839			47 B, ee	1,500 B, ee		65FR66443
37	Methylene Chloride	75092			4.6 B, C	590 B, C	5 C	65FR66443 SDWA
38	Monochloroacetic acid	79118					60 Total HAA5 C,mm	SDWA
39	1, 1, 2, 2-Tetrachloroethane	79345			0.17 B, C	4.0 B, C		65FR66443

SCDHEC R.61 68 WATER CLASSIFICATIONS AND STANDARDS TABLE FOR PROTECTION OF FRESHWATER AQUATIC LIFE

40	Tetrachloroethylene	127184					0.69 C	3.3 C	5 C	65FR66443 SDWA
41	Toluene	108883					1,300 ee	15,000 ee	1000 ee	68FR75510 SDWA
42	1,2-Trans-Dichloroethylene	156605					140 ee	10,000 ee	100 ee	68FR75510 SDWA
43	Trichloroacetic acid	79039							60 Total HAA5 C,nnn	SDWA
44	1, 1, 1-Trichloroethane	71556					J, ee	J, ee	200 ee	65FR31682 SDWA
45	1, 1, 2-Trichloroethane	79005					0.59 B, C	16 B, C	5 C	65FR66443 SDWA
46	Trichloroethylene	79016					2.5 C	30 C	5 C	65FR66443 SDWA
47	Vinyl Chloride	75014					0.025 kk	2.4 kk	2 C	68FR75510 SDWA
48	2-Chlorophenol	95578					81 B, T, ee	150 B, T, ee		65FR66443
49	2, 4-Dichlorophenol	120832					77 B, T, ee	290 B, T, ee		65FR66443
50	2, 4-Dimethylphenol	105679					380 B, T, ee	850 B, T, ee		65FR66443
51	2-Methyl- 4, 6-Dinitrophenol	534521					13 ee	280 ee		65FR66443
52	2, 4-Dinitrophenol	51285					69 B, ee	5,300 B, ee		65FR66443
53	Pentachlorophenol	87865	19 F, K	15 F, K	13 Y	7.9 Y	0.27 B, C	3.0 B, C, H	1 C	65FR31682 65FR66443 SDWA
54	Phenol	108952					10,000 T, ee, nn	860,000 T, ee, nn		74FR27535 74FR46587
55	2, 4, 6-Trichlorophenol	88062					1.4 B, C, T	2.4 B, C		65FR66443

SCDHEC R.61 68 WATER CLASSIFICATIONS AND STANDARDS TABLE FOR PROTECTION OF FRESHWATER AQUATIC LIFE

56	Acenaphthene	83329					670 B, T, ee	990 B, T, ee		65FR66443
57	Anthracene	120127					8,300 B, ee	40,000 B, ee		65FR66443
58	Benzidine	92875					0.000086 B, C	0.00020 B, C		65FR66443
59	Benzo (a) Anthracene	56553					0.0038 B, C	0.018 B, C		65FR66443
60	Benzo (a) Pyrene	50328					0.0038 B, C	0.018 B, C	0.2 C	65FR66443 SDWA
61	Benzo (b) Fluoranthene	205992					0.0038 B, C	0.018 B, C		65FR66443
62	Benzo (k) Fluoranthene	207089					0.0038 B, C	0.018 B, C		65FR66443
63	Bis-2-Chloroethyl Ether	111444					0.030 B, C	0.53 B, C		65FR66443
64	Bis-2-Chloroisopropyl Ether	108601					1,400 B, ee	65,000 B, ee		65FR66443
65	Bi-s2-Ethylhexyl Phthalate (DEHP)	117817	V	V	V	V	1.2 B, C	2.2 B, C	6 C	65FR66443 SDWA
66	Butylbenzene Phthalate	85687	ii	ii	ii	ii	1,500 B, ee	1,900 B, ee		65FR66443
67	2-Chloronaphthalene	91587					1,000 B, ee	1,600 B, ee		65FR66443
68	Chrysene	218019					0.0038 B, C	0.018 B, C		65FR66443
69	Dibenzo(a,h)Anthracene	53703					0.0038 B, C	0.018 B, C		65FR66443

SCDHEC R.61 68 WATER CLASSIFICATIONS AND STANDARDS TABLE FOR PROTECTION OF FRESHWATER AQUATIC LIFE

70	1, 2-Dichlorobenzene	95501				420 ee	1,300 ee	600 ee	68FR75510 SDWA
71	1, 3-Dichlorobenzene	541731				320 ee	960 ee		65FR66443
72	1, 4-Dichlorobenzene	106467				63 ee	190 ee	75 ee	68FR75510 SDWA
73	3, 3'-Dichlorobenzidine	91941				0.021 B, C	0.028 B, C		65FR66443
74	Diethyl Phthalate	84662	ii	ii	ii	ii	17,000 B, ee	44,000 B, ee	65FR66443
75	Dimethyl Phthalate	13113	ii	ii	ii	ii	270,000 B, ee	1,100,000 B, ee	64FR66443
76	Di-n-butyl Phthalate	84742	ii	ii	ii	ii	2,000 B, ee	4,500 B, ee	65FR66443
77	2, 4-Dinitrotoluene	121142					0.11 C	3.4 C	65FR66443
78	1, 2-Diphenylhydrazine	122667					0.036 B, C	0.20 B, C	65FR66443
79	Fluoranthene	206440					130 B, ee	140 B, ee	65FR66443
80	Fluorene	86737					1,100 B, ee	5,300 B, ee	65FR66443
81	Hexachlorobenzene	118741					0.00028 B, C	0.00029 B, C	1 C 65FR66443 SDWA
82	Hexachlorobutadiene	87683					0.44 B, C	18 B, C	65FR66443
83	Hexachlorocyclo-pentadiene	77474					40 T, ee	1100 T, ee	50 ee 68FR75510 SDWA
84	Hexachloroethane	67721					1.4 B, C	3.3 B, C	65FR66443
85	Indeno 1,2,3(cd) Pyrene	193395					0.0038 B, C	0.018 B, C	65FR66443

SCDHEC R.61 68 WATER CLASSIFICATIONS AND STANDARDS TABLE FOR PROTECTION OF FRESHWATER AQUATIC LIFE

86	Isophorone	78591					35 B, C	960 B, C			65FR66443
87	Nitrobenzene	98953					17 B, ee	690 B, H, T, ee			65FR66443
88	N-Nitrosodimethylamine	62759					0.00069 B, C	3.0 B, C			65FR66443
89	N-Nitrosodi-n-Propylamine	621647					0.0050 B, C	0.51 B, C			65FR66443
90	N-Nitrosodiphenylamine	86306					3.3 B, C	6.0 B, C			65FR66443
91	Pyrene	129000					830 B, ee	4,000 B, ee			65FR66443
92	1, 2, 4-Trichlorobenzene	120821					35 ee	70 ee	70 ee		68FR75510 SDWA
93	Aldrin	309002	3.0 G, X		1.3 G, X		0.000049 B, C	0.000050 B, C			65FR31682 65FR66443
94	alpha-BHC	319846					0.0026 B, C	0.0049 B, C			65FR66443
95	beta-BHC	319857					0.0091 B, C	0.017 B, C			65FR66443
96	gamma-BHC (Lindane)	58899	0.95 K		0.16 G		0.98 ee	1.8 ee	0.2 C		65FR31682 68FR75510 SDWA
97	Chlordane	57749	2.4 G	0.0043 G, X	0.09 G	0.004 G, X	0.00080 B, C	0.00081 B, C	2 C		65FR31682 65FR66443 SDWA
98	4, 4'-DDT	50293	1.1 G, gg	0.001 G, X, gg	0.13 G, gg	0.001 G, X, gg	0.00022 B, C	0.00022 B, C			65FR31682 65FR66443
99	4, 4'-DDE	72559					0.00022 B, C	0.00022 B, C			65FR66443
100	4, 4'-DDD	72548					0.00031 B, C	0.00031 B, C			65FR66443

SCDHEC R.61 68 WATER CLASSIFICATIONS AND STANDARDS TABLE FOR PROTECTION OF FRESHWATER AQUATIC LIFE

101	Dieldrin	60571	0.24 K	0.056 K, N	0.71 G	0.0019 G, X	0.000052 B, C	0.000054 B, C		65FR31682 65FR66443
102	alpha-Endosulfan	959988	0.22 G, W	0.056 G, W	0.034 G, W	0.0087 G, W	62 B, ee	89 B, ee		65FR31682 65FR66443
103	beta-Endosulfan	33213659	0.22 G, W	0.056 G, W	0.034 G, W	0.0087 G, W	62 B, ee	89 B, ee		65FR31682 65FR66443
104	Endosulfan Sulfate	1031078					62 B, ee	89 B, ee		65FR31682 65FR66443
105	Endrin	72208	0.086 K	0.036 K, N	0.037 G	0.0023 G, X	0.059 ee	0.060 ee	2 ee	68FR75510 SDWA
106	Endrin Aldehyde	7421934					0.29 B, ee	0.30 B, H, ee		65FR66443
107	Heptachlor	76448	0.52 G	0.0038 G, X	0.053 G	0.0036 G, X	0.000079 B, C	0.000079 B, C	0.4 C	65FR31682 65FR66443 SDWA
108	Heptachlor Epoxide	1024573	0.52 G, U	0.0038 G, U, X	0.053 G, U	0.0036 G, U, X	0.000039 B, C	0.000039B, C	0.2 C	65FR31682 65FR66443 SDWA
109	Polychlorinated Biphenyls PCBs	--		0.014 M, X		0.03 M, X	0.000064 B, C, M	0.000064 B, C, M	0.5 C	65FR31682 65FR66443 SDWA
110	Toxaphene	8001352	0.73	0.0002 X	0.21	0.0002 X	0.00028 B, C	0.00028 B, C	3 C	65FR31682 65FR66443 SDWA

Footnotes:

A This water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic, which might imply that arsenic (III) and arsenic (V) are equally toxic to aquatic life and that their toxicities are additive. In the arsenic criteria document (EPA 440/5-84-033, January 1985), Species Mean Acute Values are given for both arsenic (III) and arsenic (V) for five species and the ratios of the SMAVs for each species range from 0.6 to 1.7. Chronic values are available for both arsenic (III) and arsenic (V) for one species; for the fathead minnow, the chronic value for arsenic (V) is 0.29 times the chronic value for arsenic (III). No data are known to be available concerning whether the toxicities of the forms of arsenic to aquatic organisms are additive.

B This criterion has been revised to reflect The Environmental Protection Agency's q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.

C This criterion is based on carcinogenicity of 10^{-6} risk. As prescribed in Section E of this regulation, application of this criterion for permit effluent limitations requires the use annual average flow or comparable tidal condition as determined by the Department.

D Freshwater and saltwater criteria for metals are expressed in terms of total recoverable metals. As allowed in Section E of this regulation, these criteria may be expressed as dissolved metal for the purposes of deriving permit effluent limitations. The dissolved metal water quality criteria value may be calculated by using these 304(a) aquatic life criteria expressed in terms of total recoverable metal, and multiplying it by a conversion factor (CF). The term "Conversion Factor" (CF) represents the conversion factor for

SCDHEC R.61 68 WATER CLASSIFICATIONS AND STANDARDS TABLE FOR PROTECTION OF FRESHWATER AQUATIC LIFE

converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. (Conversion Factors for saltwater CCCs are not currently available. Conversion factors derived for saltwater CMCs have been used for both saltwater CMCs and CCCs). See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria", October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource center, USEPA, 401 M St., SW, mail code RC4100, Washington, DC 20460; and 40CFR§131.36(b)(1). Conversion Factors can be found in Attachment 1 – Conversion Factors for Dissolved Metals.

E The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. The value given here corresponds to a hardness of 25 mg/L as expressed as $CaCO_3$. Criteria values for other hardness may be calculated from the following: CMC (dissolved) = $\exp\{m_A [\ln(\text{hardness})] + b_A\}$ (CF), or CCC (dissolved) = $\exp\{mc [\ln(\text{hardness})] + bc\}$ (CF) and the parameters specified in Attachment 2 – Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent. As noted in footnote D above, the values in this appendix are expressed as total recoverable, the criterion may be calculated from the following: CMC (total) = $\exp\{m_A [\ln(\text{hardness})] + b_A\}$, or CCC (total) = $\exp\{mc [\ln(\text{hardness})] + bc\}$.

F Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows: CMC = exp(1.005(pH)-4.869); CCC = exp(1.005(pH)-5.134). Values displayed in table correspond to a pH of 7.8.

G This criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (EPA 440/5-80-019), Chlordane (EPA 440/5-80-027), DDT (EPA 440/5-80-038), Endosulfan (EPA 440/5-80-046), Endrin (EPA 440/5-80-047), Heptachlor (440/5-80-052), Hexachlorocyclohexane (EPA 440/5-80-054), Silver (EPA 440/5-80-071). The Minimum Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines. For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

H No criterion for protection of human health from consumption of aquatic organisms excluding water was presented in the 1980 criteria document or in the *1986 Quality Criteria for Water*. Nevertheless, sufficient information was presented in the 1980 document to allow the calculation of a criterion, even though the results of such a calculation were not shown in the document.

I This criterion for asbestos is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act (SDWA) and the National Primary Drinking Water Regulation (NPDWR).

J EPA has not calculated a 304(a) human health criterion for this contaminant. The criterion is the Maximum Contaminant Level developed under the Safe Drinking Water Act (SDWA) and the National Primary Drinking Water Regulation (NPDWR).

K This criterion is based on a 304(a) aquatic life criterion that was issued in the *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water*, (EPA-820-B-96-001, September 1996). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the difference between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. None of the decisions concerning the derivation of this criterion were affected by any considerations that are specific to the Great Lakes.

L The CMC = 1/[(f1/CMC1) + (f2/CMC2)] where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate, respectively, and CMC1 and CMC2 are 185.9 µg /l and 12.82 µg /l, respectively.

M This criterion applies to total PCBs, (e.g., the sum of all congener or all isomer or homolog or Aroclor analyses.)

N The derivation of the CCC for this pollutant did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.

O This state criterion is also based on a total fish consumption rate of 0.0175 kg/day.

P This water quality criterion is expressed asµg free cyanide (as CN)/L.

Q This value was announced (61FR58444-58449, November 14, 1996) as a proposed GLI 303 I aquatic life criterion

S This water quality criterion for selenium is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor (0.996 – CMC or 0.922 – CCC) that was used in the GLI to convert this to a value that is expressed in terms of dissolved metal.

T The organoleptic effect criterion is more stringent than the value for priority toxic pollutants.

U This value was derived from data for heptachlor and the criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.

V There is a full set of aquatic life toxicity data that show that DEHP is not toxic to aquatic organisms at or below its solubilitylimit.

W This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.

X This criterion is based on a 304(a) aquatic life criterion issued in 1980 or 1986, and was issued in one of the following documents: Aldrin/Dieldrin (EPA440/5-80-019), Chlordane (EPA 440/5-80-027), DDT (EPA 440/5-80-038), Endrin (EPA 440/5-80-047), Heptachlor (EPA 440/5-80-052), Polychlorinated Biphenyls (EPA 440/5- 80-068), Toxaphene (EPA 440/5-86-006). This CCC is based on the Final Residue value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the EPA no longer uses the Final Residue value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.

SCDHEC R.61 68 WATER CLASSIFICATIONS AND STANDARDS TABLE FOR PROTECTION OF FRESHWATER AQUATIC LIFE

Y This water quality criterion is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (*Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, PB85-227049, January 1985) and was issued in one of the following criteria documents: Arsenic (EPA 440/5-84-033), Cadmium (EPA 440/5-84-032), Chromium (EPA 440/5-84-029), Copper (EPA 440/5-84-031), Cyanide (EPA 440/5-84-028), Lead (EPA 440/5-84-027), Nickel (EPA 440/5-86-004), Pentachlorophenol (EPA 440/5-86-009), Toxaphene, (EPA 440/5-86-006), Zinc (EPA 440/5-87- 003).

Z When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate.

aa The selenium criteria document (EPA 440/5-87-006, September 1987) provides that if selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field, the status of the fish community should be monitored whenever the concentration of selenium exceeds 5.0 7g/L in salt water because the saltwater CCC does not take into account uptake via the food chain.

bb This water quality criterion was derived on page 43 of the mercury criteria document (EPA 440/5-84-026, January 1985). The saltwater CCC of 0.025 ug/L given on page 23 of the criteria document is based on the Final Residue value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the EPA no longer uses the Final Residue value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.

cc This water quality criterion was derived in *Ambient Water Quality Criteria Saltwater Copper Addendum* (Draft, April 14, 1995) and was promulgated in the Interim Final National Toxics Rule (60FR22228-222237, May 4, 1995).

dd This water quality criterion was derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, this criterion will probably be under protective. In addition, even though inorganic mercury is converted to methylmercury and methylmercury bioaccumulates to a great extent, this criterion does not account for uptake via the food chain because sufficient data were not available when the criterion was derived.

ee This criterion is a noncarcinogen. As prescribed in Section E of this regulation, application of this criterion for determining permit effluent limitations requires the use of 7Q10 or comparable tidal condition as determined by the Department.

gg This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).

hh Although a new RfD is available in IRIS, the surface water criteria will not be revised until the National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) is completed, since public comment on the relative source contribution (RSC) for chloroform is anticipated.

ii Although EPA has not published a completed criteria document for phthalate, it is EPA's understanding that sufficient data exist to allow calculation of aquatic life criteria.

jj This recommended water quality criterion is expressed as total cyanide, even though the IRIS RfD the EPA used to derive the criterion is based on free cyanide. The multiple forms of cyanide that are present in ambient water have significant differences in toxicity due to their abilities to liberate the CN-moiety. Some complex cyanides require even more extreme conditions than refluxing with sulfuric acid to liberate the CN-moiety. Thus, these complex cyanides are expected to have little or no 'bioavailalbility' to humans. If a substantial fraction of the cyanide present in a water body is present in a complexed form (e.g.,$FE_4[FE(CN)_6]_3$), this criterion may be overly conservative.

kk This recommended water quality criterion was derived using the cancer slope factor of 1.4 (Linear multi-stage model (LMS) exposure from birth).

ll Freshwater copper criteria may be calculated utilizing the procedures identified in EPA-822-R-07-001.

mm HAA5 means five haloacetic acids (monochloracitic acid, dichloroacetic acid, trichloroacetic acid, bromoacetic acid and dibromoaccetic acid).

nn This criterion has been revised to reflect the EPA's cancer slope factor (CSF) or reference dose (RfD), as contained in the Integrated Risk Information System (IRIS) as of (Final FR Notice June 10, 2009). The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.

Attachment D-5

Uncertainty Tables

This page intentionally left blank.

Table 1. Uncertainty Evaluation for ECODS N-1 (Soil 0-1 ft)

Analyte[1]	EPC[2] *(mg/kg)*	RSV Source[3]	American Robin (Avian herbivore)		American Robin (Avian omnivore)		American Robin (Avian insectivore)	
			RSV	HQ	RSV	HQ	RSV	HQ
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	3.38E-01	b	1.60E+02	2.11E-03	4.00E-01	8.45E-01	2.00E-01	1.69E+00
CYANIDE	1.55E+00	b	1.00E+00	1.55E+00	9.90E-01	1.56E+00	9.80E-01	1.58E+00
LEAD	2.02E+02	b	3.60E+01	5.61E+00	2.80E+01	7.22E+00	2.30E+01	8.79E+00
VANADIUM	3.56E+01	b	1.30E+01	2.74E+00	1.10E+01	3.24E+00	9.50E+00	3.75E+00

1 – Analytes identified as COPCs from Table D-2
2 - EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.1.1 (0-1 ft)
3 - a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).
3 - b = Los Alamos National Laboratory Low Effect ESL for soil media (2017)
Hazard Quotient (HQ) = EPC/RSV

Table 2. Uncertainty Evaluation ECODS N-1 (Soil 1-4 ft)

Analyte[1]	EPC[2] *(mg/kg)*	RSV Source[3]	American Robin (Avian Herbivore)		American Robin (Avian Omnivore)		American Robin (Avian Insectivore)	
			RSV	HQ	RSV	HQ	RSV	HQ
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	4.16E-01	b	1.60E+02	2.60E-03	4.00E-01	1.04E+00	2.00E-01	2.08E+00
HEXAVALENT CHROMIUM 7199	3.90E+00	b	2.10E+03	1.86E-03	1.60E+03	2.44E-03	1.40E+03	2.79E-03
CADMIUM	3.26E+00	b	2.30E+01	1.42E-01	3.00E+00	1.09E+00	1.60E+00	2.04E+00
COPPER	2.34E+03	b	1.00E+02	2.34E+01	6.00E+01	3.90E+01	4.30E+01	5.44E+01
CYANIDE	1.62E+00	b	1.00E+00	1.62E+00	9.90E-01	1.63E+00	9.80E-01	1.65E+00
LEAD	1.31E+02	b	3.60E+01	3.63E+00	2.80E+01	4.66E+00	2.30E+01	5.68E+00
SELENIUM	4.11E+01	b	1.90E+00	2.17E+01	1.60E+00	2.57E+01	1.40E+00	2.94E+01
VANADIUM	4.72E+01	b	1.30E+01	3.63E+00	1.10E+01	4.29E+00	9.50E+00	4.96E+00

Analyte[1]	EPC[2] *(mg/kg)*	RSV Source[3]	Montane Shrew (Mammalian Insectivore)	
			RSV	HQ
CADMIUM	3.26E+00	b	3.00E+00	1.09E+00
SELENIUM	4.11E+01	b	1.00E+00	4.11E+01

1 – Analytes identified as COPCs from Table D-4

2 – EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.1.2 (1-4 ft)

3 – a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).

3 – b = Los Alamos National Laboratory Low Effect ESL for soil media (2017)

Hazard Quotient (HQ) = EPC/RSV

Table 3. Uncertainty Evaluation for CSSLP (Soil 0-1 ft)

Analyte[1]	EPC[2] *(mg/kg)*	RSV Source[3]	American Robin (Avian Herbivore)		American Robin (Avian Omnivore)		American Robin (Avian Insectivore)	
			RSV	HQ	RSV	HQ	RSV	HQ
SELENIUM	1.25E+00	b	1.90E+00	5.23E-02	1.60E+00	6.21E-02	1.40E+00	7.10E-02
VANADIUM	2.68E+01	b	1.30E+01	2.06E+00	1.10E+01	2.43E+00	9.50E+00	2.82E+00

Analyte[1]	EPC[2] (mg/kg)	RSV Source[3]	Deer mouse	
			RSV	HQ
SELENIUM	1.25E+00	b	1.20E+00	1.04E+00
VANADIUM	2.68E+01	b	1.00E+03	2.68E-02

Analyte[1]	EPC[2] (mg/kg)	RSV Source[3]	American Kestrel (Insectivore/carnivore)	
			RSV	HQ
SELENIUM	1.25E+00	b	7.50E+00	1.66E-01
VANADIUM	2.68E+01	b	1.10E+02	2.43E-01

Analyte[1]	EPC[2] (mg/kg)	RSV Source[3]	Montane Shrew	
			RSV	HQ
SELENIUM	1.25E+00	b	1.00E+00	1.25E+00
VANADIUM	2.68E+01	b	6.10E+02	4.39E-02

1 – Analytes identified as COPCs from Table D-6
2 - EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.2.1 (0-1 ft)
3 - a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).
3 - b = Los Alamos National Laboratory Low Effect ESL for soil media (2017)
Hazard Quotient (HQ) = EPC/RSV

Table 4. Uncertainty Evaluation for CSSLP (Soil 1-4 ft)

Analyte[1]	EPC[2] *(mg/kg)*	RSV Source[3]	American Robin (Avian Herbivore)		American Robin (Avian Omnivore)		American Robin (Avian Insectivore)	
			RSV	HQ	RSV	HQ	RSV	HQ
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	4.33E-01	b	1.60E+02	2.71E-03	4.00E-01	1.08E+00	2.00E-01	2.17E+00
MERCURY	2.40E-01	b	6.70E-01	3.58E-01	2.20E-01	1.09E+00	1.30E-01	1.85E+00
SELENIUM	1.48E+00	b	1.90E+00	7.79E-01	1.60E+00	9.25E-01	1.40E+00	1.06E+00
VANADIUM	2.36E+01	b	1.30E+01	1.82E+00	1.10E+01	2.15E+00	9.50E+00	2.49E+00

Analyte[1]	EPC[2] (mg/kg)	RSV Source[3]	Deer mouse	
			RSV	HQ
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	4.33E-01	b	1.10E+01	3.94E-02
MERCURY	2.40E-01	b	3.00E+01	8.00E-03
SELENIUM	1.48E+00	b	1.20E+00	1.23E+00
VANADIUM	2.36E+01	b	1.00E+03	2.36E-02

Analyte[1]	EPC[2] (mg/kg)	RSV Source[3]	American Kestrel (Insectivore/carnivore)	
			RSV	HQ
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	4.33E-01	b	9.60E-01	4.51E-01
MERCURY	2.40E-01	b	5.80E-01	4.14E-01
SELENIUM	1.48E+00	b	7.50E+00	1.97E-01
VANADIUM	2.36E+01	b	1.10E+02	2.15E-01

Analyte[1]	EPC[2] (mg/kg)	RSV Source[3]	Montane Shrew	
			RSV	HQ
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	4.33E-01	b	6.00E+00	7.22E-02
MERCURY	2.40E-01	b	1.70E+01	1.41E-02
SELENIUM	1.48E+00	b	1.00E+00	1.48E+00
VANADIUM	2.36E+01	b	6.10E+02	3.88E-02

1 – Analytes identified as COPCs from Table D-8
2 – EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.1.2 (1-4 ft)
3 – a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).
3 – b = Los Alamos National Laboratory Low Effect ESL for soil media (2017)
Hazard Quotient (HQ) = EPC/RSV

Table 5. Uncertainty Evaluation for CSSLP Surface Water Impoundment Area (Sediment 0-1 ft)

Analyte[1]	EPC[2] *(mg/kg)*	RSV Source[3]	American Robin (Avian Herbivore)		American Robin (Avian Omnivore)		American Robin (Avian Insectivore)	
			RSV	HQ	RSV	HQ	RSV	HQ
VANADIUM	3.92E+01	b	1.30E+01	3.02E+00	1.10E+01	3.56E+00	9.50E+00	4.13E+00

Analyte[1]	EPC[2] *(mg/kg)*	RSV Source[3]	Little Brown Bat (Mammalian Aerial Insectivore)		Violet-Green Swallow (Avian Aerial Insectivore)	
			RSV	HQ	RSV	HQ
VANADIUM	3.92E+01	b	1.10E+03	3.56E-02	5.90E+01	6.64E-01

1 – Analytes identified as COPCs from Table D-10

2 – EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.2.4 (0-1 ft)

3 – a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).

3 – b = Los Alamos National Laboratory Low Effect ESL for soil media (2017)

Hazard Quotient (HQ) = EPC/RSV

Table 6. Uncertainty Evaluation for CSSLP Surface Water Impoundment Area (Surface Water, Unfiltered)

Analyte[1]	Exposure Point Concentration[2] *(mg/kg)*	RSV Source[3]	Aquatic Community Organisms	
			RSV	HQ
ALUMINUM	4.03E+02	c	1.30E+03	3.10E-01
COPPER	3.26E+01	c	7.00E+00	4.66E+00
IRON	2.66E+03	c	1.00E+04	2.66E-01
LEAD	4.50E+00	c	1.00E+01	4.50E-01
MANGANESE	4.00E+02	c	2.30E+03	1.74E-01
ZINC	4.17E+01	c	8.50E+01	4.91E-01
Analyte[1]	**Exposure Point Concentration[2] *(mg/kg)***	**RSV Source[3]**	**Aquatic Life**	
			RSV	**HQ**
ALUMINUM	4.03E+02	b	8.70E+01	4.63E+00
COPPER	3.26E+01	b	4.95E+00	6.59E+00
IRON	2.66E+03	b	1.00E+03	2.66E+00
LEAD	4.50E+00	b	3.01E+01	1.50E-01
MANGANESE	4.00E+02	b	9.30E+01	4.30E+00
ZINC	4.17E+01	b	6.60E+01	6.32E-01
Analyte[1]	**Exposure Point Concentration[2] *(mg/kg)***	**RSV Source[3]**	**Freshwater Aquatic Life**	
			RSV	**HQ**
COPPER	3.26E+01	a	2.90E+00	1.12E+01
LEAD	4.50E+00	a	5.40E-01	8.33E+00
ZINC	4.17E+01	a	3.70E+01	1.13E+00

1 – Analytes identified as COPCs from Table D-12 (with RSVs available)
2 – EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.2.7 Surface Water (unfiltered)
3: a = SCDHEC, R61-68, Water Classifications and Standards, chronic values for freshwater aquatic life (2014)
3: b = Table 1a in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
3: c = Los Alamos National Laboratory Ecorisk Database (Release 3.3) (2017)
Hazard Quotient (HQ) = EPC / RSV

Table 7. Uncertainty Evaluation for CSSLP Surface Water Impoundment Area (Surface Water, Filtered)

Analyte[1]	Exposure Point Concentration[2] *(mg/kg)*	RSV Source[3]	Aquatic community organisms	
			RSV	HQ
ALUMINUM	3.95E+02	c	1.30E+03	3.04E-01
COPPER	3.96E+01	c	7.00E+00	5.66E+00
IRON	2.19E+03	c	1.00E+04	2.19E-01
LEAD	5.41E+00	c	1.00E+01	5.41E-01
MANGANESE	2.88E+02	c	2.30E+03	1.25E-01
ZINC	4.06E+01	c	8.50E+01	4.78E-01

Analyte[1]	Exposure Point Concentration[2] *(mg/kg)*	RSV Source[3]	Aquatic life	
			RSV	HQ
ALUMINUM	3.95E+02	b	8.70E+01	4.54E+00
COPPER	3.96E+01	b	4.95E+00	8.00E+00
IRON	2.19E+03	b	1.00E+03	2.19E+00
LEAD	5.41E+00	b	3.01E+01	1.80E-01
MANGANESE	2.88E+02	b	9.30E+01	3.10E+00
ZINC	4.06E+01	b	6.60E+01	6.15E-01

Analyte[1]	Exposure Point Concentration[2] *(mg/kg)*	RSV Source[3]	Freshwater aquatic life	
			RSV	HQ
COPPER	3.99E+01	a	2.90E+00	1.38E+01
LEAD	5.41E+00	a	5.40E-01	1.00E+01
ZINC	4.06E+01	a	3.70E+01	1.10E+00

1 – Analytes identified as COPCs from Table D-14 (with RSVs available)
2 – EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.2.8 Surface Water (unfiltered)
3: a = SCDHEC, R61-68, Water Classifications and Standards, chronic values for freshwater aquatic life (2014)
3: b = Table 1a in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
3: c = Los Alamos National Laboratory Ecorisk Database (Release 3.3) (2017)
Hazard Quotient (HQ) = EPC / RSV

Table 8. Uncertainty Evaluation for Ford Building (Soil 0-1 ft)

Analyte[1]	Exposure Point Concentration[2] *(mg/kg)*	RSV Source[3]	American Robin (Avian Herbivore)		American Robin (Avian Omnivore)		American Robin (Avian Insectivore)	
			RSV	HQ	RSV	HQ	RSV	HQ
SELENIUM	1.75E+00	b	1.90E+00	9.19E-01	1.60E+00	1.09E+00	1.40E+00	1.25E+00
THALLIUM	3.78E+00	b	6.90E+01	5.48E-02	5.50E+01	6.87E-02	4.50E+01	8.40E-02
VANADIUM	4.93E+01	b	1.30E+01	3.79E+00	1.10E+01	4.48E+00	9.50E+00	5.19E+00

Analyte[1]	Exposure Point Concentration[2] *(mg/kg)*	RSV Source[3]	Deer Mouse	
			RSV	HQ
SELENIUM	1.75E+00	b	1.20E+00	1.46E+00
THALLIUM	3.78E+00	b	7.20E+00	5.25E-01
VANADIUM	4.93E+01	b	1.00E+03	4.93E-02

Analyte[1]	Exposure Point Concentration[2] *(mg/kg)*	RSV Source[3]	American Kestrel (Insectivore/Carnivore)	
			RSV	HQ
SELENIUM	1.75E+00	b	7.50E+00	2.33E-01
THALLIUM	3.78E+00	b	4.80E+02	7.88E-03
VANADIUM	4.93E+01	b	1.10E+02	4.48E-01

Analyte[1]	Exposure Point Concentration[2] (mg/kg)	RSV Source[3]	Montane Shrew	
			RSV	HQ
SELENIUM	1.75E+00	b	1.00E+00	1.75E+00
THALLIUM	3.78E+00	b	4.20E+00	9.00E-01
VANADIUM	4.93E+01	b	6.10E+02	8.08E-02

1 – Analytes identified as COPCs from Table D-17
2 - EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.3.1 (0-1 ft)
3 - a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).
3 - b = Los Alamos National Laboratory Low Effect ESL for soil media (2017)
Hazard Quotient (HQ) = EPC/RSV

Table 9 Uncertainty Evaluation for Ford Building (Soil 1-4 ft)

Analyte[1]	Exposure Point Concentration[2] (mg/kg)	RSV Source[3]	American robin (Avian herbivore)		American robin (Avian omnivore)		American robin (Avian insectivore)	
			RSV	HQ	RSV	HQ	RSV	HQ
COPPER	7.31E+01	b	1.00E+02	7.31E-01	6.00E+01	1.22E+00	4.30E+01	1.70E+00
SELENIUM	3.22E+00	b	1.90E+00	1.69E+00	1.60E+00	2.01E+00	1.40E+00	2.30E+00
THALLIUM	6.09E+00	b	6.90E+01	8.82E-02	5.50E+01	1.11E-01	4.50E+01	1.35E-01

Analyte[1]	Exposure Point Concentration[2] (mg/kg)	RSV Source[3]	Deer mouse	
			RSV	HQ
SELENIUM	3.22E+00	b	1.20E+00	2.68E+00
THALLIUM	6.09E+00	b	7.20E+00	8.46E-01

Analyte[1]	Exposure Point Concentration[2] (mg/kg)	RSV Source[3]	American Kestrel (Insectivore/carnivore)	
			RSV	HQ
SELENIUM	3.22E+00	b	7.50E+00	4.29E-01
THALLIUM	6.09E+00	b	1.00E+03	6.09E-03

Analyte[1]	Exposure Point Concentration[2] (mg/kg)	RSV Source[3]	Montane Shrew	
			RSV	HQ
SELENIUM	3.22E+00	b	1.00E+00	3.22E+00
THALLIUM	6.09E+00	b	4.20E+00	1.45E+00

1 – Analytes identified as COPCs from Table D-19

2 – EPC = reasonable maximum exposure (RME) exposure point concentration (EPC) is the lesser of the maximum detected concentration and the 95% upper confidence limit (UCL) on the mean concentration. RME from Appendix A Table A.3.2 (1-4 ft)

3 – a = Table 3 in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March Update (2018).

3 – b = Los Alamos National Laboratory Low Effect ESL for soil media (2017)

Hazard Quotient (HQ) = EPC/RSV

This page intentionally left blank.

Attachment D-6

RESRAD Biota Values
Argonne National Laboratory (2006) RESRAD BIOTA (v.1.8) [software]

(www.ead.anl.gov/resrad website accessed January 20, 2017

This page intentionally left blank

.

Table 1. Sediment/Soil

Radionuclide	Tier 3 Terrestrial Animal Soil	Tier 3 Aquatic Animal Sediment	Tier 3 Riparian Animal Sediment	Minimum of Tier 3
	BCG *(pCi/g)*			
Actinium-228	---	---	---	---
Americium-243	---	---	---	---
Barium-133	---	---	---	---
Bismuth-212	---	---	---	---
Bismuth-214	---	---	---	---
Californium-244	---	---	---	---
Carbon-14	4,760	789,000	59,000	4,760
Cobalt-58	1,790	38,600	3,790	1,790
Curium-244	4,060	4,000,000	5,200	4,060
Curium-245 and Curium-246	---	---	---	---
Europium-155	15,800	318,000	31,600	15,800
Lead-212	---	---	---	---
Lead-214	---	---	---	---
Manganese-54	---	---	---	---
Neptunium-239	---	---	---	---
Potassium-40	119	57,900	4,420	119
Promethium-146	---	---	---	---
Radium-224	---	---	---	---
Ruthenium-106	---	---	---	---
Thallium-208	---	---	---	---
Thorium-231	---	---	---	---
Thorium-234	2,160	43,200	4,320	2,160
Tin-113	---	---	---	---
Zinc-65	413	65,800	1,430	413
Zirconium-95	1,170	23,500	2,330	1,170

Table 2. Surface Water

Radionuclide	Tier 3 Aquatic Animal Water	Tier 3 Riparian Animal Water	Minimum of Tier 3
	BCG *(pCi/L)*		
Bismuth-214	---	---	---
Cesium-137	1,050	42.7	42.7
Curium-244	66.4	1,390	66.4
Iodine-129	1,000,000	38,500	38,500
Lead-212	---	---	---
Lead-214	---	---	---
Potassium-40	2,900	249	249
Technetium-99	2,470,000	667,000	667,000
Thorium-234	266,000	3,800,000	266,000

Attachment D-7

Los Alamos National Laboratory Receptor-Specific ESLs (2017)

This page intentionally left blank

LANL RECEPTOR-SPECIFIC ESLS

Analyte Class	Analyte Group	Analyte Name	Analyte Code	ESL Medium	ESL Receptor	No Effect ESL	Low Effect ESL	Units	Minimum ESL	ESL ID
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	SEDIMENT	Aquatic community organisms - sediment	0.00000085	0.0000085	mg/kg		SEDIMENT_AQ(s)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.00000033	0.0000022	mg/kg	MINIMUM	SEDIMENT_BA(l)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	SOIL	Deer mouse (Mammalian omnivore)	0.00000058	0.0000038	mg/kg		SOIL_DM(ip)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	SOIL	Earthworm (Soil-dwelling invertebrate)	5	10	mg/kg		SOIL_EW_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	SOIL	Gray fox (Mammalian top carnivore)	0.0001	0.00068	mg/kg		SOIL_RF(f)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	SOIL	Montane shrew (Mammalian insectivore)	0.00000029	0.0000019	mg/kg	MINIMUM	SOIL_MS(i)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	SOIL	Mountain cottontail (Mammalian herbivore)	0.00004	0.00027	mg/kg		SOIL_DC(p)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	WATER	Aquatic community organisms - water	0.000002	0.00002	µg/L	MINIMUM	WATER_AQ(w)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	WATER	Deer mouse (water)	0.0052	0.052	µg/L		WATER_DM(w)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	WATER	Gray fox (water)	0.011	0.11	µg/L		WATER_RF(w)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	WATER	Montane shrew (water)	0.0044	0.044	µg/L		WATER_MS(w)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	WATER	Mountain cottontail (water)	0.01	0.1	µg/L		WATER_DC(w)_1746-01-6
NONRAD	Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	WATER	Occult little brown myotis bat (water)	0.0062	0.062	µg/L		WATER_BA(w)_1746-01-6
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	14	140	mg/kg	MINIMUM	SEDIMENT_BA(l)_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	SOIL	Deer mouse (Mammalian omnivore)	23	230	mg/kg		SOIL_DM(ip)_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	SOIL	Earthworm (Soil-dwelling invertebrate)	18	180	mg/kg		SOIL_EW_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	SOIL	Generic plant (Terrestrial autotroph - producer)	33	330	mg/kg		SOIL_GP_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	SOIL	Gray fox (Mammalian top carnivore)	6700	67000	mg/kg		SOIL_RF(f)_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	SOIL	Montane shrew (Mammalian insectivore)	12	120	mg/kg	MINIMUM	SOIL_MS(i)_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	SOIL	Mountain cottontail (Mammalian herbivore)	320	3200	mg/kg		SOIL_DC(p)_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	WATER	Deer mouse (water)	50000	500000	µg/L		WATER_DM(w)_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	WATER	Gray fox (water)	110000	1100000	µg/L		WATER_RF(w)_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	WATER	Montane shrew (water)	43000	430000	µg/L	MINIMUM	WATER_MS(w)_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	WATER	Mountain cottontail (water)	98000	980000	µg/L		WATER_DC(w)_19406-51-0
NONRAD	High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	WATER	Occult little brown myotis bat (water)	60000	600000	µg/L		WATER_BA(w)_19406-51-0
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	17	170	mg/kg	MINIMUM	SEDIMENT_BA(l)_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	SOIL	Deer mouse (Mammalian omnivore)	23	230	mg/kg		SOIL_DM(ip)_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	SOIL	Earthworm (Soil-dwelling invertebrate)	43	430	mg/kg		SOIL_EW_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	SOIL	Generic plant (Terrestrial autotroph - producer)	14	140	mg/kg	MINIMUM	SOIL_GP_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	SOIL	Gray fox (Mammalian top carnivore)	9700	97000	mg/kg		SOIL_RF(f)_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	SOIL	Montane shrew (Mammalian insectivore)	16	160	mg/kg		SOIL_MS(i)_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	SOIL	Mountain cottontail (Mammalian herbivore)	110	1100	mg/kg		SOIL_DC(p)_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	WATER	Deer mouse (water)	73000	730000	µg/L		WATER_DM(w)_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	WATER	Gray fox (water)	160000	1600000	µg/L		WATER_RF(w)_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	WATER	Montane shrew (water)	62000	620000	µg/L	MINIMUM	WATER_MS(w)_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	WATER	Mountain cottontail (water)	140000	1400000	µg/L		WATER_DC(w)_35572-78-2
NONRAD	High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	WATER	Occult little brown myotis bat (water)	87000	870000	µg/L		WATER_BA(w)_35572-78-2
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1.1	2.5	mg/kg	MINIMUM	SEDIMENT_BA(l)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	2.7	27	mg/kg		SEDIMENT_VGS(i)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SOIL	American kestrel (Avian top carnivore)	120	1200	mg/kg		SOIL_AK(f)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SOIL	American kestrel (insectivore / carnivore)	9.3	93	mg/kg		SOIL_AK(fi)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SOIL	American robin (Avian herbivore)	0.079	0.79	mg/kg		SOIL_AR(p)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SOIL	American robin (Avian insectivore)	1.6	16	mg/kg		SOIL_AR(i)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SOIL	American robin (Avian omnivore)	0.15	1.5	mg/kg		SOIL_AR(ip)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SOIL	Deer mouse (Mammalian omnivore)	0.072	0.16	mg/kg	MINIMUM	SOIL_DM(ip)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SOIL	Gray fox (Mammalian top carnivore)	82	190	mg/kg		SOIL_RF(f)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SOIL	Montane shrew (Mammalian insectivore)	0.95	2.2	mg/kg		SOIL_MS(i)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	SOIL	Mountain cottontail (Mammalian herbivore)	0.091	0.21	mg/kg		SOIL_DC(p)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	WATER	American kestrel (water)	3500	35000	µg/L		WATER_AK(w)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	WATER	American robin (water)	3000	30000	µg/L		WATER_AR(w)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	WATER	Aquatic community organisms - water	16	160	µg/L	MINIMUM	WATER_AQ(w)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	WATER	Deer mouse (water)	590	1300	µg/L		WATER_DM(w)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	WATER	Gray fox (water)	1300	3000	µg/L		WATER_RF(w)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	WATER	Montane shrew (water)	500	1100	µg/L		WATER_MS(w)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	WATER	Mountain cottontail (water)	1100	2700	µg/L		WATER_DC(w)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	WATER	Occult little brown myotis bat (water)	710	1600	µg/L		WATER_BA(w)_99-65-0
NONRAD	High Explosive	Dinitrobenzene[1,3-]	99-65-0	WATER	Violet-green Swallow (water)	1700	17000	µg/L		WATER_VGS(w)_99-65-0
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	SEDIMENT	Aquatic community organisms - sediment	0.29	2.9	mg/kg	MINIMUM	SEDIMENT_AQ(s)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	16	160	mg/kg		SEDIMENT_BA(l)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	SOIL	Deer mouse (Mammalian omnivore)	20	200	mg/kg		SOIL_DM(ip)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	SOIL	Earthworm (Soil-dwelling invertebrate)	18	180	mg/kg		SOIL_EW_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	SOIL	Generic plant (Terrestrial autotroph - producer)	6	60	mg/kg	MINIMUM	SOIL_GP_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	SOIL	Gray fox (Mammalian top carnivore)	2000	20000	mg/kg		SOIL_RF(f)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	SOIL	Montane shrew (Mammalian insectivore)	14	140	mg/kg		SOIL_MS(i)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	SOIL	Mountain cottontail (Mammalian herbivore)	74	740	mg/kg		SOIL_DC(p)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	WATER	Aquatic community organisms - water	65	330	µg/L	MINIMUM	WATER_AQ(w)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	WATER	Deer mouse (water)	14000	140000	µg/L		WATER_DM(w)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	WATER	Gray fox (water)	31000	310000	µg/L		WATER_RF(w)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	WATER	Montane shrew (water)	12000	120000	µg/L		WATER_MS(w)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	WATER	Mountain cottontail (water)	27000	270000	µg/L		WATER_DC(w)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,4-]	121-14-2	WATER	Occult little brown myotis bat (water)	16000	160000	µg/L		WATER_BA(w)_121-14-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	8.6	86	mg/kg	MINIMUM	SEDIMENT_BA(l)_606-20-2

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	190	1900	mg/kg		SEDIMENT_VGS(i)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SOIL	American kestrel (Avian top carnivore)	18000	180000	mg/kg		SOIL_AK(f)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SOIL	American kestrel (Insectivore / carnivore)	680	6800	mg/kg		SOIL_AK(ff)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SOIL	American robin (Avian herbivore)	52	520	mg/kg		SOIL_AR(p)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SOIL	American robin (Avian insectivore)	130	1300	mg/kg		SOIL_AR(i)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SOIL	American robin (Avian omnivore)	74	740	mg/kg		SOIL_AR(ip)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SOIL	Deer mouse (Mammalian omnivore)	4	40	mg/kg	MINIMUM	SOIL_DM(ip)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SOIL	Earthworm (Soil-dwelling invertebrate)	30	44	mg/kg		SOIL_EW_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SOIL	Gray fox (Mammalian top carnivore)	1300	13000	mg/kg		SOIL_RF(f)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SOIL	Montane shrew (Mammalian insectivore)	7.6	76	mg/kg		SOIL_MS(i)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	SOIL	Mountain cottontail (Mammalian herbivore)	6.7	67	mg/kg		SOIL_DC(p)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	WATER	Aquatic community organisms - water	230	330	µg/L	MINIMUM	WATER_AQ(w)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	WATER	Deer mouse (water)	9300	93000	µg/L		WATER_DM(w)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	WATER	Gray fox (water)	20000	200000	µg/L		WATER_RF(w)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	WATER	Montane shrew (water)	7900	79000	µg/L		WATER_MS(w)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	WATER	Mountain cottontail (water)	18000	180000	µg/L		WATER_DC(w)_606-20-2
NONRAD	High Explosive	Dinitrotoluene[2,6-]	606-20-2	WATER	Occult little brown myotis bat (water)	11000	110000	µg/L		WATER_BA(w)_606-20-2
NONRAD	High Explosive	HMX	2691-41-0	SEDIMENT	Aquatic community organisms - sediment	130	170	mg/kg	MINIMUM	SEDIMENT_AQ(s)_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1300	3500	mg/kg		SEDIMENT_BA(i)_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	SOIL	Deer mouse (Mammalian omnivore)	290	790	mg/kg		SOIL_DM(ip)_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	SOIL	Earthworm (Soil-dwelling invertebrate)	16	160	mg/kg	MINIMUM	SOIL_EW_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	SOIL	Generic plant (Terrestrial autotroph - producer)	2700	3500	mg/kg		SOIL_GP_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	SOIL	Gray fox (Mammalian top carnivore)	59000	150000	mg/kg		SOIL_RF(f)_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	SOIL	Montane shrew (Mammalian insectivore)	1100	2900	mg/kg		SOIL_MS(i)_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	SOIL	Mountain cottontail (Mammalian herbivore)	410	1100	mg/kg		SOIL_DC(p)_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	WATER	Deer mouse (water)	390000	1000000	µg/L		WATER_DM(w)_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	WATER	Gray fox (water)	870000	2300000	µg/L		WATER_RF(w)_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	WATER	Montane shrew (water)	330000	890000	µg/L	MINIMUM	WATER_MS(w)_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	WATER	Mountain cottontail (water)	770000	2000000	µg/L		WATER_DC(w)_2691-41-0
NONRAD	High Explosive	HMX	2691-41-0	WATER	Occult little brown myotis bat (water)	470000	1200000	µg/L		WATER_BA(w)_2691-41-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1500	16000	mg/kg	MINIMUM	SEDIMENT_BA(i)_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	SOIL	Deer mouse (Mammalian omnivore)	70	740	mg/kg		SOIL_DM(ip)_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	SOIL	Earthworm (Soil-dwelling invertebrate)	13	130	mg/kg	MINIMUM	SOIL_EW_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	SOIL	Generic plant (Terrestrial autotroph - producer)	21	210	mg/kg		SOIL_GP_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	SOIL	Gray fox (Mammalian top carnivore)	69000	730000	mg/kg		SOIL_RF(f)_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	SOIL	Montane shrew (Mammalian insectivore)	1200	13000	mg/kg		SOIL_MS(i)_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	SOIL	Mountain cottontail (Mammalian herbivore)	88	930	mg/kg		SOIL_DC(p)_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	WATER	Deer mouse (water)	500000	5300000	µg/L		WATER_DM(w)_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	WATER	Gray fox (water)	1100000	11000000	µg/L		WATER_RF(w)_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	WATER	Montane shrew (water)	430000	4500000	µg/L	MINIMUM	WATER_MS(w)_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	WATER	Mountain cottontail (water)	990000	10000000	µg/L		WATER_DC(w)_55-63-0
NONRAD	High Explosive	Nitroglycerine	55-63-0	WATER	Occult little brown myotis bat (water)	600000	6400000	µg/L		WATER_BA(w)_55-63-0
NONRAD	High Explosive	Nitrotoluene[2-]	88-72-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	25	250	mg/kg	MINIMUM	SEDIMENT_BA(i)_88-72-2
NONRAD	High Explosive	Nitrotoluene[2-]	88-72-2	SOIL	Deer mouse (Mammalian omnivore)	9.8	98	mg/kg	MINIMUM	SOIL_DM(ip)_88-72-2
NONRAD	High Explosive	Nitrotoluene[2-]	88-72-2	SOIL	Gray fox (Mammalian top carnivore)	6000	60000	mg/kg		SOIL_RF(f)_88-72-2
NONRAD	High Explosive	Nitrotoluene[2-]	88-72-2	SOIL	Montane shrew (Mammalian insectivore)	22	220	mg/kg		SOIL_MS(i)_88-72-2
NONRAD	High Explosive	Nitrotoluene[2-]	88-72-2	SOIL	Mountain cottontail (Mammalian herbivore)	15	150	mg/kg		SOIL_DC(p)_88-72-2
NONRAD	High Explosive	Nitrotoluene[2-]	88-72-2	WATER	Deer mouse (water)	46000	460000	µg/L		WATER_DM(w)_88-72-2
NONRAD	High Explosive	Nitrotoluene[2-]	88-72-2	WATER	Gray fox (water)	100000	1000000	µg/L		WATER_RF(w)_88-72-2
NONRAD	High Explosive	Nitrotoluene[2-]	88-72-2	WATER	Montane shrew (water)	39000	390000	µg/L	MINIMUM	WATER_MS(w)_88-72-2
NONRAD	High Explosive	Nitrotoluene[2-]	88-72-2	WATER	Mountain cottontail (water)	91000	910000	µg/L		WATER_DC(w)_88-72-2
NONRAD	High Explosive	Nitrotoluene[2-]	88-72-2	WATER	Occult little brown myotis bat (water)	56000	560000	µg/L		WATER_BA(w)_88-72-2
NONRAD	High Explosive	Nitrotoluene[3-]	99-08-1	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	21	210	mg/kg	MINIMUM	SEDIMENT_BA(i)_99-08-1
NONRAD	High Explosive	Nitrotoluene[3-]	99-08-1	SOIL	Deer mouse (Mammalian omnivore)	12	120	mg/kg	MINIMUM	SOIL_DM(ip)_99-08-1
NONRAD	High Explosive	Nitrotoluene[3-]	99-08-1	SOIL	Gray fox (Mammalian top carnivore)	7000	70000	mg/kg		SOIL_RF(f)_99-08-1
NONRAD	High Explosive	Nitrotoluene[3-]	99-08-1	SOIL	Montane shrew (Mammalian insectivore)	19	190	mg/kg		SOIL_MS(i)_99-08-1
NONRAD	High Explosive	Nitrotoluene[3-]	99-08-1	SOIL	Mountain cottontail (Mammalian herbivore)	21	210	mg/kg		SOIL_DC(p)_99-08-1
NONRAD	High Explosive	Nitrotoluene[3-]	99-08-1	WATER	Deer mouse (water)	56000	560000	µg/L		WATER_DM(w)_99-08-1
NONRAD	High Explosive	Nitrotoluene[3-]	99-08-1	WATER	Gray fox (water)	120000	1200000	µg/L		WATER_RF(w)_99-08-1
NONRAD	High Explosive	Nitrotoluene[3-]	99-08-1	WATER	Montane shrew (water)	47000	470000	µg/L	MINIMUM	WATER_MS(w)_99-08-1
NONRAD	High Explosive	Nitrotoluene[3-]	99-08-1	WATER	Mountain cottontail (water)	110000	1100000	µg/L		WATER_DC(w)_99-08-1
NONRAD	High Explosive	Nitrotoluene[3-]	99-08-1	WATER	Occult little brown myotis bat (water)	67000	670000	µg/L		WATER_BA(w)_99-08-1
NONRAD	High Explosive	Nitrotoluene[4-]	99-99-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	46	460	mg/kg	MINIMUM	SEDIMENT_BA(i)_99-99-0
NONRAD	High Explosive	Nitrotoluene[4-]	99-99-0	SOIL	Deer mouse (Mammalian omnivore)	21	210	mg/kg	MINIMUM	SOIL_DM(ip)_99-99-0
NONRAD	High Explosive	Nitrotoluene[4-]	99-99-0	SOIL	Gray fox (Mammalian top carnivore)	13000	130000	mg/kg		SOIL_RF(f)_99-99-0
NONRAD	High Explosive	Nitrotoluene[4-]	99-99-0	SOIL	Montane shrew (Mammalian insectivore)	41	410	mg/kg		SOIL_MS(i)_99-99-0
NONRAD	High Explosive	Nitrotoluene[4-]	99-99-0	SOIL	Mountain cottontail (Mammalian herbivore)	36	360	mg/kg		SOIL_DC(p)_99-99-0
NONRAD	High Explosive	Nitrotoluene[4-]	99-99-0	WATER	Deer mouse (water)	100000	1000000	µg/L		WATER_DM(w)_99-99-0
NONRAD	High Explosive	Nitrotoluene[4-]	99-99-0	WATER	Gray fox (water)	220000	2200000	µg/L		WATER_RF(w)_99-99-0
NONRAD	High Explosive	Nitrotoluene[4-]	99-99-0	WATER	Montane shrew (water)	87000	870000	µg/L	MINIMUM	WATER_MS(w)_99-99-0
NONRAD	High Explosive	Nitrotoluene[4-]	99-99-0	WATER	Mountain cottontail (water)	200000	2000000	µg/L		WATER_DC(w)_99-99-0
NONRAD	High Explosive	Nitrotoluene[4-]	99-99-0	WATER	Occult little brown myotis bat (water)	120000	1200000	µg/L		WATER_BA(w)_99-99-0
NONRAD	High Explosive	PETN	78-11-5	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1300	13000	mg/kg	MINIMUM	SEDIMENT_BA(i)_78-11-5

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	High Explosive	PETN	78-11-5	SOIL	Deer mouse (Mammalian omnivore)	100	1000	mg/kg	MINIMUM	SOIL_DM(ip)_78-11-5
NONRAD	High Explosive	PETN	78-11-5	SOIL	Gray fox (Mammalian top carnivore)	47000	470000	mg/kg		SOIL_RF(f)_78-11-5
NONRAD	High Explosive	PETN	78-11-5	SOIL	Montane shrew (Mammalian insectivore)	1000	10000	mg/kg		SOIL_MS(i)_78-11-5
NONRAD	High Explosive	PETN	78-11-5	SOIL	Mountain cottontail (Mammalian herbivore)	120	1200	mg/kg		SOIL_DC(p)_78-11-5
NONRAD	High Explosive	PETN	78-11-5	WATER	Deer mouse (water)	360000	3600000	µg/L		WATER_DM(w)_78-11-5
NONRAD	High Explosive	PETN	78-11-5	WATER	Gray fox (water)	810000	8100000	µg/L		WATER_RF(w)_78-11-5
NONRAD	High Explosive	PETN	78-11-5	WATER	Montane shrew (water)	310000	3100000	µg/L	MINIMUM	WATER_MS(w)_78-11-5
NONRAD	High Explosive	PETN	78-11-5	WATER	Mountain cottontail (water)	720000	7200000	µg/L		WATER_DC(w)_78-11-5
NONRAD	High Explosive	PETN	78-11-5	WATER	Occult little brown myotis bat (water)	440000	4400000	µg/L		WATER_BA(w)_78-11-5
NONRAD	High Explosive	RDX	121-82-4	SEDIMENT	Aquatic community organisms - sediment	260	350	mg/kg		SEDIMENT_AQ(s)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	18	60	mg/kg		SEDIMENT_BA(i)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	3.2	6.2	mg/kg	MINIMUM	SEDIMENT_VGS(i)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SOIL	American kestrel (Avian top carnivore)	780	1400	mg/kg		SOIL_AK(f)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SOIL	American kestrel (insectivore / carnivore)	11	22	mg/kg		SOIL_AK(fi)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SOIL	American robin (Avian herbivore)	2.3	4.3	mg/kg	MINIMUM	SOIL_AR(p)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SOIL	American robin (Avian insectivore)	2.4	4.5	mg/kg		SOIL_AR(i)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SOIL	American robin (Avian omnivore)	2.3	4.4	mg/kg	MINIMUM	SOIL_AR(ip)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SOIL	Deer mouse (Mammalian omnivore)	16	51	mg/kg		SOIL_DM(ip)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SOIL	Earthworm (Soil-dwelling invertebrate)	8.4	15	mg/kg		SOIL_EW_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SOIL	Gray fox (Mammalian top carnivore)	7000	22000	mg/kg		SOIL_RF(f)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SOIL	Montane shrew (Mammalian insectivore)	16	53	mg/kg		SOIL_MS(i)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	SOIL	Mountain cottontail (Mammalian herbivore)	38	120	mg/kg		SOIL_DC(p)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	WATER	Deer mouse (water)	52000	520000	µg/L		WATER_DM(w)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	WATER	Gray fox (water)	110000	1100000	µg/L		WATER_RF(w)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	WATER	Montane shrew (water)	44000	440000	µg/L	MINIMUM	WATER_MS(w)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	WATER	Mountain cottontail (water)	100000	1000000	µg/L		WATER_DC(w)_121-82-4
NONRAD	High Explosive	RDX	121-82-4	WATER	Occult little brown myotis bat (water)	62000	620000	µg/L		WATER_BA(w)_121-82-4
NONRAD	High Explosive	Tetryl	479-45-8	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	91	430	mg/kg	MINIMUM	SEDIMENT_BA(i)_479-45-8
NONRAD	High Explosive	Tetryl	479-45-8	SOIL	Deer mouse (Mammalian omnivore)	1.5	7.2	mg/kg	MINIMUM	SOIL_DM(ip)_479-45-8
NONRAD	High Explosive	Tetryl	479-45-8	SOIL	Gray fox (Mammalian top carnivore)	960	4600	mg/kg		SOIL_RF(f)_479-45-8
NONRAD	High Explosive	Tetryl	479-45-8	SOIL	Montane shrew (Mammalian insectivore)	60	280	mg/kg		SOIL_MS(i)_479-45-8
NONRAD	High Explosive	Tetryl	479-45-8	SOIL	Mountain cottontail (Mammalian herbivore)	1.8	8.9	mg/kg		SOIL_DC(p)_479-45-8
NONRAD	High Explosive	Tetryl	479-45-8	WATER	Deer mouse (water)	6800	32000	µg/L		WATER_DM(w)_479-45-8
NONRAD	High Explosive	Tetryl	479-45-8	WATER	Gray fox (water)	15000	72000	µg/L		WATER_RF(w)_479-45-8
NONRAD	High Explosive	Tetryl	479-45-8	WATER	Montane shrew (water)	5800	27000	µg/L	MINIMUM	WATER_MS(w)_479-45-8
NONRAD	High Explosive	Tetryl	479-45-8	WATER	Mountain cottontail (water)	13000	63000	µg/L		WATER_DC(w)_479-45-8
NONRAD	High Explosive	Tetryl	479-45-8	WATER	Occult little brown myotis bat (water)	8100	38000	µg/L		WATER_BA(w)_479-45-8
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	SEDIMENT	Aquatic community organisms - sediment	1.1	1.5	mg/kg	MINIMUM	SEDIMENT_AQ(s)_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1100	11000	mg/kg		SEDIMENT_BA(i)_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	SOIL	Deer mouse (Mammalian omnivore)	110	1100	mg/kg		SOIL_DM(ip)_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	SOIL	Earthworm (Soil-dwelling invertebrate)	10	28	mg/kg	MINIMUM	SOIL_EW_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	SOIL	Gray fox (Mammalian top carnivore)	10000	100000	mg/kg		SOIL_RF(f)_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	SOIL	Montane shrew (Mammalian insectivore)	720	7200	mg/kg		SOIL_MS(i)_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	SOIL	Mountain cottontail (Mammalian herbivore)	150	1500	mg/kg		SOIL_DC(p)_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	WATER	Deer mouse (water)	70000	700000	µg/L		WATER_DM(w)_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	WATER	Gray fox (water)	150000	1500000	µg/L		WATER_RF(w)_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	WATER	Montane shrew (water)	60000	600000	µg/L	MINIMUM	WATER_MS(w)_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	WATER	Mountain cottontail (water)	130000	1300000	µg/L		WATER_DC(w)_99-35-4
NONRAD	High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	WATER	Occult little brown myotis bat (water)	84000	840000	µg/L		WATER_BA(w)_99-35-4
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SEDIMENT	Aquatic community organisms - sediment	25	32	mg/kg	MINIMUM	SEDIMENT_AQ(s)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	3300	15000	mg/kg		SEDIMENT_BA(i)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	610	1100	mg/kg		SEDIMENT_VGS(i)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	American kestrel (Avian top carnivore)	3100	5700	mg/kg		SOIL_AK(f)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	American kestrel (insectivore / carnivore)	1300	2400	mg/kg		SOIL_AK(fi)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	American robin (Avian herbivore)	7.5	13	mg/kg	MINIMUM	SOIL_AR(p)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	American robin (Avian insectivore)	120	220	mg/kg		SOIL_AR(i)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	American robin (Avian omnivore)	14	26	mg/kg		SOIL_AR(ip)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	Deer mouse (Mammalian omnivore)	95	440	mg/kg		SOIL_DM(ip)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	Earthworm (Soil-dwelling invertebrate)	32	58	mg/kg		SOIL_EW_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	Generic plant (Terrestrial autotroph - producer)	62	120	mg/kg		SOIL_GP_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	Gray fox (Mammalian top carnivore)	26000	120000	mg/kg		SOIL_RF(f)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	Montane shrew (Mammalian insectivore)	1900	9100	mg/kg		SOIL_MS(i)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	Mountain cottontail (Mammalian herbivore)	110	540	mg/kg		SOIL_DC(p)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	WATER	American kestrel (water)	81000	140000	µg/L		WATER_AK(w)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	WATER	American robin (water)	69000	120000	µg/L		WATER_AR(w)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	WATER	Deer mouse (water)	180000	840000	µg/L		WATER_DM(w)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	WATER	Gray fox (water)	400000	1800000	µg/L		WATER_RF(w)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	WATER	Montane shrew (water)	150000	710000	µg/L		WATER_MS(w)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	WATER	Mountain cottontail (water)	350000	1600000	µg/L		WATER_DC(w)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	WATER	Occult little brown myotis bat (water)	210000	1000000	µg/L		WATER_BA(w)_118-96-7
NONRAD	High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	WATER	Violet-green Swallow (water)	40000	73000	µg/L	MINIMUM	WATER_VGS(w)_118-96-7
NONRAD	Inorganic Compound	Aluminum	AL	SEDIMENT	Aquatic community organisms - sediment	25000	58000	mg/kg	MINIMUM	SEDIMENT_AQ(s)_AL
NONRAD	Inorganic Compound	Aluminum	AL	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)			mg/kg		SEDIMENT_BA(i)_AL

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Inorganic Compound	Aluminum	AL	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)			mg/kg		SEDIMENT_VGS(i)_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	American kestrel (Avian top carnivore)					SOIL_AK(f)_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	American kestrel (insectivore / carnivore)					SOIL_AK(if)_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	American robin (Avian herbivore)					SOIL_AR(p)_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	American robin (Avian insectivore)					SOIL_AR(i)_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	American robin (Avian omnivore)					SOIL_AR(ip)_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	Deer mouse (Mammalian omnivore)					SOIL_DM(ip)_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	Earthworm (Soil-dwelling invertebrate)					SOIL_EW_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	Generic plant (Terrestrial autotroph - producer)					SOIL_GP_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	Gray fox (Mammalian top carnivore)					SOIL_RF(f)_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	Montane shrew (Mammalian insectivore)					SOIL_MS(i)_AL
NONRAD	Inorganic Compound	Aluminum	AL	SOIL	Mountain cottontail (Mammalian herbivore)					SOIL_DC(p)_AL
NONRAD	Inorganic Compound	Aluminum	AL	WATER	American kestrel (water)	910000	9100000	µg/L		WATER_AK(w)_AL
NONRAD	Inorganic Compound	Aluminum	AL	WATER	American robin (water)	780000	7800000	µg/L		WATER_AR(w)_AL
NONRAD	Inorganic Compound	Aluminum	AL	WATER	Aquatic community organisms - water	530	1300	µg/L	MINIMUM	WATER_AQ(w)_AL
NONRAD	Inorganic Compound	Aluminum	AL	WATER	Deer mouse (water)	10000	100000	µg/L		WATER_DM(w)_AL
NONRAD	Inorganic Compound	Aluminum	AL	WATER	Gray fox (water)	22000	220000	µg/L		WATER_RF(w)_AL
NONRAD	Inorganic Compound	Aluminum	AL	WATER	Montane shrew (water)	8600	86000	µg/L		WATER_MS(w)_AL
NONRAD	Inorganic Compound	Aluminum	AL	WATER	Mountain cottontail (water)	19000	190000	µg/L		WATER_DC(w)_AL
NONRAD	Inorganic Compound	Aluminum	AL	WATER	Occult little brown myotis bat (water)	12000	120000	µg/L		WATER_BA(w)_AL
NONRAD	Inorganic Compound	Aluminum	AL	WATER	Violet-green Swallow (water)	450000	4500000	µg/L		WATER_VGS(w)_AL
NONRAD	Inorganic Compound	Antimony	SB	SEDIMENT	Aquatic community organisms - sediment			mg/kg		SEDIMENT_AQ(s)_SB
NONRAD	Inorganic Compound	Antimony	SB	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	45	450	mg/kg	MINIMUM	SEDIMENT_BA(i)_SB
NONRAD	Inorganic Compound	Antimony	SB	SOIL	Deer mouse (Mammalian omnivore)	2.3	23	mg/kg	MINIMUM	SOIL_DM(ip)_SB
NONRAD	Inorganic Compound	Antimony	SB	SOIL	Earthworm (Soil-dwelling invertebrate)	78	780	mg/kg		SOIL_EW_SB
NONRAD	Inorganic Compound	Antimony	SB	SOIL	Generic plant (Terrestrial autotroph - producer)	11	58	mg/kg		SOIL_GP_SB
NONRAD	Inorganic Compound	Antimony	SB	SOIL	Gray fox (Mammalian top carnivore)	46	460	mg/kg		SOIL_RF(f)_SB
NONRAD	Inorganic Compound	Antimony	SB	SOIL	Montane shrew (Mammalian insectivore)	7.9	79	mg/kg		SOIL_MS(i)_SB
NONRAD	Inorganic Compound	Antimony	SB	SOIL	Mountain cottontail (Mammalian herbivore)	2.7	27	mg/kg		SOIL_DC(p)_SB
NONRAD	Inorganic Compound	Antimony	SB	WATER	Aquatic community organisms - water	30	88	µg/L	MINIMUM	WATER_AQ(w)_SB
NONRAD	Inorganic Compound	Antimony	SB	WATER	Deer mouse (water)	810	2700	µg/L		WATER_DM(w)_SB
NONRAD	Inorganic Compound	Antimony	SB	WATER	Gray fox (water)	1700	6100	µg/L		WATER_RF(w)_SB
NONRAD	Inorganic Compound	Antimony	SB	WATER	Montane shrew (water)	690	2300	µg/L		WATER_MS(w)_SB
NONRAD	Inorganic Compound	Antimony	SB	WATER	Mountain cottontail (water)	1500	5400	µg/L		WATER_DC(w)_SB
NONRAD	Inorganic Compound	Antimony	SB	WATER	Occult little brown myotis bat (water)	960	3300	µg/L		WATER_BA(w)_SB
NONRAD	Inorganic Compound	Arsenic	AS	SEDIMENT	Aquatic community organisms - sediment	9.7	33	mg/kg	MINIMUM	SEDIMENT_AQ(s)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	24	39	mg/kg		SEDIMENT_BA(i)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	34	340	mg/kg		SEDIMENT_VGS(i)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	American kestrel (Avian top carnivore)	740	7400	mg/kg		SOIL_AK(f)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	American kestrel (insectivore / carnivore)	100	1000	mg/kg		SOIL_AK(if)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	American robin (Avian herbivore)	34	340	mg/kg		SOIL_AR(p)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	American robin (Avian insectivore)	15	150	mg/kg		SOIL_AR(i)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	American robin (Avian omnivore)	21	210	mg/kg		SOIL_AR(ip)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	Deer mouse (Mammalian omnivore)	32	51	mg/kg		SOIL_DM(ip)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	Earthworm (Soil-dwelling invertebrate)	6.8	68	mg/kg	MINIMUM	SOIL_EW_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	Generic plant (Terrestrial autotroph - producer)	18	91	mg/kg		SOIL_GP_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	Gray fox (Mammalian top carnivore)	820	1300	mg/kg		SOIL_RF(f)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	Montane shrew (Mammalian insectivore)	19	31	mg/kg		SOIL_MS(i)_AS
NONRAD	Inorganic Compound	Arsenic	AS	SOIL	Mountain cottontail (Mammalian herbivore)	110	180	mg/kg		SOIL_DC(p)_AS
NONRAD	Inorganic Compound	Arsenic	AS	WATER	American kestrel (water)	42000	100000	µg/L		WATER_AK(w)_AS
NONRAD	Inorganic Compound	Arsenic	AS	WATER	American robin (water)	36000	91000	µg/L		WATER_AR(w)_AS
NONRAD	Inorganic Compound	Arsenic	AS	WATER	Aquatic community organisms - water	150	340	µg/L	MINIMUM	WATER_AQ(w)_AS
NONRAD	Inorganic Compound	Arsenic	AS	WATER	Deer mouse (water)	660	6600	µg/L		WATER_DM(w)_AS
NONRAD	Inorganic Compound	Arsenic	AS	WATER	Gray fox (water)	1400	14000	µg/L		WATER_RF(w)_AS
NONRAD	Inorganic Compound	Arsenic	AS	WATER	Montane shrew (water)	560	5600	µg/L		WATER_MS(w)_AS
NONRAD	Inorganic Compound	Arsenic	AS	WATER	Mountain cottontail (water)	1200	12000	µg/L		WATER_DC(w)_AS
NONRAD	Inorganic Compound	Arsenic	AS	WATER	Occult little brown myotis bat (water)	790	7900	µg/L		WATER_BA(w)_AS
NONRAD	Inorganic Compound	Arsenic	AS	WATER	Violet-green Swallow (water)	21000	52000	µg/L		WATER_VGS(w)_AS
NONRAD	Inorganic Compound	Barium	BA	SEDIMENT	Aquatic community organisms - sediment	150	300	mg/kg	MINIMUM	SEDIMENT_AQ(s)_BA
NONRAD	Inorganic Compound	Barium	BA	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	3100	31000	mg/kg		SEDIMENT_BA(i)_BA
NONRAD	Inorganic Compound	Barium	BA	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	2900	5200	mg/kg		SEDIMENT_VGS(i)_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	American kestrel (Avian top carnivore)	24000	44000	mg/kg		SOIL_AK(f)_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	American kestrel (insectivore / carnivore)	7500	13000	mg/kg		SOIL_AK(if)_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	American robin (Avian herbivore)	720	1200	mg/kg		SOIL_AR(p)_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	American robin (Avian insectivore)	820	1400	mg/kg		SOIL_AR(i)_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	American robin (Avian omnivore)	770	1300	mg/kg		SOIL_AR(ip)_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	Deer mouse (Mammalian omnivore)	1800	8700	mg/kg		SOIL_DM(ip)_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	Earthworm (Soil-dwelling invertebrate)	330	3200	mg/kg		SOIL_EW_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	Generic plant (Terrestrial autotroph - producer)	110	260	mg/kg	MINIMUM	SOIL_GP_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	Gray fox (Mammalian top carnivore)	41000	190000	mg/kg		SOIL_RF(f)_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	Montane shrew (Mammalian insectivore)	2100	10000	mg/kg		SOIL_MS(i)_BA
NONRAD	Inorganic Compound	Barium	BA	SOIL	Mountain cottontail (Mammalian herbivore)	2900	14000	mg/kg		SOIL_DC(p)_BA
NONRAD	Inorganic Compound	Barium	BA	WATER	American kestrel (water)	760000	1500000	µg/L		WATER_AK(w)_BA

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Inorganic Compound	Barium	BA	WATER	American robin (water)	650000	1300000	µg/L		WATER_AR(w)_BA
NONRAD	Inorganic Compound	Barium	BA	WATER	Aquatic community organisms - water	3.9	39	µg/L	MINIMUM	WATER_AQ(w)_BA
NONRAD	Inorganic Compound	Barium	BA	WATER	Deer mouse (water)	7200	10000	µg/L		WATER_DM(w)_BA
NONRAD	Inorganic Compound	Barium	BA	WATER	Gray fox (water)	16000	23000	µg/L		WATER_RF(w)_BA
NONRAD	Inorganic Compound	Barium	BA	WATER	Montane shrew (water)	6100	8800	µg/L		WATER_MS(w)_BA
NONRAD	Inorganic Compound	Barium	BA	WATER	Mountain cottontail (water)	14000	20000	µg/L		WATER_DC(w)_BA
NONRAD	Inorganic Compound	Barium	BA	WATER	Occult little brown myotis bat (water)	8600	12000	µg/L		WATER_BA(w)_BA
NONRAD	Inorganic Compound	Barium	BA	WATER	Violet-green Swallow (water)	380000	760000	µg/L		WATER_VGS(w)_BA
NONRAD	Inorganic Compound	Beryllium	BE	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	66	660	mg/kg	MINIMUM	SEDIMENT_BA(I)_BE
NONRAD	Inorganic Compound	Beryllium	BE	SOIL	Deer mouse (Mammalian omnivore)	56	560	mg/kg		SOIL_DM(ip)_BE
NONRAD	Inorganic Compound	Beryllium	BE	SOIL	Earthworm (Soil-dwelling invertebrate)	40	400	mg/kg		SOIL_EW_BE
NONRAD	Inorganic Compound	Beryllium	BE	SOIL	Generic plant (Terrestrial autotroph - producer)	2.5	25	mg/kg	MINIMUM	SOIL_GP_BE
NONRAD	Inorganic Compound	Beryllium	BE	SOIL	Gray fox (Mammalian top carnivore)	420	4200	mg/kg		SOIL_RF(f)_BE
NONRAD	Inorganic Compound	Beryllium	BE	SOIL	Montane shrew (Mammalian insectivore)	35	350	mg/kg		SOIL_MS(i)_BE
NONRAD	Inorganic Compound	Beryllium	BE	SOIL	Mountain cottontail (Mammalian herbivore)	89	890	mg/kg		SOIL_DC(p)_BE
NONRAD	Inorganic Compound	Beryllium	BE	WATER	Aquatic community organisms - water	0.66	6.6	ug/L	MINIMUM	WATER_AQ(w)_BE
NONRAD	Inorganic Compound	Beryllium	BE	WATER	Deer mouse (water)	3400	34000	µg/L		WATER_DM(w)_BE
NONRAD	Inorganic Compound	Beryllium	BE	WATER	Gray fox (water)	7600	76000	µg/L		WATER_RF(w)_BE
NONRAD	Inorganic Compound	Beryllium	BE	WATER	Montane shrew (water)	2900	29000	µg/L		WATER_MS(w)_BE
NONRAD	Inorganic Compound	Beryllium	BE	WATER	Mountain cottontail (water)	6800	68000	µg/L		WATER_DC(w)_BE
NONRAD	Inorganic Compound	Beryllium	BE	WATER	Occult little brown myotis bat (water)	4100	41000	µg/L		WATER_BA(w)_BE
NONRAD	Inorganic Compound	Boron	B	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	150	1500	mg/kg		SEDIMENT_BA(I)_B
NONRAD	Inorganic Compound	Boron	B	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	10	52	mg/kg	MINIMUM	SEDIMENT_VGS(i)_B
NONRAD	Inorganic Compound	Boron	B	SOIL	American kestrel (Avian top carnivore)	960	4700	mg/kg		SOIL_AK(f)_B
NONRAD	Inorganic Compound	Boron	B	SOIL	American kestrel (insectivore / carnivore)	37	180	mg/kg		SOIL_AK(fi)_B
NONRAD	Inorganic Compound	Boron	B	SOIL	American robin (Avian herbivore)	2	10	mg/kg	MINIMUM	SOIL_AR(p)_B
NONRAD	Inorganic Compound	Boron	B	SOIL	American robin (Avian insectivore)	7.1	35	mg/kg		SOIL_AR(I)_B
NONRAD	Inorganic Compound	Boron	B	SOIL	American robin (Avian omnivore)	3.1	15	mg/kg		SOIL_AR(ip)_B
NONRAD	Inorganic Compound	Boron	B	SOIL	Deer mouse (Mammalian omnivore)	55	550	mg/kg		SOIL_DM(ip)_B
NONRAD	Inorganic Compound	Boron	B	SOIL	Generic plant (Terrestrial autotroph - producer)	36	86	mg/kg		SOIL_GP_B
NONRAD	Inorganic Compound	Boron	B	SOIL	Gray fox (Mammalian top carnivore)	21000	210000	mg/kg		SOIL_RF(f)_B
NONRAD	Inorganic Compound	Boron	B	SOIL	Montane shrew (Mammalian insectivore)	130	1300	mg/kg		SOIL_MS(i)_B
NONRAD	Inorganic Compound	Boron	B	SOIL	Mountain cottontail (Mammalian herbivore)	84	840	mg/kg		SOIL_DC(p)_B
NONRAD	Inorganic Compound	Boron	B	WATER	American kestrel (water)	440000	1500000	µg/L		WATER_AK(w)_B
NONRAD	Inorganic Compound	Boron	B	WATER	American robin (water)	380000	1300000	µg/L		WATER_AR(w)_B
NONRAD	Inorganic Compound	Boron	B	WATER	Aquatic community organisms - water	1.6	16	µg/L	MINIMUM	WATER_AQ(w)_B
NONRAD	Inorganic Compound	Boron	B	WATER	Deer mouse (water)	140000	1400000	µg/L		WATER_DM(w)_B
NONRAD	Inorganic Compound	Boron	B	WATER	Gray fox (water)	320000	3200000	µg/L		WATER_RF(w)_B
NONRAD	Inorganic Compound	Boron	B	WATER	Montane shrew (water)	120000	1200000	µg/L		WATER_MS(w)_B
NONRAD	Inorganic Compound	Boron	B	WATER	Mountain cottontail (water)	280000	2800000	µg/L		WATER_DC(w)_B
NONRAD	Inorganic Compound	Boron	B	WATER	Occult little brown myotis bat (water)	170000	1700000	µg/L		WATER_BA(w)_B
NONRAD	Inorganic Compound	Boron	B	WATER	Violet-green Swallow (water)	220000	770000	µg/L		WATER_VGS(w)_B
NONRAD	Inorganic Compound	Cadmium	CD	SEDIMENT	Aquatic community organisms - sediment	0.99	4.9	mg/kg		SEDIMENT_AQ(s)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.3	3	mg/kg	MINIMUM	SEDIMENT_BA(I)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.37	3.7	mg/kg		SEDIMENT_VGS(I)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	American kestrel (Avian top carnivore)	430	2300	mg/kg		SOIL_AK(f)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	American kestrel (insectivore / carnivore)	1.3	7.7	mg/kg		SOIL_AK(fi)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	American robin (Avian herbivore)	4.3	23	mg/kg		SOIL_AR(p)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	American robin (Avian insectivore)	0.29	1.6	mg/kg		SOIL_AR(i)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	American robin (Avian omnivore)	0.54	3	mg/kg		SOIL_AR(ip)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	Deer mouse (Mammalian omnivore)	0.5	6.8	mg/kg		SOIL_DM(ip)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	Earthworm (Soil-dwelling invertebrate)	140	760	mg/kg		SOIL_EW_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	Generic plant (Terrestrial autotroph - producer)	32	160	mg/kg		SOIL_GP_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	Gray fox (Mammalian top carnivore)	550	7400	mg/kg		SOIL_RF(f)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	Montane shrew (Mammalian insectivore)	0.27	3.6	mg/kg	MINIMUM	SOIL_MS(i)_CD
NONRAD	Inorganic Compound	Cadmium	CD	SOIL	Mountain cottontail (Mammalian herbivore)	10	140	mg/kg		SOIL_DC(p)_CD
NONRAD	Inorganic Compound	Cadmium	CD	WATER	American kestrel (water)	12000	160000	µg/L		WATER_AK(w)_CD
NONRAD	Inorganic Compound	Cadmium	CD	WATER	American robin (water)	10000	140000	µg/L		WATER_AR(w)_CD
NONRAD	Inorganic Compound	Cadmium	CD	WATER	Aquatic community organisms - water	0.28	0.91	µg/L	MINIMUM	WATER_AQ(w)_CD
NONRAD	Inorganic Compound	Cadmium	CD	WATER	Deer mouse (water)	5600	20000	µg/L		WATER_DM(w)_CD
NONRAD	Inorganic Compound	Cadmium	CD	WATER	Gray fox (water)	12000	45000	µg/L		WATER_RF(w)_CD
NONRAD	Inorganic Compound	Cadmium	CD	WATER	Montane shrew (water)	4800	17000	µg/L		WATER_MS(w)_CD
NONRAD	Inorganic Compound	Cadmium	CD	WATER	Mountain cottontail (water)	11000	40000	µg/L		WATER_DC(w)_CD
NONRAD	Inorganic Compound	Cadmium	CD	WATER	Occult little brown myotis bat (water)	6700	24000	µg/L		WATER_BA(w)_CD
NONRAD	Inorganic Compound	Cadmium	CD	WATER	Violet-green Swallow (water)	5900	82000	µg/L		WATER_VGS(w)_CD
NONRAD	Inorganic Compound	Chloride	CL(-1)	WATER	Aquatic community organisms - water	230	860	µg/L	MINIMUM	WATER_AQ(w)_CL(-1)
NONRAD	Inorganic Compound	Chromium (total)	CR	SEDIMENT	Aquatic community organisms - sediment	43	110	mg/kg	MINIMUM	SEDIMENT_AQ(s)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	83	830	mg/kg		SEDIMENT_BA(I)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	60	600	mg/kg		SEDIMENT_VGS(I)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	SOIL	American kestrel (Avian top carnivore)	860	2700	mg/kg		SOIL_AK(f)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	SOIL	American kestrel (insectivore / carnivore)	170	560	mg/kg		SOIL_AK(fi)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	SOIL	American robin (Avian herbivore)	51	160	mg/kg		SOIL_AR(p)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	SOIL	American robin (Avian insectivore)	23	73	mg/kg	MINIMUM	SOIL_AR(i)_CR

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Inorganic Compound	Chromium (total)	CR	SOIL	American robin (Avian omnivore)	32	100	mg/kg		SOIL_AR(ip)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	SOIL	Deer mouse (Mammalian omnivore)	110	11000	mg/kg		SOIL_DM(ip)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	SOIL	Gray fox (Mammalian top carnivore)	1800	180000	mg/kg		SOIL_RF(f)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	SOIL	Montane shrew (Mammalian insectivore)	63	6300	mg/kg		SOIL_MS(i)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	SOIL	Mountain cottontail (Mammalian herbivore)	410	41000	mg/kg		SOIL_DC(p)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	WATER	American kestrel (water)	14000	140000	µg/L		WATER_AK(w)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	WATER	American robin (water)	12000	120000	µg/L		WATER_AR(w)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	WATER	Aquatic community organisms - water	11	16	µg/L	MINIMUM	WATER_AQ(w)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	WATER	Deer mouse (water)	190000	740000	µg/L		WATER_DM(w)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	WATER	Gray fox (water)	430000	1600000	µg/L		WATER_RF(w)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	WATER	Montane shrew (water)	160000	630000	µg/L		WATER_MS(w)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	WATER	Mountain cottontail (water)	380000	1400000	µg/L		WATER_DC(w)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	WATER	Occult little brown myotis bat (water)	230000	890000	µg/L		WATER_BA(w)_CR
NONRAD	Inorganic Compound	Chromium (total)	CR	WATER	Violet-green Swallow (water)	7100	71000	µg/L		WATER_VGS(w)_CR
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	860	8600	mg/kg		SEDIMENT_BA(i)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	660	6600	mg/kg	MINIMUM	SEDIMENT_VGS(i)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	American kestrel (Avian top carnivore)	3600	36000	mg/kg		SOIL_AK(f)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	American kestrel (insectivore / carnivore)	1400	14000	mg/kg		SOIL_AK(fi)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	American robin (Avian herbivore)	210	2100	mg/kg		SOIL_AR(p)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	American robin (Avian insectivore)	140	1400	mg/kg		SOIL_AR(i)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	American robin (Avian omnivore)	160	1600	mg/kg		SOIL_AR(ip)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	Deer mouse (Mammalian omnivore)	850	5500	mg/kg		SOIL_DM(ip)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	Earthworm (Soil-dwelling invertebrate)	0.34	3.4	mg/kg	MINIMUM	SOIL_EW_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	Generic plant (Terrestrial autotroph - producer)	0.35	4	mg/kg		SOIL_GP_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	Gray fox (Mammalian top carnivore)	7200	46000	mg/kg		SOIL_RF(f)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	Montane shrew (Mammalian insectivore)	510	3300	mg/kg		SOIL_MS(i)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	SOIL	Mountain cottontail (Mammalian herbivore)	1600	10000	mg/kg		SOIL_DC(p)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	WATER	American kestrel (water)	14000	140000	µg/L		WATER_AK(w)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	WATER	American robin (water)	12000	120000	µg/L		WATER_AR(w)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	WATER	Aquatic community organisms - water	11	16	µg/L	MINIMUM	WATER_AQ(w)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	WATER	Deer mouse (water)	190000	740000	µg/L		WATER_DM(w)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	WATER	Gray fox (water)	430000	1600000	µg/L		WATER_RF(w)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	WATER	Montane shrew (water)	160000	630000	µg/L		WATER_MS(w)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	WATER	Mountain cottontail (water)	380000	1400000	µg/L		WATER_DC(w)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	WATER	Occult little brown myotis bat (water)	230000	890000	µg/L		WATER_BA(w)_CR(+6)
NONRAD	Inorganic Compound	Chromium(+6)	CR(+6)	WATER	Violet-green Swallow (water)	7100	71000	µg/L		WATER_VGS(w)_CR(+6)
NONRAD	Inorganic Compound	Cobalt	CO	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	330	3300	mg/kg		SEDIMENT_BA(i)_CO
NONRAD	Inorganic Compound	Cobalt	CO	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	220	2200	mg/kg	MINIMUM	SEDIMENT_VGS(i)_CO
NONRAD	Inorganic Compound	Cobalt	CO	SOIL	American kestrel (Avian top carnivore)	2300	5200	mg/kg		SOIL_AK(f)_CO
NONRAD	Inorganic Compound	Cobalt	CO	SOIL	American kestrel (insectivore / carnivore)	620	1400	mg/kg		SOIL_AK(fi)_CO
NONRAD	Inorganic Compound	Cobalt	CO	SOIL	American robin (Avian herbivore)	130	300	mg/kg		SOIL_AR(p)_CO
NONRAD	Inorganic Compound	Cobalt	CO	SOIL	American robin (Avian insectivore)	76	170	mg/kg		SOIL_AR(i)_CO
NONRAD	Inorganic Compound	Cobalt	CO	SOIL	American robin (Avian omnivore)	97	210	mg/kg		SOIL_AR(ip)_CO
NONRAD	Inorganic Compound	Cobalt	CO	SOIL	Deer mouse (Mammalian omnivore)	400	1000	mg/kg		SOIL_DM(ip)_CO
NONRAD	Inorganic Compound	Cobalt	CO	SOIL	Generic plant (Terrestrial autotroph - producer)	13	130	mg/kg	MINIMUM	SOIL_GP_CO
NONRAD	Inorganic Compound	Cobalt	CO	SOIL	Gray fox (Mammalian top carnivore)	5400	14000	mg/kg		SOIL_RF(f)_CO
NONRAD	Inorganic Compound	Cobalt	CO	SOIL	Montane shrew (Mammalian insectivore)	240	640	mg/kg		SOIL_MS(i)_CO
NONRAD	Inorganic Compound	Cobalt	CO	SOIL	Mountain cottontail (Mammalian herbivore)	1000	2800	mg/kg		SOIL_DC(p)_CO
NONRAD	Inorganic Compound	Cobalt	CO	WATER	American kestrel (water)	160	4100	µg/L		WATER_AK(w)_CO
NONRAD	Inorganic Compound	Cobalt	CO	WATER	American robin (water)	140	3500	µg/L		WATER_AR(w)_CO
NONRAD	Inorganic Compound	Cobalt	CO	WATER	Aquatic community organisms - water	3	30	µg/L	MINIMUM	WATER_AQ(w)_CO
NONRAD	Inorganic Compound	Cobalt	CO	WATER	Deer mouse (water)	100	2600	µg/L		WATER_DM(w)_CO
NONRAD	Inorganic Compound	Cobalt	CO	WATER	Gray fox (water)	230	5800	µg/L		WATER_RF(w)_CO
NONRAD	Inorganic Compound	Cobalt	CO	WATER	Montane shrew (water)	89	2200	µg/L		WATER_MS(w)_CO
NONRAD	Inorganic Compound	Cobalt	CO	WATER	Mountain cottontail (water)	200	5100	µg/L		WATER_DC(w)_CO
NONRAD	Inorganic Compound	Cobalt	CO	WATER	Occult little brown myotis bat (water)	120	3100	µg/L		WATER_BA(w)_CO
NONRAD	Inorganic Compound	Cobalt	CO	WATER	Violet-green Swallow (water)	82	2000	µg/L		WATER_VGS(w)_CO
NONRAD	Inorganic Compound	Copper	CU	SEDIMENT	Aquatic community organisms - sediment	91	140	mg/kg		SEDIMENT_AQ(s)_CU
NONRAD	Inorganic Compound	Copper	CU	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	49	81	mg/kg		SEDIMENT_BA(i)_CU
NONRAD	Inorganic Compound	Copper	CU	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	23	69	mg/kg	MINIMUM	SEDIMENT_VGS(i)_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	American kestrel (Avian top carnivore)	1100	3500	mg/kg		SOIL_AK(f)_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	American kestrel (insectivore / carnivore)	80	240	mg/kg		SOIL_AK(fi)_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	American robin (Avian herbivore)	34	100	mg/kg		SOIL_AR(p)_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	American robin (Avian insectivore)	14	43	mg/kg	MINIMUM	SOIL_AR(i)_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	American robin (Avian omnivore)	20	60	mg/kg		SOIL_AR(ip)_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	Deer mouse (Mammalian omnivore)	63	100	mg/kg		SOIL_DM(ip)_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	Earthworm (Soil-dwelling invertebrate)	80	530	mg/kg		SOIL_EW_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	Generic plant (Terrestrial autotroph - producer)	70	490	mg/kg		SOIL_GP_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	Gray fox (Mammalian top carnivore)	4000	6700	mg/kg		SOIL_RF(f)_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	Montane shrew (Mammalian insectivore)	42	70	mg/kg		SOIL_MS(i)_CU
NONRAD	Inorganic Compound	Copper	CU	SOIL	Mountain cottontail (Mammalian herbivore)	260	430	mg/kg		SOIL_DC(p)_CU
NONRAD	Inorganic Compound	Copper	CU	WATER	American kestrel (water)	25000	260000	µg/L		WATER_AK(w)_CU
NONRAD	Inorganic Compound	Copper	CU	WATER	American robin (water)	21000	220000	µg/L		WATER_AR(w)_CU

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Inorganic Compound	Copper	CU	WATER	Aquatic community organisms - water	5	7	µg/L	MINIMUM	WATER_AQ(w)_CU
NONRAD	Inorganic Compound	Copper	CU	WATER	Deer mouse (water)	26000	39000	µg/L		WATER_DM(w)_CU
NONRAD	Inorganic Compound	Copper	CU	WATER	Gray fox (water)	59000	86000	µg/L		WATER_RF(w)_CU
NONRAD	Inorganic Compound	Copper	CU	WATER	Montane shrew (water)	22000	33000	µg/L		WATER_MS(w)_CU
NONRAD	Inorganic Compound	Copper	CU	WATER	Mountain cottontail (water)	52000	76000	µg/L		WATER_DC(w)_CU
NONRAD	Inorganic Compound	Copper	CU	WATER	Occult little brown myotis bat (water)	32000	46000	µg/L		WATER_BA(w)_CU
NONRAD	Inorganic Compound	Copper	CU	WATER	Violet-green Swallow (water)	12000	130000	µg/L		WATER_VGS(w)_CU
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SEDIMENT	Aquatic community organisms - sediment	0.1	1	mg/kg	MINIMUM	SEDIMENT_AQ(s)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	380	3800	mg/kg		SEDIMENT_BA(i)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.14	1.4	mg/kg		SEDIMENT_VGS(i)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SOIL	American kestrel (Avian top carnivore)	0.59	5.9	mg/kg		SOIL_AK(f)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SOIL	American kestrel (insectivore / carnivore)	0.36	3.6	mg/kg		SOIL_AK(fi)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SOIL	American robin (Avian herbivore)	0.1	1	mg/kg		SOIL_AR(p)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SOIL	American robin (Avian insectivore)	0.098	0.98	mg/kg	MINIMUM	SOIL_AR(i)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SOIL	American robin (Avian omnivore)	0.099	0.99	mg/kg		SOIL_AR(ip)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SOIL	Deer mouse (Mammalian omnivore)	330	3300	mg/kg		SOIL_DM(ip)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SOIL	Gray fox (Mammalian top carnivore)	3300	33000	mg/kg		SOIL_RF(f)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SOIL	Montane shrew (Mammalian insectivore)	330	3300	mg/kg		SOIL_MS(i)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	SOIL	Mountain cottontail (Mammalian herbivore)	790	7900	mg/kg		SOIL_DC(p)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	WATER	American kestrel (water)	330	3300	µg/L		WATER_AK(w)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	WATER	American robin (water)	280	2800	µg/L		WATER_AR(w)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	WATER	Aquatic community organisms - water	5.2	22	µg/L	MINIMUM	WATER_AQ(w)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	WATER	Deer mouse (water)	360000	3600000	µg/L		WATER_DM(w)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	WATER	Gray fox (water)	790000	7900000	µg/L		WATER_RF(w)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	WATER	Montane shrew (water)	300000	3000000	µg/L		WATER_MS(w)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	WATER	Mountain cottontail (water)	700000	7000000	µg/L		WATER_DC(w)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	WATER	Occult little brown myotis bat (water)	430000	4300000	µg/L		WATER_BA(w)_CN(-1)
NONRAD	Inorganic Compound	Cyanide (total)	CN(-1)	WATER	Violet-green Swallow (water)	160	1600	µg/L		WATER_VGS(w)_CN(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1100	2200	mg/kg		SEDIMENT_BA(i)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	350	3500	mg/kg	MINIMUM	SEDIMENT_VGS(i)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SOIL	American kestrel (Avian top carnivore)	2200	22000	mg/kg		SOIL_AK(f)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SOIL	American kestrel (insectivore / carnivore)	910	9100	mg/kg		SOIL_AK(fi)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SOIL	American robin (Avian herbivore)	170	1700	mg/kg		SOIL_AR(p)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SOIL	American robin (Avian insectivore)	120	1200	mg/kg	MINIMUM	SOIL_AR(i)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SOIL	American robin (Avian omnivore)	140	1400	mg/kg		SOIL_AR(ip)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SOIL	Deer mouse (Mammalian omnivore)	1100	2100	mg/kg		SOIL_DM(ip)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SOIL	Gray fox (Mammalian top carnivore)	13000	24000	mg/kg		SOIL_RF(f)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SOIL	Montane shrew (Mammalian insectivore)	870	1600	mg/kg		SOIL_MS(i)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	SOIL	Mountain cottontail (Mammalian herbivore)	2600	4800	mg/kg		SOIL_DC(p)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	WATER	American kestrel (water)	100000	1000000	µg/L		WATER_AK(w)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	WATER	American robin (water)	87000	870000	µg/L		WATER_AR(w)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	WATER	Aquatic community organisms - water	20	200	µg/L	MINIMUM	WATER_AQ(w)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	WATER	Deer mouse (water)	140000	250000	µg/L		WATER_DM(w)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	WATER	Gray fox (water)	300000	560000	µg/L		WATER_RF(w)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	WATER	Montane shrew (water)	110000	210000	µg/L		WATER_MS(w)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	WATER	Mountain cottontail (water)	270000	500000	µg/L		WATER_DC(w)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	WATER	Occult little brown myotis bat (water)	160000	300000	µg/L		WATER_BA(w)_F(-1)
NONRAD	Inorganic Compound	Fluoride	F(-1)	WATER	Violet-green Swallow (water)	50000	500000	µg/L		WATER_VGS(w)_F(-1)
NONRAD	Inorganic Compound	Iron	FE	SEDIMENT	Aquatic community organisms - sediment	20000	40000	mg/kg	MINIMUM	SEDIMENT_AQ(s)_FE
NONRAD	Inorganic Compound	Iron	FE	WATER	Aquatic community organisms - water	1000	10000	µg/L	MINIMUM	WATER_AQ(w)_FE
NONRAD	Inorganic Compound	Lead	PB	SEDIMENT	Aquatic community organisms - sediment	35	120	mg/kg		SEDIMENT_AQ(s)_PB
NONRAD	Inorganic Compound	Lead	PB	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	110	220	mg/kg		SEDIMENT_BA(i)_PB
NONRAD	Inorganic Compound	Lead	PB	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	26	52	mg/kg	MINIMUM	SEDIMENT_VGS(i)_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	American kestrel (Avian top carnivore)	540	1000	mg/kg		SOIL_AK(f)_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	American kestrel (insectivore / carnivore)	83	160	mg/kg		SOIL_AK(fi)_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	American robin (Avian herbivore)	18	36	mg/kg		SOIL_AR(p)_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	American robin (Avian insectivore)	11	23	mg/kg	MINIMUM	SOIL_AR(i)_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	American robin (Avian omnivore)	14	28	mg/kg		SOIL_AR(ip)_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	Deer mouse (Mammalian omnivore)	120	230	mg/kg		SOIL_DM(ip)_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	Earthworm (Soil-dwelling invertebrate)	1700	8400	mg/kg		SOIL_EW_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	Generic plant (Terrestrial autotroph - producer)	120	570	mg/kg		SOIL_GP_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	Gray fox (Mammalian top carnivore)	3700	7000	mg/kg		SOIL_RF(f)_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	Montane shrew (Mammalian insectivore)	93	170	mg/kg		SOIL_MS(i)_PB
NONRAD	Inorganic Compound	Lead	PB	SOIL	Mountain cottontail (Mammalian herbivore)	310	600	mg/kg		SOIL_DC(p)_PB
NONRAD	Inorganic Compound	Lead	PB	WATER	American kestrel (water)	130000	1300000	µg/L		WATER_AK(w)_PB
NONRAD	Inorganic Compound	Lead	PB	WATER	American robin (water)	110000	1100000	µg/L		WATER_AR(w)_PB
NONRAD	Inorganic Compound	Lead	PB	WATER	Aquatic community organisms - water	1	10	µg/L	MINIMUM	WATER_AQ(w)_PB
NONRAD	Inorganic Compound	Lead	PB	WATER	Deer mouse (water)	5100	19000	µg/L		WATER_DM(w)_PB
NONRAD	Inorganic Compound	Lead	PB	WATER	Gray fox (water)	11000	43000	µg/L		WATER_RF(w)_PB
NONRAD	Inorganic Compound	Lead	PB	WATER	Montane shrew (water)	4300	16000	µg/L		WATER_MS(w)_PB
NONRAD	Inorganic Compound	Lead	PB	WATER	Mountain cottontail (water)	10000	38000	µg/L		WATER_DC(w)_PB
NONRAD	Inorganic Compound	Lead	PB	WATER	Occult little brown myotis bat (water)	6100	23000	µg/L		WATER_BA(w)_PB
NONRAD	Inorganic Compound	Lead	PB	WATER	Violet-green Swallow (water)	64000	640000	µg/L		WATER_VGS(w)_PB

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Inorganic Compound	Lithium	LI	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	130	650	mg/kg	MINIMUM	SEDIMENT_BA(I)_LI
NONRAD	Inorganic Compound	Lithium	LI	SOIL	Deer mouse (Mammalian omnivore)	100	480	mg/kg		SOIL_DM(ip)_LI
NONRAD	Inorganic Compound	Lithium	LI	SOIL	Gray fox (Mammalian top carnivore)	870	4100	mg/kg		SOIL_RF(f)_LI
NONRAD	Inorganic Compound	Lithium	LI	SOIL	Montane shrew (Mammalian insectivore)	75	350	mg/kg	MINIMUM	SOIL_MS(I)_LI
NONRAD	Inorganic Compound	Lithium	LI	SOIL	Mountain cottontail (Mammalian herbivore)	150	750	mg/kg		SOIL_DC(p)_LI
NONRAD	Inorganic Compound	Manganese	MN	SEDIMENT	Aquatic community organisms - sediment	460	1100	mg/kg	MINIMUM	SEDIMENT_AQ(s)_MN
NONRAD	Inorganic Compound	Manganese	MN	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	4700	47000	mg/kg		SEDIMENT_BA(I)_MN
NONRAD	Inorganic Compound	Manganese	MN	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	10000	100000	mg/kg		SEDIMENT_VGS(i)_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	American kestrel (Avian top carnivore)	60000	120000	mg/kg		SOIL_AK(f)_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	American kestrel (Insectivore / carnivore)	24000	50000	mg/kg		SOIL_AK(fi)_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	American robin (Avian herbivore)	1300	2700	mg/kg		SOIL_AR(p)_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	American robin (Avian insectivore)	2200	4700	mg/kg		SOIL_AR(I)_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	American robin (Avian omnivore)	1600	3500	mg/kg		SOIL_AR(ip)_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	Deer mouse (Mammalian omnivore)	1400	5400	mg/kg		SOIL_DM(ip)_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	Earthworm (Soil-dwelling invertebrate)	450	4500	mg/kg		SOIL_EW_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	Generic plant (Terrestrial autotroph - producer)	220	1100	mg/kg	MINIMUM	SOIL_GP_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	Gray fox (Mammalian top carnivore)	40000	150000	mg/kg		SOIL_RF(f)_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	Montane shrew (Mammalian insectivore)	2800	10000	mg/kg		SOIL_MS(I)_MN
NONRAD	Inorganic Compound	Manganese	MN	SOIL	Mountain cottontail (Mammalian herbivore)	2000	7500	mg/kg		SOIL_DC(p)_MN
NONRAD	Inorganic Compound	Manganese	MN	WATER	American kestrel (water)	4800000	48000000	µg/L		WATER_AK(w)_MN
NONRAD	Inorganic Compound	Manganese	MN	WATER	American robin (water)	4100000	41000000	µg/L		WATER_AR(w)_MN
NONRAD	Inorganic Compound	Manganese	MN	WATER	Aquatic community organisms - water	1300	2300	µg/L	MINIMUM	WATER_AQ(w)_MN
NONRAD	Inorganic Compound	Manganese	MN	WATER	Deer mouse (water)	230000	830000	µg/L		WATER_DM(w)_MN
NONRAD	Inorganic Compound	Manganese	MN	WATER	Gray fox (water)	510000	1800000	µg/L		WATER_RF(w)_MN
NONRAD	Inorganic Compound	Manganese	MN	WATER	Montane shrew (water)	190000	700000	µg/L		WATER_MS(w)_MN
NONRAD	Inorganic Compound	Manganese	MN	WATER	Mountain cottontail (water)	450000	1600000	µg/L		WATER_DC(w)_MN
NONRAD	Inorganic Compound	Manganese	MN	WATER	Occult little brown myotis bat (water)	270000	990000	µg/L		WATER_BA(w)_MN
NONRAD	Inorganic Compound	Manganese	MN	WATER	Violet-green Swallow (water)	2400000	24000000	µg/L		WATER_VGS(w)_MN
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SEDIMENT	Aquatic community organisms - sediment	0.18	1	mg/kg		SEDIMENT_AQ(s)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2	20	mg/kg		SEDIMENT_BA(I)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.017	0.17	mg/kg	MINIMUM	SEDIMENT_VGS(i)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	American kestrel (Avian top carnivore)	0.32	3.2	mg/kg		SOIL_AK(f)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	American kestrel (Insectivore / carnivore)	0.058	0.58	mg/kg		SOIL_AK(fi)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	American robin (Avian herbivore)	0.067	0.67	mg/kg		SOIL_AR(p)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	American robin (Avian insectivore)	0.013	0.13	mg/kg	MINIMUM	SOIL_AR(i)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	American robin (Avian omnivore)	0.022	0.22	mg/kg		SOIL_AR(ip)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	Deer mouse (Mammalian omnivore)	3	30	mg/kg		SOIL_DM(ip)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	Earthworm (Soil-dwelling invertebrate)	0.05	0.5	mg/kg		SOIL_EW_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	Generic plant (Terrestrial autotroph - producer)	34	64	mg/kg		SOIL_GP_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	Gray fox (Mammalian top carnivore)	76	760	mg/kg		SOIL_RF(f)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	Montane shrew (Mammalian insectivore)	1.7	17	mg/kg		SOIL_MS(i)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	SOIL	Mountain cottontail (Mammalian herbivore)	23	230	mg/kg		SOIL_DC(p)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	WATER	American kestrel (water)	150	1500	µg/L		WATER_AK(w)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	WATER	American robin (water)	130	1300	µg/L		WATER_AR(w)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	WATER	Aquatic community organisms - water	0.77	1.4	µg/L	MINIMUM	WATER_AQ(w)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	WATER	Deer mouse (water)	7400	74000	µg/L		WATER_DM(w)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	WATER	Gray fox (water)	16000	160000	µg/L		WATER_RF(w)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	WATER	Montane shrew (water)	6300	63000	µg/L		WATER_MS(w)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	WATER	Mountain cottontail (water)	14000	140000	µg/L		WATER_DC(w)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	WATER	Occult little brown myotis bat (water)	8800	88000	µg/L		WATER_BA(w)_HGI
NONRAD	Inorganic Compound	Mercury (inorganic)	HGI	WATER	Violet-green Swallow (water)	78	780	µg/L		WATER_VGS(w)_HGI
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.0035	0.017	mg/kg		SEDIMENT_BA(I)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.00045	0.0045	mg/kg	MINIMUM	SEDIMENT_VGS(i)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SOIL	American kestrel (Avian top carnivore)	0.009	0.09	mg/kg		SOIL_AK(f)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SOIL	American kestrel (Insectivore / carnivore)	0.0015	0.015	mg/kg		SOIL_AK(fi)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SOIL	American robin (Avian herbivore)	0.066	0.66	mg/kg		SOIL_AR(p)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SOIL	American robin (Avian insectivore)	0.00035	0.0035	mg/kg	MINIMUM	SOIL_AR(I)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SOIL	American robin (Avian omnivore)	0.00071	0.0071	mg/kg		SOIL_AR(ip)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SOIL	Deer mouse (Mammalian omnivore)	0.0062	0.031	mg/kg		SOIL_DM(ip)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SOIL	Earthworm (Soil-dwelling invertebrate)	2.5	12	mg/kg		SOIL_EW_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SOIL	Gray fox (Mammalian top carnivore)	0.14	0.74	mg/kg		SOIL_RF(f)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SOIL	Montane shrew (Mammalian insectivore)	0.0031	0.015	mg/kg		SOIL_MS(i)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	SOIL	Mountain cottontail (Mammalian herbivore)	1.9	9.8	mg/kg		SOIL_DC(p)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	WATER	American kestrel (water)	53	530	µg/L		WATER_AK(w)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	WATER	American robin (water)	45	450	µg/L		WATER_AR(w)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	WATER	Aquatic community organisms - water	0.0028	0.028	µg/L	MINIMUM	WATER_AQ(w)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	WATER	Deer mouse (water)	160	840	µg/L		WATER_DM(w)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	WATER	Gray fox (water)	370	1800	µg/L		WATER_RF(w)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	WATER	Montane shrew (water)	140	710	µg/L		WATER_MS(w)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	WATER	Mountain cottontail (water)	320	1600	µg/L		WATER_DC(w)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	WATER	Occult little brown myotis bat (water)	200	1000	µg/L		WATER_BA(w)_HGM
NONRAD	Inorganic Compound	Mercury (methyl)	HGM	WATER	Violet-green Swallow (water)	26	260	µg/L		WATER_VGS(w)_HGM
NONRAD	Inorganic Compound	Molybdenum	MO	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	26	260	mg/kg	MINIMUM	SEDIMENT_VGS(i)_MO

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Inorganic Compound	Molybdenum	MO	SOIL	American kestrel (Avian top carnivore)	1100	11000	mg/kg		SOIL_AK(f)_MO
NONRAD	Inorganic Compound	Molybdenum	MO	SOIL	American kestrel (insectivore / carnivore)	90	900	mg/kg		SOIL_AK(fi)_MO
NONRAD	Inorganic Compound	Molybdenum	MO	SOIL	American robin (Avian herbivore)	18	180	mg/kg		SOIL_AR(p)_MO
NONRAD	Inorganic Compound	Molybdenum	MO	SOIL	American robin (Avian insectivore)	15	150	mg/kg	MINIMUM	SOIL_AR(i)_MO
NONRAD	Inorganic Compound	Molybdenum	MO	SOIL	American robin (Avian omnivore)	16	160	mg/kg		SOIL_AR(ip)_MO
NONRAD	Inorganic Compound	Molybdenum	MO	WATER	Aquatic community organisms - water	1800	7900	µg/L	MINIMUM	WATER_AQ(w)_MO
NONRAD	Inorganic Compound	Nickel	NI	SEDIMENT	Aquatic community organisms - sediment	22	48	mg/kg		SEDIMENT_AQ(s)_NI
NONRAD	Inorganic Compound	Nickel	NI	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	12	24	mg/kg	MINIMUM	SEDIMENT_BA(i)_NI
NONRAD	Inorganic Compound	Nickel	NI	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	31	310	mg/kg		SEDIMENT_VGS(i)_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	American kestrel (Avian top carnivore)	2000	8100	mg/kg		SOIL_AK(f)_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	American kestrel (insectivore / carnivore)	110	440	mg/kg		SOIL_AK(fi)_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	American robin (Avian herbivore)	120	500	mg/kg		SOIL_AR(p)_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	American robin (Avian insectivore)	20	81	mg/kg		SOIL_AR(i)_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	American robin (Avian omnivore)	35	130	mg/kg		SOIL_AR(ip)_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	Deer mouse (Mammalian omnivore)	20	40	mg/kg		SOIL_DM(ip)_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	Earthworm (Soil-dwelling invertebrate)	280	1300	mg/kg		SOIL_EW_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	Generic plant (Terrestrial autotroph - producer)	38	270	mg/kg		SOIL_GP_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	Gray fox (Mammalian top carnivore)	1200	2500	mg/kg		SOIL_RF(f)_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	Montane shrew (Mammalian insectivore)	10	21	mg/kg	MINIMUM	SOIL_MS(i)_NI
NONRAD	Inorganic Compound	Nickel	NI	SOIL	Mountain cottontail (Mammalian herbivore)	270	540	mg/kg		SOIL_DC(p)_NI
NONRAD	Inorganic Compound	Nickel	NI	WATER	American kestrel (water)	230000	320000	µg/L		WATER_AK(w)_NI
NONRAD	Inorganic Compound	Nickel	NI	WATER	American robin (water)	200000	270000	µg/L		WATER_AR(w)_NI
NONRAD	Inorganic Compound	Nickel	NI	WATER	Aquatic community organisms - water	29	260	µg/L	MINIMUM	WATER_AQ(w)_NI
NONRAD	Inorganic Compound	Nickel	NI	WATER	Deer mouse (water)	360	3600	µg/L		WATER_DM(w)_NI
NONRAD	Inorganic Compound	Nickel	NI	WATER	Gray fox (water)	800	8000	µg/L		WATER_RF(w)_NI
NONRAD	Inorganic Compound	Nickel	NI	WATER	Montane shrew (water)	300	3000	µg/L		WATER_MS(w)_NI
NONRAD	Inorganic Compound	Nickel	NI	WATER	Mountain cottontail (water)	710	7100	µg/L		WATER_DC(w)_NI
NONRAD	Inorganic Compound	Nickel	NI	WATER	Occult little brown myotis bat (water)	430	4300	µg/L		WATER_BA(w)_NI
NONRAD	Inorganic Compound	Nickel	NI	WATER	Violet-green Swallow (water)	110000	160000	µg/L		WATER_VGS(w)_NI
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	American kestrel (Avian top carnivore)	2	4	mg/kg		SOIL_AK(f)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	American kestrel (insectivore / carnivore)	3.9	8	mg/kg		SOIL_AK(fi)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	American robin (Avian herbivore)	0.12	0.24	mg/kg	MINIMUM	SOIL_AR(p)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	American robin (Avian insectivore)	31	64	mg/kg		SOIL_AR(i)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	American robin (Avian omnivore)	0.24	0.49	mg/kg		SOIL_AR(ip)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	Deer mouse (Mammalian omnivore)	0.21	1	mg/kg		SOIL_DM(ip)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	Earthworm (Soil-dwelling invertebrate)	3.5	35	mg/kg		SOIL_EW_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	Generic plant (Terrestrial autotroph - producer)	40	80	mg/kg		SOIL_GP_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	Gray fox (Mammalian top carnivore)	3.3	16	mg/kg		SOIL_RF(f)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	Montane shrew (Mammalian insectivore)	31	150	mg/kg		SOIL_MS(i)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	SOIL	Mountain cottontail (Mammalian herbivore)	0.26	1.3	mg/kg		SOIL_DC(p)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	WATER	American kestrel (water)	2100000	21000000	µg/L		WATER_AK(w)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	WATER	American robin (water)	1800000	18000000	µg/L		WATER_AR(w)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	WATER	Deer mouse (water)	41000	140000	µg/L		WATER_DM(w)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	WATER	Gray fox (water)	91000	330000	µg/L		WATER_RF(w)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	WATER	Montane shrew (water)	35000	120000	µg/L	MINIMUM	WATER_MS(w)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	WATER	Mountain cottontail (water)	80000	290000	µg/L		WATER_DC(w)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	WATER	Occult little brown myotis bat (water)	49000	170000	µg/L		WATER_BA(w)_ClO4(-1)
NONRAD	Inorganic Compound	Perchlorate Ion	ClO4(-1)	WATER	Violet-green Swallow (water)	1000000	10000000	µg/L		WATER_VGS(w)_ClO4(-1)
NONRAD	Inorganic Compound	Selenium	SE	SEDIMENT	Aquatic community organisms - sediment	0.72	2.9	mg/kg	MINIMUM	SEDIMENT_AQ(s)_SE
NONRAD	Inorganic Compound	Selenium	SE	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.8	1.2	mg/kg		SEDIMENT_BA(i)_SE
NONRAD	Inorganic Compound	Selenium	SE	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	1	2.1	mg/kg		SEDIMENT_VGS(i)_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	American kestrel (Avian top carnivore)	74	140	mg/kg		SOIL_AK(f)_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	American kestrel (insectivore / carnivore)	3.7	7.5	mg/kg		SOIL_AK(fi)_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	American robin (Avian herbivore)	0.98	1.9	mg/kg		SOIL_AR(p)_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	American robin (Avian insectivore)	0.71	1.4	mg/kg		SOIL_AR(i)_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	American robin (Avian omnivore)	0.83	1.6	mg/kg		SOIL_AR(ip)_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	Deer mouse (Mammalian omnivore)	0.82	1.2	mg/kg		SOIL_DM(ip)_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	Earthworm (Soil-dwelling invertebrate)	4.1	41	mg/kg		SOIL_EW_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	Generic plant (Terrestrial autotroph - producer)	0.52	3	mg/kg	MINIMUM	SOIL_GP_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	Gray fox (Mammalian top carnivore)	92	130	mg/kg		SOIL_RF(f)_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	Montane shrew (Mammalian insectivore)	0.7	1	mg/kg		SOIL_MS(i)_SE
NONRAD	Inorganic Compound	Selenium	SE	SOIL	Mountain cottontail (Mammalian herbivore)	2.2	3.4	mg/kg		SOIL_DC(p)_SE
NONRAD	Inorganic Compound	Selenium	SE	WATER	American kestrel (water)	3600	12000	µg/L		WATER_AK(w)_SE
NONRAD	Inorganic Compound	Selenium	SE	WATER	American robin (water)	3100	10000	µg/L		WATER_AR(w)_SE
NONRAD	Inorganic Compound	Selenium	SE	WATER	Aquatic community organisms - water	5	20	µg/L	MINIMUM	WATER_AQ(w)_SE
NONRAD	Inorganic Compound	Selenium	SE	WATER	Deer mouse (water)	1000	1700	µg/L		WATER_DM(w)_SE
NONRAD	Inorganic Compound	Selenium	SE	WATER	Gray fox (water)	2300	3800	µg/L		WATER_RF(w)_SE
NONRAD	Inorganic Compound	Selenium	SE	WATER	Montane shrew (water)	890	1400	µg/L		WATER_MS(w)_SE
NONRAD	Inorganic Compound	Selenium	SE	WATER	Mountain cottontail (water)	2000	3400	µg/L		WATER_DC(w)_SE
NONRAD	Inorganic Compound	Selenium	SE	WATER	Occult little brown myotis bat (water)	1200	2000	µg/L		WATER_BA(w)_SE
NONRAD	Inorganic Compound	Selenium	SE	WATER	Violet-green Swallow (water)	1800	6100	µg/L		WATER_VGS(w)_SE
NONRAD	Inorganic Compound	Silver	AG	SEDIMENT	Aquatic community organisms - sediment	0.5	5	mg/kg	MINIMUM	SEDIMENT_AQ(s)_AG
NONRAD	Inorganic Compound	Silver	AG	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	16	160	mg/kg		SEDIMENT_BA(i)_AG

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Inorganic Compound	Silver	AG	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	3.6	36	mg/kg		SEDIMENT_VGS(i)_AG
NONRAD	Inorganic Compound	Silver	AG	SOIL	American kestrel (Avian top carnivore)	600	6000	mg/kg		SOIL_AK(f)_AG
NONRAD	Inorganic Compound	Silver	AG	SOIL	American kestrel (insectivore / carnivore)	13	130	mg/kg		SOIL_AK(fi)_AG
NONRAD	Inorganic Compound	Silver	AG	SOIL	American robin (Avian herbivore)	10	100	mg/kg		SOIL_AR(p)_AG
NONRAD	Inorganic Compound	Silver	AG	SOIL	American robin (Avian insectivore)	2.6	26	mg/kg	MINIMUM	SOIL_AR(i)_AG
NONRAD	Inorganic Compound	Silver	AG	SOIL	American robin (Avian omnivore)	4.1	41	mg/kg		SOIL_AR(ip)_AG
NONRAD	Inorganic Compound	Silver	AG	SOIL	Deer mouse (Mammalian omnivore)	24	240	mg/kg		SOIL_DM(ip)_AG
NONRAD	Inorganic Compound	Silver	AG	SOIL	Generic plant (Terrestrial autotroph - producer)	560	2800	mg/kg		SOIL_GP_AG
NONRAD	Inorganic Compound	Silver	AG	SOIL	Gray fox (Mammalian top carnivore)	4400	44000	mg/kg		SOIL_RF(f)_AG
NONRAD	Inorganic Compound	Silver	AG	SOIL	Montane shrew (Mammalian insectivore)	14	140	mg/kg		SOIL_MS(i)_AG
NONRAD	Inorganic Compound	Silver	AG	SOIL	Mountain cottontail (Mammalian herbivore)	150	1500	mg/kg		SOIL_DC(p)_AG
NONRAD	Inorganic Compound	Silver	AG	WATER	American kestrel (water)	45000	450000	µg/L		WATER_AK(w)_AG
NONRAD	Inorganic Compound	Silver	AG	WATER	American robin (water)	38000	380000	µg/L		WATER_AR(w)_AG
NONRAD	Inorganic Compound	Silver	AG	WATER	Aquatic community organisms - water	0.1	1	µg/L	MINIMUM	WATER_AQ(w)_AG
NONRAD	Inorganic Compound	Silver	AG	WATER	Deer mouse (water)	100000	1000000	µg/L		WATER_DM(w)_AG
NONRAD	Inorganic Compound	Silver	AG	WATER	Gray fox (water)	220000	2200000	µg/L		WATER_RF(w)_AG
NONRAD	Inorganic Compound	Silver	AG	WATER	Montane shrew (water)	85000	850000	µg/L		WATER_MS(w)_AG
NONRAD	Inorganic Compound	Silver	AG	WATER	Mountain cottontail (water)	190000	1900000	µg/L		WATER_DC(w)_AG
NONRAD	Inorganic Compound	Silver	AG	WATER	Occult little brown myotis bat (water)	110000	1100000	µg/L		WATER_BA(w)_AG
NONRAD	Inorganic Compound	Silver	AG	WATER	Violet-green Swallow (water)	22000	220000	µg/L		WATER_VGS(w)_AG
NONRAD	Inorganic Compound	Strontium (stable)	SR	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1600	16000	mg/kg	MINIMUM	SEDIMENT_BA(i)_SR
NONRAD	Inorganic Compound	Strontium (stable)	SR	SOIL	Deer mouse (Mammalian omnivore)	95	950	mg/kg	MINIMUM	SOIL_DM(ip)_SR
NONRAD	Inorganic Compound	Strontium (stable)	SR	SOIL	Gray fox (Mammalian top carnivore)	19000	190000	mg/kg		SOIL_RF(f)_SR
NONRAD	Inorganic Compound	Strontium (stable)	SR	SOIL	Montane shrew (Mammalian insectivore)	1000	10000	mg/kg		SOIL_MS(i)_SR
NONRAD	Inorganic Compound	Strontium (stable)	SR	SOIL	Mountain cottontail (Mammalian herbivore)	110	1100	mg/kg		SOIL_DC(p)_SR
NONRAD	Inorganic Compound	Strontium (stable)	SR	WATER	Aquatic community organisms - water	1500	15000	µg/L	MINIMUM	WATER_AQ(w)_SR
NONRAD	Inorganic Compound	Strontium (stable)	SR	WATER	Deer mouse (water)	130000	1300000	µg/L		WATER_DM(w)_SR
NONRAD	Inorganic Compound	Strontium (stable)	SR	WATER	Gray fox (water)	290000	2900000	µg/L		WATER_RF(w)_SR
NONRAD	Inorganic Compound	Strontium (stable)	SR	WATER	Montane shrew (water)	110000	1100000	µg/L		WATER_MS(w)_SR
NONRAD	Inorganic Compound	Strontium (stable)	SR	WATER	Mountain cottontail (water)	250000	2500000	µg/L		WATER_DC(w)_SR
NONRAD	Inorganic Compound	Strontium (stable)	SR	WATER	Occult little brown myotis bat (water)	150000	1500000	µg/L		WATER_BA(w)_SR
NONRAD	Inorganic Compound	Thallium	TL	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.73	7.3	mg/kg	MINIMUM	SEDIMENT_BA(i)_TL
NONRAD	Inorganic Compound	Thallium	TL	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	23	230	mg/kg		SEDIMENT_VGS(i)_TL
NONRAD	Inorganic Compound	Thallium	TL	SOIL	American kestrel (Avian top carnivore)	100	1000	mg/kg		SOIL_AK(f)_TL
NONRAD	Inorganic Compound	Thallium	TL	SOIL	American kestrel (insectivore / carnivore)	48	480	mg/kg		SOIL_AK(fi)_TL
NONRAD	Inorganic Compound	Thallium	TL	SOIL	American robin (Avian herbivore)	6.9	69	mg/kg		SOIL_AR(p)_TL
NONRAD	Inorganic Compound	Thallium	TL	SOIL	American robin (Avian insectivore)	4.5	45	mg/kg		SOIL_AR(i)_TL
NONRAD	Inorganic Compound	Thallium	TL	SOIL	American robin (Avian omnivore)	5.5	55	mg/kg		SOIL_AR(ip)_TL
NONRAD	Inorganic Compound	Thallium	TL	SOIL	Deer mouse (Mammalian omnivore)	0.72	7.2	mg/kg		SOIL_DM(ip)_TL
NONRAD	Inorganic Compound	Thallium	TL	SOIL	Generic plant (Terrestrial autotroph - producer)	0.05	0.5	mg/kg	MINIMUM	SOIL_GP_TL
NONRAD	Inorganic Compound	Thallium	TL	SOIL	Gray fox (Mammalian top carnivore)	5	50	mg/kg		SOIL_RF(f)_TL
NONRAD	Inorganic Compound	Thallium	TL	SOIL	Montane shrew (Mammalian insectivore)	0.42	4.2	mg/kg		SOIL_MS(i)_TL
NONRAD	Inorganic Compound	Thallium	TL	SOIL	Mountain cottontail (Mammalian herbivore)	1.2	12	mg/kg		SOIL_DC(p)_TL
NONRAD	Inorganic Compound	Thallium	TL	WATER	American kestrel (water)	2900	29000	µg/L		WATER_AK(w)_TL
NONRAD	Inorganic Compound	Thallium	TL	WATER	American robin (water)	2500	25000	µg/L		WATER_AR(w)_TL
NONRAD	Inorganic Compound	Thallium	TL	WATER	Aquatic community organisms - water	0.03	0.3	µg/L	MINIMUM	WATER_AQ(w)_TL
NONRAD	Inorganic Compound	Thallium	TL	WATER	Deer mouse (water)	37	370	µg/L		WATER_DM(w)_TL
NONRAD	Inorganic Compound	Thallium	TL	WATER	Gray fox (water)	82	820	µg/L		WATER_RF(w)_TL
NONRAD	Inorganic Compound	Thallium	TL	WATER	Montane shrew (water)	31	310	µg/L		WATER_MS(w)_TL
NONRAD	Inorganic Compound	Thallium	TL	WATER	Mountain cottontail (water)	73	730	µg/L		WATER_DC(w)_TL
NONRAD	Inorganic Compound	Thallium	TL	WATER	Occult little brown myotis bat (water)	44	440	µg/L		WATER_BA(w)_TL
NONRAD	Inorganic Compound	Thallium	TL	WATER	Violet-green Swallow (water)	1400	14000	µg/L		WATER_VGS(w)_TL
NONRAD	Inorganic Compound	Titanium	TI	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	88	880	mg/kg	MINIMUM	SEDIMENT_BA(i)_TI
NONRAD	Inorganic Compound	Titanium	TI	SOIL	Deer mouse (Mammalian omnivore)	150	1500	mg/kg		SOIL_DM(ip)_TI
NONRAD	Inorganic Compound	Titanium	TI	SOIL	Gray fox (Mammalian top carnivore)	8600	86000	mg/kg		SOIL_RF(f)_TI
NONRAD	Inorganic Compound	Titanium	TI	SOIL	Montane shrew (Mammalian insectivore)	77	770	mg/kg	MINIMUM	SOIL_MS(i)_TI
NONRAD	Inorganic Compound	Titanium	TI	SOIL	Mountain cottontail (Mammalian herbivore)	2800	28000	mg/kg		SOIL_DC(p)_TI
NONRAD	Inorganic Compound	Titanium	TI	WATER	Deer mouse (water)	83000	830000	µg/L		WATER_DM(w)_TI
NONRAD	Inorganic Compound	Titanium	TI	WATER	Gray fox (water)	180000	1800000	µg/L		WATER_RF(w)_TI
NONRAD	Inorganic Compound	Titanium	TI	WATER	Montane shrew (water)	70000	700000	µg/L	MINIMUM	WATER_MS(w)_TI
NONRAD	Inorganic Compound	Titanium	TI	WATER	Mountain cottontail (water)	160000	1600000	µg/L		WATER_DC(w)_TI
NONRAD	Inorganic Compound	Titanium	TI	WATER	Occult little brown myotis bat (water)	99000	990000	µg/L		WATER_BA(w)_TI
NONRAD	Inorganic Compound	Uranium	U	SEDIMENT	Aquatic community organisms - sediment	100	1000	mg/kg	MINIMUM	SEDIMENT_AQ(s)_U
NONRAD	Inorganic Compound	Uranium	U	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1000	2500	mg/kg		SEDIMENT_BA(i)_U
NONRAD	Inorganic Compound	Uranium	U	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	8600	86000	mg/kg		SEDIMENT_VGS(i)_U
NONRAD	Inorganic Compound	Uranium	U	SOIL	American kestrel (Avian top carnivore)	26000	260000	mg/kg		SOIL_AK(f)_U
NONRAD	Inorganic Compound	Uranium	U	SOIL	American kestrel (insectivore / carnivore)	14000	140000	mg/kg		SOIL_AK(fi)_U
NONRAD	Inorganic Compound	Uranium	U	SOIL	American robin (Avian herbivore)	1500	15000	mg/kg		SOIL_AR(p)_U
NONRAD	Inorganic Compound	Uranium	U	SOIL	American robin (Avian insectivore)	1100	11000	mg/kg		SOIL_AR(i)_U
NONRAD	Inorganic Compound	Uranium	U	SOIL	American robin (Avian omnivore)	1200	12000	mg/kg		SOIL_AR(ip)_U
NONRAD	Inorganic Compound	Uranium	U	SOIL	Deer mouse (Mammalian omnivore)	740	1800	mg/kg		SOIL_DM(ip)_U
NONRAD	Inorganic Compound	Uranium	U	SOIL	Generic plant (Terrestrial autotroph - producer)	25	250	mg/kg	MINIMUM	SOIL_GP_U
NONRAD	Inorganic Compound	Uranium	U	SOIL	Gray fox (Mammalian top carnivore)	4800	12000	mg/kg		SOIL_RF(f)_U

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Inorganic Compound	Uranium	U	SOIL	Montane shrew (Mammalian insectivore)	480	1200	mg/kg		SOIL_MS(i)_U
NONRAD	Inorganic Compound	Uranium	U	SOIL	Mountain cottontail (Mammalian herbivore)	1000	2600	mg/kg		SOIL_DC(p)_U
NONRAD	Inorganic Compound	Uranium	U	WATER	American kestrel (water)	650000	6500000	µg/L		WATER_AK(w)_U
NONRAD	Inorganic Compound	Uranium	U	WATER	American robin (water)	550000	5500000	µg/L		WATER_AR(w)_U
NONRAD	Inorganic Compound	Uranium	U	WATER	Aquatic community organisms - water	5	50	µg/L	MINIMUM	WATER_AQ(w)_U
NONRAD	Inorganic Compound	Uranium	U	WATER	Deer mouse (water)	32000	78000	µg/L		WATER_DM(w)_U
NONRAD	Inorganic Compound	Uranium	U	WATER	Gray fox (water)	70000	170000	µg/L		WATER_RF(w)_U
NONRAD	Inorganic Compound	Uranium	U	WATER	Montane shrew (water)	27000	67000	µg/L		WATER_MS(w)_U
NONRAD	Inorganic Compound	Uranium	U	WATER	Mountain cottontail (water)	62000	150000	µg/L		WATER_DC(w)_U
NONRAD	Inorganic Compound	Uranium	U	WATER	Occult little brown myotis bat (water)	38000	94000	µg/L		WATER_BA(w)_U
NONRAD	Inorganic Compound	Uranium	U	WATER	Violet-green Swallow (water)	320000	3200000	µg/L		WATER_VGS(w)_U
NONRAD	Inorganic Compound	Vanadium	V	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	550	1100	mg/kg		SEDIMENT_BA(i)_V
NONRAD	Inorganic Compound	Vanadium	V	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	29	59	mg/kg	MINIMUM	SEDIMENT_VGS(i)_V
NONRAD	Inorganic Compound	Vanadium	V	SOIL	American kestrel (Avian top carnivore)	110	230	mg/kg		SOIL_AK(f)_V
NONRAD	Inorganic Compound	Vanadium	V	SOIL	American kestrel (insectivore / carnivore)	56	110	mg/kg		SOIL_AK(fi)_V
NONRAD	Inorganic Compound	Vanadium	V	SOIL	American robin (Avian herbivore)	6.8	13	mg/kg		SOIL_AR(p)_V
NONRAD	Inorganic Compound	Vanadium	V	SOIL	American robin (Avian insectivore)	4.7	9.5	mg/kg	MINIMUM	SOIL_AR(i)_V
NONRAD	Inorganic Compound	Vanadium	V	SOIL	American robin (Avian omnivore)	5.5	11	mg/kg		SOIL_AR(ip)_V
NONRAD	Inorganic Compound	Vanadium	V	SOIL	Deer mouse (Mammalian omnivore)	470	1000	mg/kg		SOIL_DM(ip)_V
NONRAD	Inorganic Compound	Vanadium	V	SOIL	Generic plant (Terrestrial autotroph - producer)	60	80	mg/kg		SOIL_GP_V
NONRAD	Inorganic Compound	Vanadium	V	SOIL	Gray fox (Mammalian top carnivore)	3200	6900	mg/kg		SOIL_RF(f)_V
NONRAD	Inorganic Compound	Vanadium	V	SOIL	Montane shrew (Mammalian insectivore)	290	610	mg/kg		SOIL_MS(i)_V
NONRAD	Inorganic Compound	Vanadium	V	SOIL	Mountain cottontail (Mammalian herbivore)	740	1500	mg/kg		SOIL_DC(p)_V
NONRAD	Inorganic Compound	Vanadium	V	WATER	American kestrel (water)	9100	91000	µg/L		WATER_AK(w)_V
NONRAD	Inorganic Compound	Vanadium	V	WATER	American robin (water)	7800	78000	µg/L		WATER_AR(w)_V
NONRAD	Inorganic Compound	Vanadium	V	WATER	Aquatic community organisms - water	19	190	µg/L	MINIMUM	WATER_AQ(w)_V
NONRAD	Inorganic Compound	Vanadium	V	WATER	Deer mouse (water)	11000	22000	µg/L		WATER_DM(w)_V
NONRAD	Inorganic Compound	Vanadium	V	WATER	Gray fox (water)	24000	48000	µg/L		WATER_RF(w)_V
NONRAD	Inorganic Compound	Vanadium	V	WATER	Montane shrew (water)	9400	18000	µg/L		WATER_MS(w)_V
NONRAD	Inorganic Compound	Vanadium	V	WATER	Mountain cottontail (water)	21000	43000	µg/L		WATER_DC(w)_V
NONRAD	Inorganic Compound	Vanadium	V	WATER	Occult little brown myotis bat (water)	13000	26000	µg/L		WATER_BA(w)_V
NONRAD	Inorganic Compound	Vanadium	V	WATER	Violet-green Swallow (water)	4500	45000	µg/L		WATER_VGS(w)_V
NONRAD	Inorganic Compound	Zinc	ZN	SEDIMENT	Aquatic community organisms - sediment	120	450	mg/kg		SEDIMENT_AQ(s)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	110	1100	mg/kg		SEDIMENT_BA(i)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	63	630	mg/kg	MINIMUM	SEDIMENT_VGS(i)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	American kestrel (Avian top carnivore)	2600	7000	mg/kg		SOIL_AK(f)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	American kestrel (insectivore / carnivore)	220	590	mg/kg		SOIL_AK(fi)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	American robin (Avian herbivore)	330	120	mg/kg		SOIL_AR(p)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	American robin (Avian insectivore)	47	120	mg/kg	MINIMUM	SOIL_AR(i)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	American robin (Avian omnivore)	83	220	mg/kg		SOIL_AR(ip)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	Deer mouse (Mammalian omnivore)	170	1700	mg/kg		SOIL_DM(ip)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	Earthworm (Soil-dwelling invertebrate)	120	930	mg/kg		SOIL_EW_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	Generic plant (Terrestrial autotroph - producer)	160	810	mg/kg		SOIL_GP_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	Gray fox (Mammalian top carnivore)	9600	94000	mg/kg		SOIL_RF(f)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	Montane shrew (Mammalian insectivore)	99	980	mg/kg		SOIL_MS(i)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	SOIL	Mountain cottontail (Mammalian herbivore)	1800	18000	mg/kg		SOIL_DC(p)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	WATER	American kestrel (water)	1000000	10000000	µg/L		WATER_AK(w)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	WATER	American robin (water)	850000	8500000	µg/L		WATER_AR(w)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	WATER	Aquatic community organisms - water	65	85	µg/L	MINIMUM	WATER_AQ(w)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	WATER	Deer mouse (water)	660000	6600000	µg/L		WATER_DM(w)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	WATER	Gray fox (water)	1400000	14000000	µg/L		WATER_RF(w)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	WATER	Montane shrew (water)	560000	5600000	µg/L		WATER_MS(w)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	WATER	Mountain cottontail (water)	1200000	12000000	µg/L		WATER_DC(w)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	WATER	Occult little brown myotis bat (water)	790000	7900000	µg/L		WATER_BA(w)_ZN
NONRAD	Inorganic Compound	Zinc	ZN	WATER	Violet-green Swallow (water)	490000	4900000	µg/L		WATER_VGS(w)_ZN
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	SEDIMENT	Aquatic community organisms - sediment	0.076	0.76	mg/kg	MINIMUM	SEDIMENT_AQ(s)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	140	1400	mg/kg		SEDIMENT_BA(i)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	SOIL	Deer mouse (Mammalian omnivore)	160	1600	mg/kg		SOIL_DM(ip)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	SOIL	Generic plant (Terrestrial autotroph - producer)	0.25	2	mg/kg	MINIMUM	SOIL_GP_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	SOIL	Gray fox (Mammalian top carnivore)	29000	290000	mg/kg		SOIL_RF(f)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	SOIL	Montane shrew (Mammalian insectivore)	130	1300	mg/kg		SOIL_MS(i)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	SOIL	Mountain cottontail (Mammalian herbivore)	530	5300	mg/kg		SOIL_DC(p)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	WATER	Aquatic community organisms - water	5.8	58	µg/L	MINIMUM	WATER_AQ(w)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	WATER	Deer mouse (water)	360000	3600000	µg/L		WATER_DM(w)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	WATER	Gray fox (water)	810000	8100000	µg/L		WATER_RF(w)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	WATER	Montane shrew (water)	310000	3100000	µg/L		WATER_MS(w)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	WATER	Mountain cottontail (water)	720000	7200000	µg/L		WATER_DC(w)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthene	83-32-9	WATER	Occult little brown myotis bat (water)	440000	4400000	µg/L		WATER_BA(w)_83-32-9
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	SEDIMENT	Aquatic community organisms - sediment	0.076	0.76	mg/kg	MINIMUM	SEDIMENT_AQ(s)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	140	1400	mg/kg		SEDIMENT_BA(i)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	SOIL	Deer mouse (Mammalian omnivore)	160	1600	mg/kg		SOIL_DM(ip)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	SOIL	Gray fox (Mammalian top carnivore)	28000	280000	mg/kg		SOIL_RF(f)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	SOIL	Montane shrew (Mammalian insectivore)	120	1200	mg/kg	MINIMUM	SOIL_MS(i)_208-96-8

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	SOIL	Mountain cottontail (Mammalian herbivore)	540	5400	mg/kg		SOIL_DC(p)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	WATER	Aquatic community organisms - water	4800	48000	µg/L	MINIMUM	WATER_AQ(w)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	WATER	Deer mouse (water)	360000	3600000	µg/L		WATER_DM(w)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	WATER	Gray fox (water)	810000	8100000	µg/L		WATER_RF(w)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	WATER	Montane shrew (water)	310000	3100000	µg/L		WATER_MS(w)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	WATER	Mountain cottontail (water)	720000	7200000	µg/L		WATER_DC(w)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Acenaphthylene	208-96-8	WATER	Occult little brown myotis bat (water)	440000	4400000	µg/L		WATER_BA(w)_208-96-8
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	SEDIMENT	Aquatic community organisms - sediment	0.057	0.57	mg/kg	MINIMUM	SEDIMENT_AQ(s)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	240	2400	mg/kg		SEDIMENT_BA(I)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	SOIL	Deer mouse (Mammalian omnivore)	300	3000	mg/kg		SOIL_DM(ip)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	SOIL	Generic plant (Terrestrial autotroph - producer)	6.8	9	mg/kg	MINIMUM	SOIL_GP_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	SOIL	Gray fox (Mammalian top carnivore)	38000	380000	mg/kg		SOIL_RF(f)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	SOIL	Montane shrew (Mammalian insectivore)	210	2100	mg/kg		SOIL_MS(I)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	SOIL	Mountain cottontail (Mammalian herbivore)	1200	12000	mg/kg		SOIL_DC(p)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	WATER	Aquatic community organisms - water	0.73	7.3	µg/L	MINIMUM	WATER_AQ(w)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	WATER	Deer mouse (water)	520000	5200000	µg/L		WATER_DM(w)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	WATER	Gray fox (water)	1100000	11000000	µg/L		WATER_RF(w)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	WATER	Montane shrew (water)	440000	4400000	µg/L		WATER_MS(w)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	WATER	Mountain cottontail (water)	1000000	10000000	µg/L		WATER_DC(w)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Anthracene	120-12-7	WATER	Occult little brown myotis bat (water)	620000	6200000	µg/L		WATER_BA(w)_120-12-7
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SEDIMENT	Aquatic community organisms - sediment	0.1	1	mg/kg	MINIMUM	SEDIMENT_AQ(s)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	5.2	52	mg/kg		SEDIMENT_BA(I)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	2.1	21	mg/kg		SEDIMENT_VGS(I)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SOIL	American kestrel (Avian top carnivore)	28	280	mg/kg		SOIL_AK(f)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SOIL	American kestrel (insectivore / carnivore)	6.4	64	mg/kg		SOIL_AK(fI)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SOIL	American robin (Avian herbivore)	0.73	7.3	mg/kg	MINIMUM	SOIL_AR(p)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SOIL	American robin (Avian insectivore)	0.88	8.8	mg/kg		SOIL_AR(I)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SOIL	American robin (Avian omnivore)	0.8	8	mg/kg		SOIL_AR(ip)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SOIL	Deer mouse (Mammalian omnivore)	3.4	34	mg/kg		SOIL_DM(ip)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SOIL	Generic plant (Terrestrial autotroph - producer)	18	180	mg/kg		SOIL_GP_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SOIL	Gray fox (Mammalian top carnivore)	110	1100	mg/kg		SOIL_RF(f)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SOIL	Montane shrew (Mammalian insectivore)	4	40	mg/kg		SOIL_MS(I)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	SOIL	Mountain cottontail (Mammalian herbivore)	6.1	61	mg/kg		SOIL_DC(p)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	WATER	Aquatic community organisms - water	0.027	0.27	µg/L	MINIMUM	WATER_AQ(w)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	WATER	Deer mouse (water)	890	8900	µg/L		WATER_DM(w)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	WATER	Gray fox (water)	1900	19000	µg/L		WATER_RF(w)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	WATER	Montane shrew (water)	760	7600	µg/L		WATER_MS(w)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	WATER	Mountain cottontail (water)	1700	17000	µg/L		WATER_DC(w)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)anthracene	56-55-3	WATER	Occult little brown myotis bat (water)	1000	10000	µg/L		WATER_BA(w)_56-55-3
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	SEDIMENT	Aquatic community organisms - sediment	0.15	1.4	mg/kg	MINIMUM	SEDIMENT_AQ(s)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	74	230	mg/kg		SEDIMENT_BA(i)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	SOIL	Deer mouse (Mammalian omnivore)	84	260	mg/kg		SOIL_DM(ip)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	SOIL	Gray fox (Mammalian top carnivore)	3400	11000	mg/kg		SOIL_RF(f)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	SOIL	Montane shrew (Mammalian insectivore)	62	190	mg/kg	MINIMUM	SOIL_MS(i)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	SOIL	Mountain cottontail (Mammalian herbivore)	260	830	mg/kg		SOIL_DC(p)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	WATER	Aquatic community organisms - water	0.014	0.14	µg/L	MINIMUM	WATER_AQ(w)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	WATER	Deer mouse (water)	5200	52000	µg/L		WATER_DM(w)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	WATER	Gray fox (water)	11000	110000	µg/L		WATER_RF(w)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	WATER	Montane shrew (water)	4400	44000	µg/L		WATER_MS(w)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	WATER	Mountain cottontail (water)	10000	100000	µg/L		WATER_DC(w)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(a)pyrene	50-32-8	WATER	Occult little brown myotis bat (water)	6200	62000	µg/L		WATER_BA(w)_50-32-8
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	SEDIMENT	Aquatic community organisms - sediment	0.19	1.9	mg/kg	MINIMUM	SEDIMENT_AQ(s)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	53	530	mg/kg		SEDIMENT_BA(i)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	SOIL	Deer mouse (Mammalian omnivore)	51	510	mg/kg		SOIL_DM(ip)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	SOIL	Generic plant (Terrestrial autotroph - producer)	18	180	mg/kg	MINIMUM	SOIL_GP_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	SOIL	Gray fox (Mammalian top carnivore)	2400	24000	mg/kg		SOIL_RF(f)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	SOIL	Montane shrew (Mammalian insectivore)	44	440	mg/kg		SOIL_MS(I)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	SOIL	Mountain cottontail (Mammalian herbivore)	130	1300	mg/kg		SOIL_DC(p)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	WATER	Aquatic community organisms - water	9	90	µg/L	MINIMUM	WATER_AQ(w)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	WATER	Deer mouse (water)	21000	210000	µg/L		WATER_DM(w)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	WATER	Gray fox (water)	46000	460000	µg/L		WATER_RF(w)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	WATER	Montane shrew (water)	17000	170000	µg/L		WATER_MS(w)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	WATER	Mountain cottontail (water)	41000	410000	µg/L		WATER_DC(w)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(b)fluoranthene	205-99-2	WATER	Occult little brown myotis bat (water)	25000	250000	µg/L		WATER_BA(w)_205-99-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	SEDIMENT	Aquatic community organisms - sediment	0.17	1.7	mg/kg	MINIMUM	SEDIMENT_AQ(s)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	29	290	mg/kg		SEDIMENT_BA(I)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	SOIL	Deer mouse (Mammalian omnivore)	46	460	mg/kg		SOIL_DM(ip)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	SOIL	Gray fox (Mammalian top carnivore)	3600	36000	mg/kg		SOIL_RF(f)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	SOIL	Montane shrew (Mammalian insectivore)	25	250	mg/kg	MINIMUM	SOIL_MS(I)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	SOIL	Mountain cottontail (Mammalian herbivore)	470	4700	mg/kg		SOIL_DC(p)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	WATER	Aquatic community organisms - water	7.6	76	µg/L	MINIMUM	WATER_AQ(w)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	WATER	Deer mouse (water)	37000	370000	µg/L		WATER_DM(w)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	WATER	Gray fox (water)	83000	830000	µg/L		WATER_RF(w)_191-24-2

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	WATER	Montane shrew (water)	32000	320000	µg/L		WATER_MS(w)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	WATER	Mountain cottontail (water)	74000	740000	µg/L		WATER_DC(w)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(g,h,i)perylene	191-24-2	WATER	Occult little brown myotis bat (water)	45000	450000	µg/L		WATER_BA(w)_191-24-2
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	SEDIMENT	Aquatic community organisms - sediment	0.24	2.4	mg/kg	MINIMUM	SEDIMENT_AQ(s)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	83	830	mg/kg		SEDIMENT_BA(i)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	SOIL	Deer mouse (Mammalian omnivore)	99	990	mg/kg		SOIL_DM(ip)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	SOIL	Gray fox (Mammalian top carnivore)	4300	43000	mg/kg		SOIL_RF(f)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	SOIL	Montane shrew (Mammalian insectivore)	71	710	mg/kg	MINIMUM	SOIL_MS(i)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	SOIL	Mountain cottontail (Mammalian herbivore)	330	3300	mg/kg		SOIL_DC(p)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	WATER	Aquatic community organisms - water	0.0041	0.041	µg/L	MINIMUM	WATER_AQ(w)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	WATER	Deer mouse (water)	37000	370000	µg/L		WATER_DM(w)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	WATER	Gray fox (water)	83000	830000	µg/L		WATER_RF(w)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	WATER	Montane shrew (water)	32000	320000	µg/L		WATER_MS(w)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	WATER	Mountain cottontail (water)	74000	740000	µg/L		WATER_DC(w)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Benzo(k)fluoranthene	207-08-9	WATER	Occult little brown myotis bat (water)	45000	450000	µg/L		WATER_BA(w)_207-08-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	SEDIMENT	Aquatic community organisms - sediment	0.16	1.2	mg/kg	MINIMUM	SEDIMENT_AQ(s)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	3.9	39	mg/kg		SEDIMENT_BA(i)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	SOIL	Deer mouse (Mammalian omnivore)	3.1	31	mg/kg		SOIL_DM(ip)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	SOIL	Gray fox (Mammalian top carnivore)	110	1100	mg/kg		SOIL_RF(f)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	SOIL	Montane shrew (Mammalian insectivore)	3.1	31	mg/kg	MINIMUM	SOIL_MS(i)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	SOIL	Mountain cottontail (Mammalian herbivore)	6.3	63	mg/kg		SOIL_DC(p)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	WATER	Aquatic community organisms - water	0.0018	0.018	µg/L	MINIMUM	WATER_AQ(w)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	WATER	Deer mouse (water)	890	8900	µg/L		WATER_DM(w)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	WATER	Gray fox (water)	1900	19000	µg/L		WATER_RF(w)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	WATER	Montane shrew (water)	760	7600	µg/L		WATER_MS(w)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	WATER	Mountain cottontail (water)	1700	17000	µg/L		WATER_DC(w)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Chrysene	218-01-9	WATER	Occult little brown myotis bat (water)	1000	10000	µg/L		WATER_BA(w)_218-01-9
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	SEDIMENT	Aquatic community organisms - sediment	0.033	0.33	mg/kg	MINIMUM	SEDIMENT_AQ(s)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	17	170	mg/kg		SEDIMENT_BA(i)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	SOIL	Deer mouse (Mammalian omnivore)	22	220	mg/kg		SOIL_DM(ip)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	SOIL	Gray fox (Mammalian top carnivore)	850	8500	mg/kg		SOIL_RF(f)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	SOIL	Montane shrew (Mammalian insectivore)	14	140	mg/kg	MINIMUM	SOIL_MS(i)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	SOIL	Mountain cottontail (Mammalian herbivore)	84	840	mg/kg		SOIL_DC(p)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	WATER	Aquatic community organisms - water	0.0034	0.034	µg/L	MINIMUM	WATER_AQ(w)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	WATER	Deer mouse (water)	7000	70000	µg/L		WATER_DM(w)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	WATER	Gray fox (water)	15000	150000	µg/L		WATER_RF(w)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	WATER	Montane shrew (water)	5900	59000	µg/L		WATER_MS(w)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	WATER	Mountain cottontail (water)	13000	130000	µg/L		WATER_DC(w)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Dibenzo(a,h)anthracene	53-70-3	WATER	Occult little brown myotis bat (water)	8300	83000	µg/L		WATER_BA(w)_53-70-3
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	SEDIMENT	Aquatic community organisms - sediment	0.42	2.2	mg/kg	MINIMUM	SEDIMENT_AQ(s)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	25	250	mg/kg		SEDIMENT_BA(i)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	SOIL	Deer mouse (Mammalian omnivore)	38	380	mg/kg		SOIL_DM(ip)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	SOIL	Earthworm (Soil-dwelling invertebrate)	10	23	mg/kg	MINIMUM	SOIL_EW_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	SOIL	Gray fox (Mammalian top carnivore)	3900	39000	mg/kg		SOIL_RF(f)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	SOIL	Montane shrew (Mammalian insectivore)	22	220	mg/kg		SOIL_MS(i)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	SOIL	Mountain cottontail (Mammalian herbivore)	270	2700	mg/kg		SOIL_DC(p)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	WATER	Aquatic community organisms - water	0.04	0.4	µg/L	MINIMUM	WATER_AQ(w)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	WATER	Deer mouse (water)	65000	650000	µg/L		WATER_DM(w)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	WATER	Gray fox (water)	140000	1400000	µg/L		WATER_RF(w)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	WATER	Montane shrew (water)	56000	560000	µg/L		WATER_MS(w)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	WATER	Mountain cottontail (water)	120000	1200000	µg/L		WATER_DC(w)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluoranthene	206-44-0	WATER	Occult little brown myotis bat (water)	78000	780000	µg/L		WATER_BA(w)_206-44-0
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	SEDIMENT	Aquatic community organisms - sediment	0.077	0.53	mg/kg	MINIMUM	SEDIMENT_AQ(s)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	280	570	mg/kg		SEDIMENT_BA(i)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	SOIL	Deer mouse (Mammalian omnivore)	340	680	mg/kg		SOIL_DM(ip)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	SOIL	Earthworm (Soil-dwelling invertebrate)	3.7	19	mg/kg	MINIMUM	SOIL_EW_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	SOIL	Gray fox (Mammalian top carnivore)	50000	100000	mg/kg		SOIL_RF(f)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	SOIL	Montane shrew (Mammalian insectivore)	250	510	mg/kg		SOIL_MS(i)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	SOIL	Mountain cottontail (Mammalian herbivore)	1100	2300	mg/kg		SOIL_DC(p)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	WATER	Aquatic community organisms - water	3.9	39	µg/L	MINIMUM	WATER_AQ(w)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	WATER	Deer mouse (water)	650000	1300000	µg/L		WATER_DM(w)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	WATER	Gray fox (water)	1400000	2900000	µg/L		WATER_RF(w)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	WATER	Montane shrew (water)	560000	1100000	µg/L		WATER_MS(w)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	WATER	Mountain cottontail (water)	1200000	2500000	µg/L		WATER_DC(w)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Fluorene	86-73-7	WATER	Occult little brown myotis bat (water)	780000	1500000	µg/L		WATER_BA(w)_86-73-7
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	SEDIMENT	Aquatic community organisms - sediment	0.2	2	mg/kg	MINIMUM	SEDIMENT_AQ(s)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	83	830	mg/kg		SEDIMENT_BA(i)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	SOIL	Deer mouse (Mammalian omnivore)	110	1100	mg/kg		SOIL_DM(ip)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	SOIL	Gray fox (Mammalian top carnivore)	4600	46000	mg/kg		SOIL_RF(f)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	SOIL	Montane shrew (Mammalian insectivore)	71	710	mg/kg	MINIMUM	SOIL_MS(i)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	SOIL	Mountain cottontail (Mammalian herbivore)	510	5100	mg/kg		SOIL_DC(p)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	WATER	Aquatic community organisms - water	4.3	43	µg/L	MINIMUM	WATER_AQ(w)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	WATER	Deer mouse (water)	37000	370000	µg/L		WATER_DM(w)_193-39-5

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	WATER	Gray fox (water)	83000	830000	µg/L		WATER_RF(w)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	WATER	Montane shrew (water)	32000	320000	µg/L		WATER_MS(w)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	WATER	Mountain cottontail (water)	74000	740000	µg/L		WATER_DC(w)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Indeno(1,2,3-cd)pyrene	193-39-5	WATER	Occult little brown myotis bat (water)	45000	450000	µg/L		WATER_BA(w)_193-39-5
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	SEDIMENT	Aquatic community organisms - sediment	0.076	0.76	mg/kg	MINIMUM	SEDIMENT_AQ(s)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	18	180	mg/kg		SEDIMENT_BA(I)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	SOIL	Deer mouse (Mammalian omnivore)	24	240	mg/kg		SOIL_DM(ip)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	SOIL	Gray fox (Mammalian top carnivore)	4900	49000	mg/kg		SOIL_RF(f)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	SOIL	Montane shrew (Mammalian insectivore)	16	160	mg/kg	MINIMUM	SOIL_MS(I)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	SOIL	Mountain cottontail (Mammalian herbivore)	110	1100	mg/kg		SOIL_DC(p)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	WATER	Aquatic community organisms - water	330	3300	µg/L	MINIMUM	WATER_AQ(w)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	WATER	Deer mouse (water)	84000	840000	µg/L		WATER_DM(w)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	WATER	Gray fox (water)	180000	1800000	µg/L		WATER_RF(w)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	WATER	Montane shrew (water)	71000	710000	µg/L		WATER_MS(w)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	WATER	Mountain cottontail (water)	160000	1600000	µg/L		WATER_DC(w)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Methylnaphthalene[2-]	91-57-6	WATER	Occult little brown myotis bat (water)	100000	1000000	µg/L		WATER_BA(w)_91-57-6
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SEDIMENT	Aquatic community organisms - sediment	0.17	0.56	mg/kg	MINIMUM	SEDIMENT_AQ(s)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	31	89	mg/kg		SEDIMENT_BA(I)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	21	210	mg/kg		SEDIMENT_VGS(I)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SOIL	American kestrel (Avian top carnivore)	2100	21000	mg/kg		SOIL_AK(f)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SOIL	American kestrel (insectivore / carnivore)	78	780	mg/kg		SOIL_AK(fi)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SOIL	American robin (Avian herbivore)	3.4	34	mg/kg		SOIL_AR(p)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SOIL	American robin (Avian insectivore)	15	150	mg/kg		SOIL_AR(i)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SOIL	American robin (Avian omnivore)	5.7	57	mg/kg		SOIL_AR(ip)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SOIL	Deer mouse (Mammalian omnivore)	9.6	27	mg/kg		SOIL_DM(ip)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SOIL	Generic plant (Terrestrial autotroph - producer)	1	10	mg/kg	MINIMUM	SOIL_GP_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SOIL	Gray fox (Mammalian top carnivore)	5800	16000	mg/kg		SOIL_RF(f)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SOIL	Montane shrew (Mammalian insectivore)	28	79	mg/kg		SOIL_MS(I)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	SOIL	Mountain cottontail (Mammalian herbivore)	14	40	mg/kg		SOIL_DC(p)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	WATER	American kestrel (water)	110	1100	µg/L		WATER_AK(w)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	WATER	American robin (water)	99	990	µg/L		WATER_AR(w)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	WATER	Aquatic community organisms - water	1.1	11	µg/L	MINIMUM	WATER_AQ(w)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	WATER	Deer mouse (water)	2600	26000	µg/L		WATER_DM(w)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	WATER	Gray fox (water)	5800	58000	µg/L		WATER_RF(w)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	WATER	Montane shrew (water)	2200	22000	µg/L		WATER_MS(w)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	WATER	Mountain cottontail (water)	5100	51000	µg/L		WATER_DC(w)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	WATER	Occult little brown myotis bat (water)	3100	31000	µg/L		WATER_BA(w)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Naphthalene	91-20-3	WATER	Violet-green Swallow (water)	57	570	µg/L		WATER_VGS(w)_91-20-3
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	SEDIMENT	Aquatic community organisms - sediment	0.2	1.1	mg/kg	MINIMUM	SEDIMENT_AQ(s)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	12	120	mg/kg		SEDIMENT_BA(I)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	SOIL	Deer mouse (Mammalian omnivore)	15	150	mg/kg		SOIL_DM(ip)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	SOIL	Earthworm (Soil-dwelling invertebrate)	5.5	12	mg/kg	MINIMUM	SOIL_EW_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	SOIL	Gray fox (Mammalian top carnivore)	1900	19000	mg/kg		SOIL_RF(f)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	SOIL	Montane shrew (Mammalian insectivore)	11	110	mg/kg		SOIL_MS(I)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	SOIL	Mountain cottontail (Mammalian herbivore)	62	620	mg/kg		SOIL_DC(p)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	WATER	Aquatic community organisms - water	6.3	30	µg/L	MINIMUM	WATER_AQ(w)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	WATER	Deer mouse (water)	27000	270000	µg/L		WATER_DM(w)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	WATER	Gray fox (water)	59000	590000	µg/L		WATER_RF(w)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	WATER	Montane shrew (water)	23000	230000	µg/L		WATER_MS(w)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	WATER	Mountain cottontail (water)	52000	520000	µg/L		WATER_DC(w)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Phenanthrene	85-01-8	WATER	Occult little brown myotis bat (water)	32000	320000	µg/L		WATER_BA(w)_85-01-8
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SEDIMENT	Aquatic community organisms - sediment	0.19	1.5	mg/kg	MINIMUM	SEDIMENT_AQ(s)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	26	260	mg/kg		SEDIMENT_BA(I)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	46	460	mg/kg		SEDIMENT_VGS(I)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SOIL	American kestrel (Avian top carnivore)	3000	30000	mg/kg		SOIL_AK(f)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SOIL	American kestrel (insectivore / carnivore)	160	1600	mg/kg		SOIL_AK(fi)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SOIL	American robin (Avian herbivore)	68	680	mg/kg		SOIL_AR(p)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SOIL	American robin (Avian insectivore)	33	330	mg/kg		SOIL_AR(i)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SOIL	American robin (Avian omnivore)	44	440	mg/kg		SOIL_AR(ip)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SOIL	Deer mouse (Mammalian omnivore)	31	310	mg/kg		SOIL_DM(ip)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SOIL	Earthworm (Soil-dwelling invertebrate)	10	20	mg/kg	MINIMUM	SOIL_EW_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SOIL	Gray fox (Mammalian top carnivore)	3100	31000	mg/kg		SOIL_RF(f)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SOIL	Montane shrew (Mammalian insectivore)	23	230	mg/kg		SOIL_MS(I)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	SOIL	Mountain cottontail (Mammalian herbivore)	110	1100	mg/kg		SOIL_DC(p)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	WATER	Aquatic community organisms - water	0.025	0.25	µg/L	MINIMUM	WATER_AQ(w)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	WATER	Deer mouse (water)	39000	390000	µg/L		WATER_DM(w)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	WATER	Gray fox (water)	87000	870000	µg/L		WATER_RF(w)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	WATER	Montane shrew (water)	33000	330000	µg/L		WATER_MS(w)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	WATER	Mountain cottontail (water)	77000	770000	µg/L		WATER_DC(w)_129-00-0
NONRAD	Polyaromatic Hydrocarbon	Pyrene	129-00-0	WATER	Occult little brown myotis bat (water)	47000	470000	µg/L		WATER_BA(w)_129-00-0
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	SEDIMENT	Aquatic community organisms - sediment	0.059	0.59	mg/kg	MINIMUM	SEDIMENT_AQ(s)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1.2	3.4	mg/kg		SEDIMENT_BA(I)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	SOIL	Deer mouse (Mammalian omnivore)	2	5.9	mg/kg		SOIL_DM(ip)_12674-11-2

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	SOIL	Gray fox (Mammalian top carnivore)	250	720	mg/kg		SOIL_RF(f)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	SOIL	Montane shrew (Mammalian insectivore)	1.1	3.1	mg/kg	MINIMUM	SOIL_MS(i)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	SOIL	Mountain cottontail (Mammalian herbivore)	48	130	mg/kg		SOIL_DC(p)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	WATER	Aquatic community organisms - water	0.014	0.14	µg/L	MINIMUM	WATER_AQ(w)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	WATER	Deer mouse (water)	180	1800	µg/L		WATER_DM(w)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	WATER	Gray fox (water)	400	4000	µg/L		WATER_RF(w)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	WATER	Montane shrew (water)	150	1500	µg/L		WATER_MS(w)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	WATER	Mountain cottontail (water)	360	3600	µg/L		WATER_DC(w)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1016	12674-11-2	WATER	Occult little brown myotis bat (water)	220	2200	µg/L		WATER_BA(w)_12674-11-2
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SEDIMENT	Aquatic community organisms - sediment	0.059	0.59	mg/kg		SEDIMENT_AQ(s)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.43	1.7	mg/kg		SEDIMENT_BA(i)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.053	0.53	mg/kg	MINIMUM	SEDIMENT_VGS(i)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SOIL	American kestrel (Avian top carnivore)	6.2	62	mg/kg		SOIL_AK(f)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SOIL	American kestrel (insectivore / carnivore)	0.19	1.9	mg/kg		SOIL_AK(fi)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SOIL	American robin (Avian herbivore)	0.92	9.2	mg/kg		SOIL_AR(p)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SOIL	American robin (Avian insectivore)	0.041	0.41	mg/kg	MINIMUM	SOIL_AR(i)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SOIL	American robin (Avian omnivore)	0.078	0.78	mg/kg		SOIL_AR(ip)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SOIL	Deer mouse (Mammalian omnivore)	0.75	3	mg/kg		SOIL_DM(ip)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SOIL	Gray fox (Mammalian top carnivore)	100	400	mg/kg		SOIL_RF(f)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SOIL	Montane shrew (Mammalian insectivore)	0.39	1.5	mg/kg		SOIL_MS(i)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	SOIL	Mountain cottontail (Mammalian herbivore)	27	110	mg/kg		SOIL_DC(p)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	WATER	American kestrel (water)	830	8300	µg/L		WATER_AK(w)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	WATER	American robin (water)	710	7100	µg/L		WATER_AR(w)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	WATER	Aquatic community organisms - water	0.014	0.14	µg/L	MINIMUM	WATER_AQ(w)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	WATER	Deer mouse (water)	490	4900	µg/L		WATER_DM(w)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	WATER	Gray fox (water)	1000	10000	µg/L		WATER_RF(w)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	WATER	Montane shrew (water)	420	4200	µg/L		WATER_MS(w)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	WATER	Mountain cottontail (water)	960	9600	µg/L		WATER_DC(w)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	WATER	Occult little brown myotis bat (water)	590	5900	µg/L		WATER_BA(w)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1242	53469-21-9	WATER	Violet-green Swallow (water)	410	4100	µg/L		WATER_VGS(w)_53469-21-9
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SEDIMENT	Aquatic community organisms - sediment	0.059	0.59	mg/kg		SEDIMENT_AQ(s)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.0081	0.081	mg/kg	MINIMUM	SEDIMENT_BA(i)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.053	0.53	mg/kg		SEDIMENT_VGS(i)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SOIL	American kestrel (Avian top carnivore)	6.3	63	mg/kg		SOIL_AK(f)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SOIL	American kestrel (insectivore / carnivore)	0.19	1.9	mg/kg		SOIL_AK(fi)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SOIL	American robin (Avian herbivore)	0.94	9.4	mg/kg		SOIL_AR(p)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SOIL	American robin (Avian insectivore)	0.041	0.41	mg/kg		SOIL_AR(i)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SOIL	American robin (Avian omnivore)	0.078	0.78	mg/kg		SOIL_AR(ip)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SOIL	Deer mouse (Mammalian omnivore)	0.014	0.14	mg/kg		SOIL_DM(ip)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SOIL	Gray fox (Mammalian top carnivore)	1.9	19	mg/kg		SOIL_RF(f)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SOIL	Montane shrew (Mammalian insectivore)	0.0073	0.073	mg/kg	MINIMUM	SOIL_MS(i)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	SOIL	Mountain cottontail (Mammalian herbivore)	0.53	5.3	mg/kg		SOIL_DC(p)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	WATER	American kestrel (water)	830	8300	µg/L		WATER_AK(w)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	WATER	American robin (water)	710	7100	µg/L		WATER_AR(w)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	WATER	Aquatic community organisms - water	0.014	0.14	µg/L	MINIMUM	WATER_AQ(w)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	WATER	Deer mouse (water)	52	520	µg/L		WATER_DM(w)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	WATER	Gray fox (water)	110	1100	µg/L		WATER_RF(w)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	WATER	Montane shrew (water)	44	440	µg/L		WATER_MS(w)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	WATER	Mountain cottontail (water)	100	1000	µg/L		WATER_DC(w)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	WATER	Occult little brown myotis bat (water)	62	620	µg/L		WATER_BA(w)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1248	12672-29-6	WATER	Violet-green Swallow (water)	410	4100	µg/L		WATER_VGS(w)_12672-29-6
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SEDIMENT	Aquatic community organisms - sediment	0.06	0.34	mg/kg		SEDIMENT_AQ(s)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.5	2.7	mg/kg		SEDIMENT_BA(i)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.053	0.53	mg/kg	MINIMUM	SEDIMENT_VGS(i)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SOIL	American kestrel (Avian top carnivore)	7.6	76	mg/kg		SOIL_AK(f)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SOIL	American kestrel (insectivore / carnivore)	0.19	1.9	mg/kg		SOIL_AK(fi)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SOIL	American robin (Avian herbivore)	1.1	11	mg/kg		SOIL_AR(p)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SOIL	American robin (Avian insectivore)	0.041	0.41	mg/kg	MINIMUM	SOIL_AR(i)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SOIL	American robin (Avian omnivore)	0.079	0.79	mg/kg		SOIL_AR(ip)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SOIL	Deer mouse (Mammalian omnivore)	0.87	4.8	mg/kg		SOIL_DM(ip)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SOIL	Generic plant (Terrestrial autotroph - producer)	160	620	mg/kg		SOIL_GP_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SOIL	Gray fox (Mammalian top carnivore)	7.2	72	mg/kg		SOIL_RF(f)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SOIL	Montane shrew (Mammalian insectivore)	0.45	2.4	mg/kg		SOIL_MS(i)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	SOIL	Mountain cottontail (Mammalian herbivore)	44	240	mg/kg		SOIL_DC(p)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	WATER	American kestrel (water)	830	8300	µg/L		WATER_AK(w)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	WATER	American robin (water)	710	7100	µg/L		WATER_AR(w)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	WATER	Aquatic community organisms - water	0.014	0.14	µg/L	MINIMUM	WATER_AQ(w)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	WATER	Deer mouse (water)	160	1600	µg/L		WATER_DM(w)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	WATER	Gray fox (water)	360	3600	µg/L		WATER_RF(w)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	WATER	Montane shrew (water)	130	1300	µg/L		WATER_MS(w)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	WATER	Mountain cottontail (water)	310	3100	µg/L		WATER_DC(w)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	WATER	Occult little brown myotis bat (water)	190	1900	µg/L		WATER_BA(w)_11097-69-1
NONRAD	Polychlorinated Biphenyl	Aroclor-1254	11097-69-1	WATER	Violet-green Swallow (water)	410	4100	µg/L		WATER_VGS(w)_11097-69-1

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SEDIMENT	Aquatic community organisms - sediment	0.059	0.59	mg/kg	MINIMUM	SEDIMENT_AQ(s)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	11	27	mg/kg		SEDIMENT_BA(i)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	1.1	1.6	mg/kg		SEDIMENT_VGS(i)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SOIL	American kestrel (Avian top carnivore)	400	560	mg/kg		SOIL_AK(f)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SOIL	American kestrel (insectivore / carnivore)	4.2	5.9	mg/kg		SOIL_AK(fi)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SOIL	American robin (Avian herbivore)	37	52	mg/kg		SOIL_AR(p)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SOIL	American robin (Avian insectivore)	0.88	1.2	mg/kg	MINIMUM	SOIL_AR(i)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SOIL	American robin (Avian omnivore)	1.7	2.4	mg/kg		SOIL_AR(ip)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SOIL	Deer mouse (Mammalian omnivore)	20	48	mg/kg		SOIL_DM(ip)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SOIL	Gray fox (Mammalian top carnivore)	15	150	mg/kg		SOIL_RF(f)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SOIL	Montane shrew (Mammalian insectivore)	10	24	mg/kg		SOIL_MS(i)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	SOIL	Mountain cottontail (Mammalian herbivore)	1800	4500	mg/kg		SOIL_DC(p)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	WATER	American kestrel (water)	8900	89000	µg/L		WATER_AK(w)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	WATER	American robin (water)	7600	76000	µg/L		WATER_AR(w)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	WATER	Aquatic community organisms - water	0.014	0.14	µg/L	MINIMUM	WATER_AQ(w)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	WATER	Deer mouse (water)	160	1600	µg/L		WATER_DM(w)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	WATER	Gray fox (water)	360	3600	µg/L		WATER_RF(w)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	WATER	Montane shrew (water)	130	1300	µg/L		WATER_MS(w)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	WATER	Mountain cottontail (water)	310	3100	µg/L		WATER_DC(w)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	WATER	Occult little brown myotis bat (water)	190	1900	µg/L		WATER_BA(w)_11096-82-5
NONRAD	Polychlorinated Biphenyl	Aroclor-1260	11096-82-5	WATER	Violet-green Swallow (water)	4400	44000	µg/L		WATER_VGS(w)_11096-82-5
NONRAD	Pesticide	Aldrin	309-00-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.042	0.21	mg/kg	MINIMUM	SEDIMENT_BA(i)_309-00-2
NONRAD	Pesticide	Aldrin	309-00-2	SOIL	Deer mouse (Mammalian omnivore)	0.074	0.37	mg/kg		SOIL_DM(ip)_309-00-2
NONRAD	Pesticide	Aldrin	309-00-2	SOIL	Gray fox (Mammalian top carnivore)	13	66	mg/kg		SOIL_RF(f)_309-00-2
NONRAD	Pesticide	Aldrin	309-00-2	SOIL	Montane shrew (Mammalian insectivore)	0.037	0.18	mg/kg	MINIMUM	SOIL_MS(i)_309-00-2
NONRAD	Pesticide	Aldrin	309-00-2	SOIL	Mountain cottontail (Mammalian herbivore)	12	60	mg/kg		SOIL_DC(p)_309-00-2
NONRAD	Pesticide	BHC[alpha-]	319-84-6	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	66	660	mg/kg	MINIMUM	SEDIMENT_BA(i)_319-84-6
NONRAD	Pesticide	BHC[alpha-]	319-84-6	SOIL	Deer mouse (Mammalian omnivore)	100	1000	mg/kg		SOIL_DM(ip)_319-84-6
NONRAD	Pesticide	BHC[alpha-]	319-84-6	SOIL	Gray fox (Mammalian top carnivore)	18000	180000	mg/kg		SOIL_RF(f)_319-84-6
NONRAD	Pesticide	BHC[alpha-]	319-84-6	SOIL	Montane shrew (Mammalian insectivore)	59	590	mg/kg	MINIMUM	SOIL_MS(i)_319-84-6
NONRAD	Pesticide	BHC[alpha-]	319-84-6	SOIL	Mountain cottontail (Mammalian herbivore)	800	8000	mg/kg		SOIL_DC(p)_319-84-6
NONRAD	Pesticide	BHC[beta-]	319-85-7	SEDIMENT	Aquatic community organisms - sediment	0.005	0.05	mg/kg	MINIMUM	SEDIMENT_AQ(s)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.3	1.5	mg/kg		SEDIMENT_BA(i)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	18	180	mg/kg		SEDIMENT_VGS(i)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SOIL	American kestrel (Avian top carnivore)	2600	26000	mg/kg		SOIL_AK(f)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SOIL	American kestrel (insectivore / carnivore)	69	690	mg/kg		SOIL_AK(fi)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SOIL	American robin (Avian herbivore)	78	780	mg/kg		SOIL_AR(p)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SOIL	American robin (Avian insectivore)	14	140	mg/kg		SOIL_AR(i)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SOIL	American robin (Avian omnivore)	24	240	mg/kg		SOIL_AR(ip)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SOIL	Deer mouse (Mammalian omnivore)	0.46	2.3	mg/kg		SOIL_DM(ip)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SOIL	Gray fox (Mammalian top carnivore)	83	410	mg/kg		SOIL_RF(f)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SOIL	Montane shrew (Mammalian insectivore)	0.27	1.3	mg/kg	MINIMUM	SOIL_MS(i)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	SOIL	Mountain cottontail (Mammalian herbivore)	3.7	18	mg/kg		SOIL_DC(p)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	WATER	American kestrel (water)	310000	3100000	µg/L		WATER_AK(w)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	WATER	American robin (water)	270000	2700000	µg/L		WATER_AR(w)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	WATER	Aquatic community organisms - water	2.2	22	µg/L	MINIMUM	WATER_AQ(w)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	WATER	Deer mouse (water)	2100	10000	µg/L		WATER_DM(w)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	WATER	Gray fox (water)	4600	23000	µg/L		WATER_RF(w)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	WATER	Montane shrew (water)	1700	8900	µg/L		WATER_MS(w)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	WATER	Mountain cottontail (water)	4100	20000	µg/L		WATER_DC(w)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	WATER	Occult little brown myotis bat (water)	2500	12000	µg/L		WATER_BA(w)_319-85-7
NONRAD	Pesticide	BHC[beta-]	319-85-7	WATER	Violet-green Swallow (water)	150000	1500000	µg/L		WATER_VGS(w)_319-85-7
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SEDIMENT	Aquatic community organisms - sediment	0.0023	0.0049	mg/kg	MINIMUM	SEDIMENT_AQ(s)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.01	0.1	mg/kg		SEDIMENT_BA(i)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.27	1.1	mg/kg		SEDIMENT_VGS(i)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SOIL	American kestrel (Avian top carnivore)	38	150	mg/kg		SOIL_AK(f)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SOIL	American kestrel (insectivore / carnivore)	1	4	mg/kg		SOIL_AK(fi)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SOIL	American robin (Avian herbivore)	1.1	4.5	mg/kg		SOIL_AR(p)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SOIL	American robin (Avian insectivore)	0.21	0.85	mg/kg		SOIL_AR(i)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SOIL	American robin (Avian omnivore)	0.35	1.4	mg/kg		SOIL_AR(ip)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SOIL	Deer mouse (Mammalian omnivore)	0.016	0.16	mg/kg		SOIL_DM(ip)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SOIL	Generic plant (Terrestrial autotroph - producer)	0.1	1	mg/kg		SOIL_GP_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SOIL	Gray fox (Mammalian top carnivore)	2.9	29	mg/kg		SOIL_RF(f)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SOIL	Montane shrew (Mammalian insectivore)	0.0095	0.095	mg/kg	MINIMUM	SOIL_MS(i)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	SOIL	Mountain cottontail (Mammalian herbivore)	0.12	1.2	mg/kg		SOIL_DC(p)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	WATER	American kestrel (water)	4600	18000	µg/L		WATER_AK(w)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	WATER	American robin (water)	4000	16000	µg/L		WATER_AR(w)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	WATER	Aquatic community organisms - water	0.095	0.95	µg/L	MINIMUM	WATER_AQ(w)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	WATER	Deer mouse (water)	73	730	µg/L		WATER_DM(w)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	WATER	Gray fox (water)	160	1600	µg/L		WATER_RF(w)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	WATER	Montane shrew (water)	62	620	µg/L		WATER_MS(w)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	WATER	Mountain cottontail (water)	140	1400	µg/L		WATER_DC(w)_58-89-9
NONRAD	Pesticide	BHC[gamma-]	58-89-9	WATER	Occult little brown myotis bat (water)	88	880	µg/L		WATER_BA(w)_58-89-9

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Pesticide	BHC[gamma-]	58-89-9	WATER	Violet-green Swallow (water)	2300	9200	µg/L		WATER_VGS(w)_58-89-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SEDIMENT	Aquatic community organisms - sediment	0.0032	0.017	mg/kg	MINIMUM	SEDIMENT_AQ(s)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.3	3	mg/kg		SEDIMENT_BA(I)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.35	1.7	mg/kg		SEDIMENT_VGS(I)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SOIL	American kestrel (Avian top carnivore)	45	220	mg/kg		SOIL_AK(f)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SOIL	American kestrel (insectivore / carnivore)	1.3	6.5	mg/kg		SOIL_AK(fi)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SOIL	American robin (Avian herbivore)	17	89	mg/kg		SOIL_AR(p)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SOIL	American robin (Avian insectivore)	0.27	1.3	mg/kg	MINIMUM	SOIL_AR(i)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SOIL	American robin (Avian omnivore)	0.55	2.7	mg/kg		SOIL_AR(ip)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SOIL	Deer mouse (Mammalian omnivore)	0.53	5.3	mg/kg		SOIL_DM(ip)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SOIL	Generic plant (Terrestrial autotroph - producer)	2.2	22	mg/kg		SOIL_GP_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SOIL	Gray fox (Mammalian top carnivore)	80	810	mg/kg		SOIL_RF(f)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SOIL	Montane shrew (Mammalian insectivore)	0.27	2.7	mg/kg	MINIMUM	SOIL_MS(i)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	SOIL	Mountain cottontail (Mammalian herbivore)	54	540	mg/kg		SOIL_DC(p)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	WATER	American kestrel (water)	17000	89000	µg/L		WATER_AK(w)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	WATER	American robin (water)	15000	76000	µg/L		WATER_AR(w)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	WATER	Aquatic community organisms - water	0.0043	0.043	µg/L	MINIMUM	WATER_AQ(w)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	WATER	Deer mouse (water)	6100	62000	µg/L		WATER_DM(w)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	WATER	Gray fox (water)	13000	130000	µg/L		WATER_RF(w)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	WATER	Montane shrew (water)	5200	52000	µg/L		WATER_MS(w)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	WATER	Mountain cottontail (water)	12000	120000	µg/L		WATER_DC(w)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	WATER	Occult little brown myotis bat (water)	7300	74000	µg/L		WATER_BA(w)_5103-71-9
NONRAD	Pesticide	Chlordane[alpha-]	5103-71-9	WATER	Violet-green Swallow (water)	8800	44000	µg/L		WATER_VGS(w)_5103-71-9
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SEDIMENT	Aquatic community organisms - sediment	0.0032	0.017	mg/kg	MINIMUM	SEDIMENT_AQ(s)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2.6	26	mg/kg		SEDIMENT_BA(I)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	3.1	15	mg/kg		SEDIMENT_VGS(I)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SOIL	American kestrel (Avian top carnivore)	270	1300	mg/kg		SOIL_AK(f)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SOIL	American kestrel (insectivore / carnivore)	11	56	mg/kg		SOIL_AK(fi)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SOIL	American robin (Avian herbivore)	20	100	mg/kg		SOIL_AR(p)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SOIL	American robin (Avian insectivore)	2.2	11	mg/kg		SOIL_AR(I)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SOIL	American robin (Avian omnivore)	4.1	20	mg/kg		SOIL_AR(ip)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SOIL	Deer mouse (Mammalian omnivore)	4.3	43	mg/kg		SOIL_DM(ip)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SOIL	Generic plant (Terrestrial autotroph - producer)	2.2	22	mg/kg	MINIMUM	SOIL_GP_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SOIL	Gray fox (Mammalian top carnivore)	420	4200	mg/kg		SOIL_RF(f)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SOIL	Montane shrew (Mammalian insectivore)	2.3	23	mg/kg	MINIMUM	SOIL_MS(i)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	SOIL	Mountain cottontail (Mammalian herbivore)	63	630	mg/kg		SOIL_DC(p)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	WATER	American kestrel (water)	17000	89000	µg/L		WATER_AK(w)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	WATER	American robin (water)	15000	76000	µg/L		WATER_AR(w)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	WATER	Aquatic community organisms - water	0.0043	0.043	µg/L	MINIMUM	WATER_AQ(w)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	WATER	Deer mouse (water)	6100	62000	µg/L		WATER_DM(w)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	WATER	Gray fox (water)	13000	130000	µg/L		WATER_RF(w)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	WATER	Montane shrew (water)	5200	52000	µg/L		WATER_MS(w)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	WATER	Mountain cottontail (water)	12000	120000	µg/L		WATER_DC(w)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	WATER	Occult little brown myotis bat (water)	7300	74000	µg/L		WATER_BA(w)_5103-74-2
NONRAD	Pesticide	Chlordane[gamma-]	5103-74-2	WATER	Violet-green Swallow (water)	8800	44000	µg/L		WATER_VGS(w)_5103-74-2
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	4.6	9.2	mg/kg		SEDIMENT_BA(I)_72-54-8
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.0082	0.042	mg/kg	MINIMUM	SEDIMENT_VGS(I)_72-54-8
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SOIL	American kestrel (Avian top carnivore)	0.9	4.6	mg/kg		SOIL_AK(f)_72-54-8
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SOIL	American kestrel (insectivore / carnivore)	0.03	0.15	mg/kg		SOIL_AK(fi)_72-54-8
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SOIL	American robin (Avian herbivore)	0.12	0.66	mg/kg		SOIL_AR(p)_72-54-8
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SOIL	American robin (Avian insectivore)	0.0063	0.032	mg/kg	MINIMUM	SOIL_AR(I)_72-54-8
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SOIL	American robin (Avian omnivore)	0.012	0.062	mg/kg		SOIL_AR(ip)_72-54-8
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SOIL	Deer mouse (Mammalian omnivore)	7.9	15	mg/kg		SOIL_DM(ip)_72-54-8
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SOIL	Gray fox (Mammalian top carnivore)	1000	2000	mg/kg		SOIL_RF(f)_72-54-8
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SOIL	Montane shrew (Mammalian insectivore)	4.1	8.3	mg/kg		SOIL_MS(i)_72-54-8
NONRAD	Pesticide	DDD[4,4'-]	72-54-8	SOIL	Mountain cottontail (Mammalian herbivore)	250	510	mg/kg		SOIL_DC(p)_72-54-8
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SEDIMENT	Aquatic community organisms - sediment	0.0031	0.031	mg/kg	MINIMUM	SEDIMENT_AQ(s)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	4.1	10	mg/kg		SEDIMENT_BA(I)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.14	0.71	mg/kg		SEDIMENT_VGS(I)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SOIL	American kestrel (Avian top carnivore)	20	100	mg/kg		SOIL_AK(f)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SOIL	American kestrel (insectivore / carnivore)	0.52	2.6	mg/kg		SOIL_AK(fi)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SOIL	American robin (Avian herbivore)	4.9	24	mg/kg		SOIL_AR(p)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SOIL	American robin (Avian insectivore)	0.11	0.55	mg/kg	MINIMUM	SOIL_AR(I)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SOIL	American robin (Avian omnivore)	0.21	1	mg/kg		SOIL_AR(ip)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SOIL	Deer mouse (Mammalian omnivore)	7.2	18	mg/kg		SOIL_DM(ip)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SOIL	Gray fox (Mammalian top carnivore)	1100	2900	mg/kg		SOIL_RF(f)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SOIL	Montane shrew (Mammalian insectivore)	3.7	9.3	mg/kg		SOIL_MS(i)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	SOIL	Mountain cottontail (Mammalian herbivore)	540	1300	mg/kg		SOIL_DC(p)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	WATER	American kestrel (water)	1000	10000	µg/L		WATER_AK(w)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	WATER	American robin (water)	920	9200	µg/L		WATER_AR(w)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	WATER	Aquatic community organisms - water	100	1000	µg/L	MINIMUM	WATER_AQ(w)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	WATER	Deer mouse (water)	52000	520000	µg/L		WATER_DM(w)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	WATER	Gray fox (water)	110000	1100000	µg/L		WATER_RF(w)_72-55-9

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Pesticide	DDE[4,4'-]	72-55-9	WATER	Montane shrew (water)	44000	440000	µg/L		WATER_MS(w)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	WATER	Mountain cottontail (water)	100000	1000000	µg/L		WATER_DC(w)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	WATER	Occult little brown myotis bat (water)	62000	620000	µg/L		WATER_BA(w)_72-55-9
NONRAD	Pesticide	DDE[4,4'-]	72-55-9	WATER	Violet-green Swallow (water)	530	5300	µg/L		WATER_VGS(w)_72-55-9
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SEDIMENT	Aquatic community organisms - sediment	0.0041	0.041	mg/kg	MINIMUM	SEDIMENT_AQ(s)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.049	0.24	mg/kg		SEDIMENT_BA(i)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.47	1.3	mg/kg		SEDIMENT_VGS(i)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SOIL	American kestrel (Avian top carnivore)	83	240	mg/kg		SOIL_AK(f)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SOIL	American kestrel (insectivore / carnivore)	1.7	5.1	mg/kg		SOIL_AK(fi)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SOIL	American robin (Avian herbivore)	24	72	mg/kg		SOIL_AR(p)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SOIL	American robin (Avian insectivore)	0.36	1	mg/kg		SOIL_AR(i)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SOIL	American robin (Avian omnivore)	0.71	2.1	mg/kg		SOIL_AR(ip)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SOIL	Deer mouse (Mammalian omnivore)	0.088	0.44	mg/kg		SOIL_DM(ip)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SOIL	Generic plant (Terrestrial autotroph - producer)	4.1	6	mg/kg		SOIL_GP_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SOIL	Gray fox (Mammalian top carnivore)	18	91	mg/kg		SOIL_RF(f)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SOIL	Montane shrew (Mammalian insectivore)	0.044	0.22	mg/kg	MINIMUM	SOIL_MS(i)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	SOIL	Mountain cottontail (Mammalian herbivore)	10	53	mg/kg		SOIL_DC(p)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	WATER	American kestrel (water)	2000	20000	µg/L		WATER_AK(w)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	WATER	American robin (water)	1700	17000	µg/L		WATER_AR(w)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	WATER	Aquatic community organisms - water	0.001	0.01	µg/L	MINIMUM	WATER_AQ(w)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	WATER	Deer mouse (water)	8400	84000	µg/L		WATER_DM(w)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	WATER	Gray fox (water)	18000	180000	µg/L		WATER_RF(w)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	WATER	Montane shrew (water)	7100	71000	µg/L		WATER_MS(w)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	WATER	Mountain cottontail (water)	16000	160000	µg/L		WATER_DC(w)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	WATER	Occult little brown myotis bat (water)	10000	100000	µg/L		WATER_BA(w)_50-29-3
NONRAD	Pesticide	DDT[4,4'-]	50-29-3	WATER	Violet-green Swallow (water)	990	9900	µg/L		WATER_VGS(w)_50-29-3
NONRAD	Pesticide	Dieldrin	60-57-1	SEDIMENT	Aquatic community organisms - sediment	0.0019	0.019	mg/kg	MINIMUM	SEDIMENT_AQ(s)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.005	0.01	mg/kg		SEDIMENT_BA(i)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.015	0.82	mg/kg		SEDIMENT_VGS(i)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SOIL	American kestrel (Avian top carnivore)	1.7	93	mg/kg		SOIL_AK(f)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SOIL	American kestrel (insectivore / carnivore)	0.056	3	mg/kg		SOIL_AK(fi)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SOIL	American robin (Avian herbivore)	0.33	17	mg/kg		SOIL_AR(p)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SOIL	American robin (Avian insectivore)	0.012	0.64	mg/kg		SOIL_AR(i)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SOIL	American robin (Avian omnivore)	0.023	1.2	mg/kg		SOIL_AR(ip)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SOIL	Deer mouse (Mammalian omnivore)	0.0087	0.017	mg/kg		SOIL_DM(ip)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SOIL	Generic plant (Terrestrial autotroph - producer)	10	100	mg/kg		SOIL_GP_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SOIL	Gray fox (Mammalian top carnivore)	1.1	2.3	mg/kg		SOIL_RF(f)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SOIL	Montane shrew (Mammalian insectivore)	0.0045	0.009	mg/kg	MINIMUM	SOIL_MS(i)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	SOIL	Mountain cottontail (Mammalian herbivore)	0.34	0.69	mg/kg		SOIL_DC(p)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	WATER	American kestrel (water)	640	6400	µg/L		WATER_AK(w)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	WATER	American robin (water)	550	5500	µg/L		WATER_AR(w)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	WATER	Aquatic community organisms - water	0.056	0.24	µg/L	MINIMUM	WATER_AQ(w)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	WATER	Deer mouse (water)	100	1000	µg/L		WATER_DM(w)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	WATER	Gray fox (water)	230	2300	µg/L		WATER_RF(w)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	WATER	Montane shrew (water)	89	890	µg/L		WATER_MS(w)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	WATER	Mountain cottontail (water)	200	2000	µg/L		WATER_DC(w)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	WATER	Occult little brown myotis bat (water)	120	1200	µg/L		WATER_BA(w)_60-57-1
NONRAD	Pesticide	Dieldrin	60-57-1	WATER	Violet-green Swallow (water)	310	3100	µg/L		WATER_VGS(w)_60-57-1
NONRAD	Pesticide	Endosulfan	115-29-7	SEDIMENT	Aquatic community organisms - sediment	0.00001	0.0001	mg/kg	MINIMUM	SEDIMENT_AQ(s)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1.3	13	mg/kg		SEDIMENT_BA(i)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	60	600	mg/kg		SEDIMENT_VGS(i)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SOIL	American kestrel (Avian top carnivore)	2500	25000	mg/kg		SOIL_AK(f)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SOIL	American kestrel (insectivore / carnivore)	200	2000	mg/kg		SOIL_AK(fi)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SOIL	American robin (Avian herbivore)	15	150	mg/kg		SOIL_AR(p)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SOIL	American robin (Avian insectivore)	37	370	mg/kg		SOIL_AR(i)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SOIL	American robin (Avian omnivore)	21	210	mg/kg		SOIL_AR(ip)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SOIL	Deer mouse (Mammalian omnivore)	0.64	6.4	mg/kg	MINIMUM	SOIL_DM(ip)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SOIL	Gray fox (Mammalian top carnivore)	95	950	mg/kg		SOIL_RF(f)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SOIL	Montane shrew (Mammalian insectivore)	1.1	11	mg/kg		SOIL_MS(i)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	SOIL	Mountain cottontail (Mammalian herbivore)	1	10	mg/kg		SOIL_DC(p)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	WATER	American kestrel (water)	83000	830000	µg/L		WATER_AK(w)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	WATER	American robin (water)	71000	710000	µg/L		WATER_AR(w)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	WATER	Aquatic community organisms - water	0.056	0.22	µg/L	MINIMUM	WATER_AQ(w)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	WATER	Deer mouse (water)	780	7800	µg/L		WATER_DM(w)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	WATER	Gray fox (water)	1700	17000	µg/L		WATER_RF(w)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	WATER	Montane shrew (water)	670	6700	µg/L		WATER_MS(w)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	WATER	Mountain cottontail (water)	1500	15000	µg/L		WATER_DC(w)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	WATER	Occult little brown myotis bat (water)	940	9400	µg/L		WATER_BA(w)_115-29-7
NONRAD	Pesticide	Endosulfan	115-29-7	WATER	Violet-green Swallow (water)	41000	410000	µg/L		WATER_VGS(w)_115-29-7
NONRAD	Pesticide	Endrin	72-20-8	SEDIMENT	Aquatic community organisms - sediment	0.0022	0.022	mg/kg		SEDIMENT_AQ(s)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.026	0.26	mg/kg		SEDIMENT_BA(i)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.0018	0.018	mg/kg	MINIMUM	SEDIMENT_VGS(i)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SOIL	American kestrel (Avian top carnivore)	0.21	2.1	mg/kg		SOIL_AK(f)_72-20-8

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Pesticide	Endrin	72-20-8	SOIL	American kestrel (insectivore / carnivore)	0.0068	0.068	mg/kg	SOIL_AK(fi)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SOIL	American robin (Avian herbivore)	0.046	0.46	mg/kg	SOIL_AR(p)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SOIL	American robin (Avian insectivore)	0.0014	0.014	mg/kg MINIMUM	SOIL_AR(i)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SOIL	American robin (Avian omnivore)	0.0028	0.028	mg/kg	SOIL_AR(ip)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SOIL	Deer mouse (Mammalian omnivore)	0.045	0.45	mg/kg	SOIL_DM(ip)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SOIL	Generic plant (Terrestrial autotroph - producer)	0.0034	0.034	mg/kg	SOIL_GP_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SOIL	Gray fox (Mammalian top carnivore)	6.3	63	mg/kg	SOIL_RF(f)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SOIL	Montane shrew (Mammalian insectivore)	0.023	0.23	mg/kg	SOIL_MS(i)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	SOIL	Mountain cottontail (Mammalian herbivore)	2.1	21	mg/kg	SOIL_DC(p)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	WATER	American kestrel (water)	83	830	µg/L	WATER_AK(w)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	WATER	American robin (water)	71	710	µg/L	WATER_AR(w)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	WATER	Aquatic community organisms - water	0.036	0.086	µg/L MINIMUM	WATER_AQ(w)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	WATER	Deer mouse (water)	480	4800	µg/L	WATER_DM(w)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	WATER	Gray fox (water)	1000	10000	µg/L	WATER_RF(w)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	WATER	Montane shrew (water)	410	4100	µg/L	WATER_MS(w)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	WATER	Mountain cottontail (water)	940	9400	µg/L	WATER_DC(w)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	WATER	Occult little brown myotis bat (water)	570	5700	µg/L	WATER_BA(w)_72-20-8
NONRAD	Pesticide	Endrin	72-20-8	WATER	Violet-green Swallow (water)	41	410	µg/L	WATER_VGS(w)_72-20-8
NONRAD	Pesticide	Heptachlor	76-44-8	SEDIMENT	Aquatic community organisms - sediment	0.0024	0.016	mg/kg MINIMUM	SEDIMENT_AQ(s)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.066	0.66	mg/kg	SEDIMENT_BA(i)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.39	3.9	mg/kg	SEDIMENT_VGS(i)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SOIL	American kestrel (Avian top carnivore)	45	450	mg/kg	SOIL_AK(f)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SOIL	American kestrel (insectivore / carnivore)	1.4	14	mg/kg	SOIL_AK(fi)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SOIL	American robin (Avian herbivore)	7.7	77	mg/kg	SOIL_AR(p)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SOIL	American robin (Avian insectivore)	0.3	3	mg/kg	SOIL_AR(i)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SOIL	American robin (Avian omnivore)	0.59	5.9	mg/kg	SOIL_AR(ip)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SOIL	Deer mouse (Mammalian omnivore)	0.11	1.1	mg/kg	SOIL_DM(ip)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SOIL	Generic plant (Terrestrial autotroph - producer)	0.4	4	mg/kg	SOIL_GP_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SOIL	Gray fox (Mammalian top carnivore)	15	150	mg/kg	SOIL_RF(f)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SOIL	Montane shrew (Mammalian insectivore)	0.059	0.59	mg/kg MINIMUM	SOIL_MS(i)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	SOIL	Mountain cottontail (Mammalian herbivore)	4.6	46	mg/kg	SOIL_DC(p)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	WATER	American kestrel (water)	7600	76000	µg/L	WATER_AK(w)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	WATER	American robin (water)	6500	65000	µg/L	WATER_AR(w)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	WATER	Aquatic community organisms - water	0.0038	0.038	µg/L MINIMUM	WATER_AQ(w)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	WATER	Deer mouse (water)	520	5200	µg/L	WATER_DM(w)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	WATER	Gray fox (water)	1100	11000	µg/L	WATER_RF(w)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	WATER	Montane shrew (water)	440	4400	µg/L	WATER_MS(w)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	WATER	Mountain cottontail (water)	1000	10000	µg/L	WATER_DC(w)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	WATER	Occult little brown myotis bat (water)	620	6200	µg/L	WATER_BA(w)_76-44-8
NONRAD	Pesticide	Heptachlor	76-44-8	WATER	Violet-green Swallow (water)	3800	38000	µg/L	WATER_VGS(w)_76-44-8
NONRAD	Pesticide	Kepone	143-50-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.024	0.12	mg/kg MINIMUM	SEDIMENT_BA(i)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	1.6	3.3	mg/kg	SEDIMENT_VGS(i)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	SOIL	American kestrel (Avian top carnivore)	190	380	mg/kg	SOIL_AK(f)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	SOIL	American kestrel (insectivore / carnivore)	6.1	12	mg/kg	SOIL_AK(fi)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	SOIL	American robin (Avian herbivore)	46	92	mg/kg	SOIL_AR(p)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	SOIL	American robin (Avian insectivore)	1.3	2.6	mg/kg	SOIL_AR(i)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	SOIL	American robin (Avian omnivore)	2.5	5.1	mg/kg	SOIL_AR(ip)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	SOIL	Deer mouse (Mammalian omnivore)	0.042	0.21	mg/kg	SOIL_DM(ip)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	SOIL	Gray fox (Mammalian top carnivore)	5.8	29	mg/kg	SOIL_RF(f)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	SOIL	Montane shrew (Mammalian insectivore)	0.022	0.11	mg/kg MINIMUM	SOIL_MS(i)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	SOIL	Mountain cottontail (Mammalian herbivore)	2.1	10	mg/kg	SOIL_DC(p)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	WATER	American kestrel (water)	70000	140000	µg/L	WATER_AK(w)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	WATER	American robin (water)	60000	120000	µg/L	WATER_AR(w)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	WATER	Deer mouse (water)	420	2100	µg/L	WATER_DM(w)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	WATER	Gray fox (water)	930	4600	µg/L	WATER_RF(w)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	WATER	Montane shrew (water)	350	1700	µg/L MINIMUM	WATER_MS(w)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	WATER	Mountain cottontail (water)	820	4100	µg/L	WATER_DC(w)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	WATER	Occult little brown myotis bat (water)	500	2500	µg/L	WATER_BA(w)_143-50-0
NONRAD	Pesticide	Kepone	143-50-0	WATER	Violet-green Swallow (water)	35000	70000	µg/L	WATER_VGS(w)_143-50-0
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SEDIMENT	Aquatic community organisms - sediment	0.03	0.3	mg/kg MINIMUM	SEDIMENT_AQ(s)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	5.7	11	mg/kg	SEDIMENT_BA(i)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	24	240	mg/kg	SEDIMENT_VGS(i)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SOIL	American kestrel (Avian top carnivore)	2100	21000	mg/kg	SOIL_AK(f)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SOIL	American kestrel (insectivore / carnivore)	87	880	mg/kg	SOIL_AK(fi)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SOIL	American robin (Avian herbivore)	110	1100	mg/kg	SOIL_AR(p)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SOIL	American robin (Avian insectivore)	18	180	mg/kg	SOIL_AR(i)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SOIL	American robin (Avian omnivore)	31	310	mg/kg	SOIL_AR(ip)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SOIL	Deer mouse (Mammalian omnivore)	9	18	mg/kg	SOIL_DM(ip)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SOIL	Gray fox (Mammalian top carnivore)	1000	2000	mg/kg	SOIL_RF(f)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SOIL	Montane shrew (Mammalian insectivore)	5.1	10	mg/kg MINIMUM	SOIL_MS(i)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	SOIL	Mountain cottontail (Mammalian herbivore)	83	160	mg/kg	SOIL_DC(p)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	WATER	American kestrel (water)	210000	2100000	µg/L	WATER_AK(w)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	WATER	American robin (water)	180000	1800000	µg/L	WATER_AR(w)_72-43-5

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	WATER	Aquatic community organisms - water	0.03	0.3	µg/L	MINIMUM	WATER_AQ(w)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	WATER	Deer mouse (water)	21000	42000	µg/L		WATER_DM(w)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	WATER	Gray fox (water)	46000	93000	µg/L		WATER_RF(w)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	WATER	Montane shrew (water)	17000	35000	µg/L		WATER_MS(w)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	WATER	Mountain cottontail (water)	41000	82000	µg/L		WATER_DC(w)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	WATER	Occult little brown myotis bat (water)	25000	50000	µg/L		WATER_BA(w)_72-43-5
NONRAD	Pesticide	Methoxychlor[4,4'-]	72-43-5	WATER	Violet-green Swallow (water)	100000	1000000	µg/L		WATER_VGS(w)_72-43-5
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SEDIMENT	Aquatic community organisms - sediment	0.0001	0.001	mg/kg	MINIMUM	SEDIMENT_AQ(s)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	6.6	66	mg/kg		SEDIMENT_BA(I)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	5.4	54	mg/kg		SEDIMENT_VGS(I)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SOIL	American kestrel (Avian top carnivore)	550	5500	mg/kg		SOIL_AK(f)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SOIL	American kestrel (insectivore / carnivore)	19	190	mg/kg		SOIL_AK(fI)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SOIL	American robin (Avian herbivore)	69	690	mg/kg		SOIL_AR(p)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SOIL	American robin (Avian insectivore)	4.1	41	mg/kg	MINIMUM	SOIL_AR(i)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SOIL	American robin (Avian omnivore)	7.8	78	mg/kg		SOIL_AR(Ip)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SOIL	Deer mouse (Mammalian omnivore)	11	110	mg/kg		SOIL_DM(Ip)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SOIL	Gray fox (Mammalian top carnivore)	1300	13000	mg/kg		SOIL_RF(f)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SOIL	Montane shrew (Mammalian insectivore)	5.9	59	mg/kg		SOIL_MS(I)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	SOIL	Mountain cottontail (Mammalian herbivore)	290	2900	mg/kg		SOIL_DC(p)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	WATER	American kestrel (water)	83000	830000	µg/L		WATER_AK(w)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	WATER	American robin (water)	71000	710000	µg/L		WATER_AR(w)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	WATER	Aquatic community organisms - water	0.0002	0.002	µg/L	MINIMUM	WATER_AQ(w)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	WATER	Deer mouse (water)	42000	420000	µg/L		WATER_DM(w)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	WATER	Gray fox (water)	93000	930000	µg/L		WATER_RF(w)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	WATER	Montane shrew (water)	35000	350000	µg/L		WATER_MS(w)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	WATER	Mountain cottontail (water)	82000	820000	µg/L		WATER_DC(w)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	WATER	Occult little brown myotis bat (water)	50000	500000	µg/L		WATER_BA(w)_8001-35-2
NONRAD	Pesticide	Toxaphene (Technical Grade)	8001-35-2	WATER	Violet-green Swallow (water)	41000	410000	µg/L		WATER_VGS(w)_8001-35-2
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	SEDIMENT	Aquatic community organisms - sediment			mg/kg		SEDIMENT_AQ(s)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1.2	12	mg/kg	MINIMUM	SEDIMENT_BA(I)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	SOIL	Deer mouse (Mammalian omnivore)	1.3	13	mg/kg		SOIL_DM(Ip)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	SOIL	Gray fox (Mammalian top carnivore)	2000	20000	mg/kg		SOIL_RF(f)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	SOIL	Montane shrew (Mammalian insectivore)	1	10	mg/kg	MINIMUM	SOIL_MS(I)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	SOIL	Mountain cottontail (Mammalian herbivore)	4.6	46	mg/kg		SOIL_DC(p)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	WATER	Aquatic community organisms - water	42	420	µg/L	MINIMUM	WATER_AQ(w)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	WATER	Deer mouse (water)	21000	210000	µg/L		WATER_DM(w)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	WATER	Gray fox (water)	46000	460000	µg/L		WATER_RF(w)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	WATER	Montane shrew (water)	17000	170000	µg/L		WATER_MS(w)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	WATER	Mountain cottontail (water)	41000	410000	µg/L		WATER_DC(w)_65-85-0
NONRAD	Semivolatile Organic compound	Benzoic Acid	65-85-0	WATER	Occult little brown myotis bat (water)	25000	250000	µg/L		WATER_BA(w)_65-85-0
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.66	6.6	mg/kg		SEDIMENT_BA(I)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.026	0.26	mg/kg	MINIMUM	SEDIMENT_VGS(I)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	American kestrel (Avian top carnivore)	9.3	93	mg/kg		SOIL_AK(f)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	American kestrel (insectivore / carnivore)	0.096	0.96	mg/kg		SOIL_AK(fI)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	American robin (Avian herbivore)	16	160	mg/kg		SOIL_AR(p)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	American robin (Avian insectivore)	0.02	0.2	mg/kg	MINIMUM	SOIL_AR(I)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	American robin (Avian omnivore)	0.04	0.4	mg/kg		SOIL_AR(Ip)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	Deer mouse (Mammalian omnivore)	1.1	11	mg/kg		SOIL_DM(Ip)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	Gray fox (Mammalian top carnivore)	500	5000	mg/kg		SOIL_RF(f)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	Montane shrew (Mammalian insectivore)	0.6	6	mg/kg		SOIL_MS(I)_117-81-7

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	Mountain cottontail (Mammalian herbivore)	1900	19000	mg/kg		SOIL_DC(p)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	WATER	American kestrel (water)	9100	91000	µg/L		WATER_AK(w)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	WATER	American robin (water)	7800	78000	µg/L		WATER_AR(w)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	WATER	Aquatic community organisms - water	32	320	µg/L	MINIMUM	WATER_AQ(w)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	WATER	Deer mouse (water)	96000	960000	µg/L		WATER_DM(w)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	WATER	Gray fox (water)	210000	2100000	µg/L		WATER_RF(w)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	WATER	Montane shrew (water)	82000	820000	µg/L		WATER_MS(w)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	WATER	Mountain cottontail (water)	180000	1800000	µg/L		WATER_DC(w)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	WATER	Occult little brown myotis bat (water)	110000	1100000	µg/L		WATER_BA(w)_117-81-7
NONRAD	Semivolatile Organic compound	Bis(2-ethylhexyl)phthalate	117-81-7	WATER	Violet-green Swallow (water)	4500	45000	µg/L		WATER_VGS(w)_117-81-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	SEDIMENT	Aquatic community organisms - sediment	0.1	1	mg/kg	MINIMUM	SEDIMENT_AQ(s)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	100	1000	mg/kg		SEDIMENT_BA(i)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	SOIL	Deer mouse (Mammalian omnivore)	160	1600	mg/kg		SOIL_DM(ip)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	SOIL	Gray fox (Mammalian top carnivore)	23000	230000	mg/kg		SOIL_RF(f)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	SOIL	Montane shrew (Mammalian insectivore)	90	900	mg/kg	MINIMUM	SOIL_MS(i)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	SOIL	Mountain cottontail (Mammalian herbivore)	2400	24000	mg/kg		SOIL_DC(p)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	WATER	Aquatic community organisms - water	19	190	µg/L	MINIMUM	WATER_AQ(w)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	WATER	Deer mouse (water)	830000	8300000	µg/L		WATER_DM(w)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	WATER	Gray fox (water)	1800000	18000000	µg/L		WATER_RF(w)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	WATER	Montane shrew (water)	710000	7100000	µg/L		WATER_MS(w)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	WATER	Mountain cottontail (water)	1600000	16000000	µg/L		WATER_DC(w)_85-68-7
NONRAD	Semivolatile Organic compound	Butyl Benzyl Phthalate	85-68-7	WATER	Occult little brown myotis bat (water)	1000000	10000000	µg/L		WATER_BA(w)_85-68-7
NONRAD	Semivolatile Organic compound	Carbazole	86-74-8	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	130	1300	mg/kg	MINIMUM	SEDIMENT_BA(i)_86-74-8
NONRAD	Semivolatile Organic compound	Carbazole	86-74-8	SOIL	Deer mouse (Mammalian omnivore)	79	790	mg/kg	MINIMUM	SOIL_DM(ip)_86-74-8
NONRAD	Semivolatile Organic compound	Carbazole	86-74-8	SOIL	Gray fox (Mammalian top carnivore)	13000	130000	mg/kg		SOIL_RF(f)_86-74-8
NONRAD	Semivolatile Organic compound	Carbazole	86-74-8	SOIL	Montane shrew (Mammalian insectivore)	110	1100	mg/kg		SOIL_MS(i)_86-74-8
NONRAD	Semivolatile Organic compound	Carbazole	86-74-8	SOIL	Mountain cottontail (Mammalian herbivore)	140	1400	mg/kg		SOIL_DC(p)_86-74-8
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	SEDIMENT	Aquatic community organisms - sediment	0.03	0.3	mg/kg	MINIMUM	SEDIMENT_AQ(s)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	48	480	mg/kg		SEDIMENT_BA(i)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	SOIL	Deer mouse (Mammalian omnivore)	53	530	mg/kg		SOIL_DM(ip)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	SOIL	Earthworm (Soil-dwelling invertebrate)	2.4	24	mg/kg	MINIMUM	SOIL_EW_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	SOIL	Gray fox (Mammalian top carnivore)	25000	250000	mg/kg		SOIL_RF(f)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	SOIL	Montane shrew (Mammalian insectivore)	43	430	mg/kg		SOIL_MS(i)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	SOIL	Mountain cottontail (Mammalian herbivore)	170	1700	mg/kg		SOIL_DC(p)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	WATER	Aquatic community organisms - water	130	1300	µg/L	MINIMUM	WATER_AQ(w)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	WATER	Deer mouse (water)	310000	3100000	µg/L		WATER_DM(w)_108-90-7

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	WATER	Gray fox (water)	690000	6900000	µg/L		WATER_RF(w)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	WATER	Montane shrew (water)	260000	2600000	µg/L		WATER_MS(w)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	WATER	Mountain cottontail (water)	610000	6100000	µg/L		WATER_DC(w)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorobenzene	108-90-7	WATER	Occult little brown myotis bat (water)	370000	3700000	µg/L		WATER_BA(w)_108-90-7
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SEDIMENT	Aquatic community organisms - sediment	0.055	0.55	mg/kg	MINIMUM	SEDIMENT_AQ(s)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2.6	26	mg/kg		SEDIMENT_BA(i)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	3.9	39	mg/kg		SEDIMENT_VGS(i)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SOIL	American kestrel (Avian top carnivore)	310	3100	mg/kg		SOIL_AK(f)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SOIL	American kestrel (insectivore / carnivore)	14	140	mg/kg		SOIL_AK(fi)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SOIL	American robin (Avian herbivore)	0.39	3.9	mg/kg	MINIMUM	SOIL_AR(p)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SOIL	American robin (Avian insectivore)	2.6	26	mg/kg		SOIL_AR(i)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SOIL	American robin (Avian omnivore)	0.68	6.8	mg/kg		SOIL_AR(ip)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SOIL	Deer mouse (Mammalian omnivore)	0.54	5.4	mg/kg		SOIL_DM(ip)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SOIL	Gray fox (Mammalian top carnivore)	340	3400	mg/kg		SOIL_RF(f)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SOIL	Montane shrew (Mammalian insectivore)	2.3	23	mg/kg		SOIL_MS(i)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	SOIL	Mountain cottontail (Mammalian herbivore)	0.74	7.4	mg/kg		SOIL_DC(p)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	WATER	American kestrel (water)	9400	94000	µg/L		WATER_AK(w)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	WATER	American robin (water)	8000	80000	µg/L		WATER_AR(w)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	WATER	Aquatic community organisms - water	490	4900	µg/L	MINIMUM	WATER_AQ(w)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	WATER	Deer mouse (water)	2600	26000	µg/L		WATER_DM(w)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	WATER	Gray fox (water)	5800	58000	µg/L		WATER_RF(w)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	WATER	Montane shrew (water)	2200	22000	µg/L		WATER_MS(w)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	WATER	Mountain cottontail (water)	5100	51000	µg/L		WATER_DC(w)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	WATER	Occult little brown myotis bat (water)	3100	31000	µg/L		WATER_BA(w)_95-57-8
NONRAD	Semivolatile Organic compound	Chlorophenol[2-]	95-57-8	WATER	Violet-green Swallow (water)	4600	46000	µg/L		WATER_VGS(w)_95-57-8
NONRAD	Semivolatile Organic compound	Dibenzofuran	132-64-9	SEDIMENT	Aquatic community organisms - sediment	0.51	5.1	mg/kg	MINIMUM	SEDIMENT_AQ(s)_132-64-9
NONRAD	Semivolatile Organic compound	Dibenzofuran	132-64-9	SOIL	Generic plant (Terrestrial autotroph - producer)	6.1	61	mg/kg	MINIMUM	SOIL_GP_132-64-9
NONRAD	Semivolatile Organic compound	Dibenzofuran	132-64-9	WATER	Aquatic community organisms - water	3.7	37	µg/L	MINIMUM	WATER_AQ(w)_132-64-9
NONRAD	Semivolatile Organic compound	Diethyl Phthalate	84-66-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	4000	40000	mg/kg	MINIMUM	SEDIMENT_BA(i)_84-66-2
NONRAD	Semivolatile Organic compound	Diethyl Phthalate	84-66-2	SOIL	Deer mouse (Mammalian omnivore)	3600	36000	mg/kg		SOIL_DM(ip)_84-66-2
NONRAD	Semivolatile Organic compound	Diethyl Phthalate	84-66-2	SOIL	Generic plant (Terrestrial autotroph - producer)	100	1000	mg/kg	MINIMUM	SOIL_GP_84-66-2
NONRAD	Semivolatile Organic compound	Diethyl Phthalate	84-66-2	SOIL	Gray fox (Mammalian top carnivore)	2500000	25000000	mg/kg		SOIL_RF(f)_84-66-2
NONRAD	Semivolatile Organic compound	Diethyl Phthalate	84-66-2	SOIL	Montane shrew (Mammalian insectivore)	3600	36000	mg/kg		SOIL_MS(i)_84-66-2
NONRAD	Semivolatile Organic compound	Diethyl Phthalate	84-66-2	SOIL	Mountain cottontail (Mammalian herbivore)	8800	88000	mg/kg		SOIL_DC(p)_84-66-2
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	90	1100	mg/kg	MINIMUM	SEDIMENT_BA(i)_131-11-3
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	SOIL	Deer mouse (Mammalian omnivore)	38	460	mg/kg		SOIL_DM(ip)_131-11-3

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	SOIL	Earthworm (Soil-dwelling invertebrate)	10	100	mg/kg	MINIMUM	SOIL_EW_131-11-3
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	SOIL	Gray fox (Mammalian top carnivore)	48000	590000	mg/kg		SOIL_RF(f)_131-11-3
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	SOIL	Montane shrew (Mammalian insectivore)	80	980	mg/kg		SOIL_MS(i)_131-11-3
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	SOIL	Mountain cottontail (Mammalian herbivore)	60	740	mg/kg		SOIL_DC(p)_131-11-3
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	WATER	Aquatic community organisms - water	3	30	µg/L	MINIMUM	WATER_AQ(w)_131-11-3
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	WATER	Deer mouse (water)	350000	3500000	µg/L		WATER_DM(w)_131-11-3
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	WATER	Gray fox (water)	790000	7900000	µg/L		WATER_RF(w)_131-11-3
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	WATER	Montane shrew (water)	300000	3000000	µg/L		WATER_MS(w)_131-11-3
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	WATER	Mountain cottontail (water)	700000	7000000	µg/L		WATER_DC(w)_131-11-3
NONRAD	Semivolatile Organic compound	Dimethyl Phthalate	131-11-3	WATER	Occult little brown myotis bat (water)	420000	4200000	µg/L		WATER_BA(w)_131-11-3
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SEDIMENT	Aquatic community organisms - sediment	0.011	0.11	mg/kg	MINIMUM	SEDIMENT_AQ(s)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	210	490	mg/kg		SEDIMENT_BA(i)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.014	0.14	mg/kg		SEDIMENT_VGS(i)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SOIL	American kestrel (Avian top carnivore)	2	20	mg/kg		SOIL_AK(f)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SOIL	American kestrel (Insectivore / carnivore)	0.052	0.52	mg/kg		SOIL_AK(fi)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SOIL	American robin (Avian herbivore)	0.38	3.8	mg/kg		SOIL_AR(p)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SOIL	American robin (Avian insectivore)	0.011	0.11	mg/kg	MINIMUM	SOIL_AR(i)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SOIL	American robin (Avian omnivore)	0.021	0.21	mg/kg		SOIL_AR(ip)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SOIL	Deer mouse (Mammalian omnivore)	360	860	mg/kg		SOIL_DM(ip)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SOIL	Generic plant (Terrestrial autotroph - producer)	160	600	mg/kg		SOIL_GP_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SOIL	Gray fox (Mammalian top carnivore)	62000	140000	mg/kg		SOIL_RF(f)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SOIL	Montane shrew (Mammalian insectivore)	180	450	mg/kg		SOIL_MS(i)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	SOIL	Mountain cottontail (Mammalian herbivore)	17000	40000	mg/kg		SOIL_DC(p)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	WATER	American kestrel (water)	1100	11000	µg/L		WATER_AK(w)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	WATER	American robin (water)	1000	10000	µg/L		WATER_AR(w)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	WATER	Aquatic community organisms - water	19	190	µg/L	MINIMUM	WATER_AQ(w)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	WATER	Deer mouse (water)	3100000	10000000	µg/L		WATER_DM(w)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	WATER	Gray fox (water)	6900000	23000000	µg/L		WATER_RF(w)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	WATER	Montane shrew (water)	2600000	8900000	µg/L		WATER_MS(w)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	WATER	Mountain cottontail (water)	6100000	20000000	µg/L		WATER_DC(w)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	WATER	Occult little brown myotis bat (water)	3700000	12000000	µg/L		WATER_BA(w)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-Butyl Phthalate	84-74-2	WATER	Violet-green Swallow (water)	570	5700	µg/L		WATER_VGS(w)_84-74-2
NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1	10	mg/kg	MINIMUM	SEDIMENT_BA(i)_117-84-0
NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	SOIL	Deer mouse (Mammalian omnivore)	1.8	18	mg/kg		SOIL_DM(ip)_117-84-0
NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	SOIL	Gray fox (Mammalian top carnivore)	1300	13000	mg/kg		SOIL_RF(f)_117-84-0
NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	SOIL	Montane shrew (Mammalian insectivore)	0.91	9.1	mg/kg	MINIMUM	SOIL_MS(i)_117-84-0

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	SOIL	Mountain cottontail (Mammalian herbivore)	8400	84000	mg/kg		SOIL_DC(p)_117-84-0
NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	WATER	Aquatic community organisms - water	3	30	µg/L	MINIMUM	WATER_AQ(w)_117-84-0
NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	WATER	Deer mouse (water)	340000	3400000	µg/L		WATER_DM(w)_117-84-0
NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	WATER	Gray fox (water)	750000	7500000	µg/L		WATER_RF(w)_117-84-0
NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	WATER	Montane shrew (water)	290000	2900000	µg/L		WATER_MS(w)_117-84-0
NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	WATER	Mountain cottontail (water)	670000	6700000	µg/L		WATER_DC(w)_117-84-0
NONRAD	Semivolatile Organic compound	Di-n-octylphthalate	117-84-0	WATER	Occult little brown myotis bat (water)	400000	4000000	µg/L		WATER_BA(w)_117-84-0
NONRAD	Semivolatile Organic compound	Methylphenol[2-]	95-48-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1700	17000	mg/kg	MINIMUM	SEDIMENT_BA(I)_95-48-7
NONRAD	Semivolatile Organic compound	Methylphenol[2-]	95-48-7	SOIL	Deer mouse (Mammalian omnivore)	580	5800	mg/kg		SOIL_DM(ip)_95-48-7
NONRAD	Semivolatile Organic compound	Methylphenol[2-]	95-48-7	SOIL	Generic plant (Terrestrial autotroph - producer)	0.67	7	mg/kg	MINIMUM	SOIL_GP_95-48-7
NONRAD	Semivolatile Organic compound	Methylphenol[2-]	95-48-7	SOIL	Gray fox (Mammalian top carnivore)	160000	1600000	mg/kg		SOIL_RF(f)_95-48-7
NONRAD	Semivolatile Organic compound	Methylphenol[2-]	95-48-7	SOIL	Montane shrew (Mammalian insectivore)	1500	15000	mg/kg		SOIL_MS(I)_95-48-7
NONRAD	Semivolatile Organic compound	Methylphenol[2-]	95-48-7	SOIL	Mountain cottontail (Mammalian herbivore)	880	8800	mg/kg		SOIL_DC(p)_95-48-7
NONRAD	Semivolatile Organic compound	Methylphenol[3-]	108-39-4	SOIL	Generic plant (Terrestrial autotroph - producer)	0.69	7	mg/kg	MINIMUM	SOIL_GP_108-39-4
NONRAD	Semivolatile Organic compound	Nitroaniline[2-]	88-74-4	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	7.3	14	mg/kg	MINIMUM	SEDIMENT_BA(I)_88-74-4
NONRAD	Semivolatile Organic compound	Nitroaniline[2-]	88-74-4	SOIL	Deer mouse (Mammalian omnivore)	5.3	10	mg/kg	MINIMUM	SOIL_DM(ip)_88-74-4
NONRAD	Semivolatile Organic compound	Nitroaniline[2-]	88-74-4	SOIL	Gray fox (Mammalian top carnivore)	2200	4400	mg/kg		SOIL_RF(f)_88-74-4
NONRAD	Semivolatile Organic compound	Nitroaniline[2-]	88-74-4	SOIL	Montane shrew (Mammalian insectivore)	6.5	13	mg/kg		SOIL_MS(I)_88-74-4
NONRAD	Semivolatile Organic compound	Nitroaniline[2-]	88-74-4	SOIL	Mountain cottontail (Mammalian herbivore)	11	22	mg/kg		SOIL_DC(p)_88-74-4
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	24	240	mg/kg	MINIMUM	SEDIMENT_BA(I)_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	SOIL	Deer mouse (Mammalian omnivore)	4.8	48	mg/kg		SOIL_DM(ip)_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	SOIL	Earthworm (Soil-dwelling invertebrate)	2.2	22	mg/kg	MINIMUM	SOIL_EW_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	SOIL	Gray fox (Mammalian top carnivore)	4100	41000	mg/kg		SOIL_RF(f)_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	SOIL	Montane shrew (Mammalian insectivore)	21	210	mg/kg		SOIL_MS(I)_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	SOIL	Mountain cottontail (Mammalian herbivore)	6.7	67	mg/kg		SOIL_DC(p)_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	WATER	Aquatic community organisms - water	550	2200	µg/L	MINIMUM	WATER_AQ(w)_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	WATER	Deer mouse (water)	31000	310000	µg/L		WATER_DM(w)_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	WATER	Gray fox (water)	68000	680000	µg/L		WATER_RF(w)_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	WATER	Montane shrew (water)	26000	260000	µg/L		WATER_MS(w)_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	WATER	Mountain cottontail (water)	60000	600000	µg/L		WATER_DC(w)_98-95-3
NONRAD	Semivolatile Organic compound	Nitrobenzene	98-95-3	WATER	Occult little brown myotis bat (water)	37000	370000	µg/L		WATER_BA(w)_98-95-3
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SEDIMENT	Aquatic community organisms - sediment	3.6	36	mg/kg		SEDIMENT_AQ(s)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	12	120	mg/kg		SEDIMENT_BA(I)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.9	9	mg/kg	MINIMUM	SEDIMENT_VGS(i)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SOIL	American kestrel (Avian top carnivore)	110	1100	mg/kg		SOIL_AK(f)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SOIL	American kestrel (Insectivore / carnivore)	3.3	33	mg/kg		SOIL_AK(fi)_82-68-8

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SOIL	American robin (Avian herbivore)	21	210	mg/kg		SOIL_AR(p)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SOIL	American robin (Avian insectivore)	0.7	7	mg/kg	MINIMUM	SOIL_AR(i)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SOIL	American robin (Avian omnivore)	1.3	13	mg/kg		SOIL_AR(ip)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SOIL	Deer mouse (Mammalian omnivore)	22	220	mg/kg		SOIL_DM(ip)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SOIL	Gray fox (Mammalian top carnivore)	3500	35000	mg/kg		SOIL_RF(f)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SOIL	Montane shrew (Mammalian insectivore)	11	110	mg/kg		SOIL_MS(i)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	SOIL	Mountain cottontail (Mammalian herbivore)	930	9300	mg/kg		SOIL_DC(p)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	WATER	American kestrel (water)	58000	580000	µg/L		WATER_AK(w)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	WATER	American robin (water)	50000	500000	µg/L		WATER_AR(w)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	WATER	Aquatic community organisms - water	10	100	µg/L	MINIMUM	WATER_AQ(w)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	WATER	Deer mouse (water)	340000	3400000	µg/L		WATER_DM(w)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	WATER	Gray fox (water)	750000	7500000	µg/L		WATER_RF(w)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	WATER	Montane shrew (water)	290000	2900000	µg/L		WATER_MS(w)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	WATER	Mountain cottontail (water)	670000	6700000	µg/L		WATER_DC(w)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	WATER	Occult little brown myotis bat (water)	400000	4000000	µg/L		WATER_BA(w)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachloronitrobenzene	82-68-8	WATER	Violet-green Swallow (water)	29000	290000	µg/L		WATER_VGS(w)_82-68-8
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SEDIMENT	Aquatic community organisms - sediment	0.01	0.1	mg/kg	MINIMUM	SEDIMENT_AQ(s)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.9	9	mg/kg		SEDIMENT_BA(i)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.47	4.7	mg/kg		SEDIMENT_VGS(i)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	American kestrel (Avian top carnivore)	57	570	mg/kg		SOIL_AK(f)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	American kestrel (insectivore / carnivore)	1.7	17	mg/kg		SOIL_AK(fi)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	American robin (Avian herbivore)	29	290	mg/kg		SOIL_AR(p)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	American robin (Avian insectivore)	0.36	3.6	mg/kg	MINIMUM	SOIL_AR(i)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	American robin (Avian omnivore)	0.72	7.2	mg/kg		SOIL_AR(ip)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	Deer mouse (Mammalian omnivore)	1.5	15	mg/kg		SOIL_DM(ip)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	Earthworm (Soil-dwelling invertebrate)	31	150	mg/kg		SOIL_EW_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	Generic plant (Terrestrial autotroph - producer)	5	50	mg/kg		SOIL_GP_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	Gray fox (Mammalian top carnivore)	230	2300	mg/kg		SOIL_RF(f)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	Montane shrew (Mammalian insectivore)	0.81	8.1	mg/kg		SOIL_MS(i)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	SOIL	Mountain cottontail (Mammalian herbivore)	180	1800	mg/kg		SOIL_DC(p)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	WATER	American kestrel (water)	27000	270000	µg/L		WATER_AK(w)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	WATER	American robin (water)	23000	230000	µg/L		WATER_AR(w)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	WATER	Aquatic community organisms - water	15	19	µg/L	MINIMUM	WATER_AQ(w)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	WATER	Deer mouse (water)	1200	12000	µg/L		WATER_DM(w)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	WATER	Gray fox (water)	2700	27000	µg/L		WATER_RF(w)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	WATER	Montane shrew (water)	1000	10000	µg/L		WATER_MS(w)_87-86-5

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	WATER	Mountain cottontail (water)	2400	24000	µg/L		WATER_DC(w)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	WATER	Occult little brown myotis bat (water)	1500	15000	µg/L		WATER_BA(w)_87-86-5
NONRAD	Semivolatile Organic compound	Pentachlorophenol	87-86-5	WATER	Violet-green Swallow (water)	13000	130000	µg/L		WATER_VGS(w)_87-86-5
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	750	7500	mg/kg	MINIMUM	SEDIMENT_BA(i)_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	SOIL	Deer mouse (Mammalian omnivore)	37	370	mg/kg		SOIL_DM(ip)_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	SOIL	Earthworm (Soil-dwelling invertebrate)	1.8	18	mg/kg		SOIL_EW_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	SOIL	Generic plant (Terrestrial autotroph - producer)	0.79	8	mg/kg	MINIMUM	SOIL_GP_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	SOIL	Gray fox (Mammalian top carnivore)	43000	430000	mg/kg		SOIL_RF(f)_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	SOIL	Montane shrew (Mammalian insectivore)	640	6400	mg/kg		SOIL_MS(i)_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	SOIL	Mountain cottontail (Mammalian herbivore)	47	470	mg/kg		SOIL_DC(p)_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	WATER	Aquatic community organisms - water	320	3200	µg/L	MINIMUM	WATER_AQ(w)_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	WATER	Deer mouse (water)	310000	3100000	µg/L		WATER_DM(w)_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	WATER	Gray fox (water)	690000	6900000	µg/L		WATER_RF(w)_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	WATER	Montane shrew (water)	260000	2600000	µg/L		WATER_MS(w)_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	WATER	Mountain cottontail (water)	610000	6100000	µg/L		WATER_DC(w)_108-95-2
NONRAD	Semivolatile Organic compound	Phenol	108-95-2	WATER	Occult little brown myotis bat (water)	370000	3700000	µg/L		WATER_BA(w)_108-95-2
NONRAD	Volatile Organic Compound	Acetone	67-64-1	AIR	Botta's Pocket Gopher (Burrowing mammal)	530		mg/m^3	MINIMUM	AIR_BPG(a)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SEDIMENT	Aquatic community organisms - sediment	0.065	0.65	mg/kg	MINIMUM	SEDIMENT_AQ(s)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	17	88	mg/kg		SEDIMENT_BA(i)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	230	2300	mg/kg		SEDIMENT_VGS(i)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SOIL	American kestrel (Avian top carnivore)	66000	660000	mg/kg		SOIL_AK(f)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SOIL	American kestrel (Insectivore / carnivore)	840	8400	mg/kg		SOIL_AK(fi)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SOIL	American robin (Avian herbivore)	7.5	75	mg/kg		SOIL_AR(p)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SOIL	American robin (Avian insectivore)	170	1700	mg/kg		SOIL_AR(i)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SOIL	American robin (Avian omnivore)	14	140	mg/kg		SOIL_AR(ip)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SOIL	Deer mouse (Mammalian omnivore)	1.2	6.3	mg/kg	MINIMUM	SOIL_DM(ip)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SOIL	Gray fox (Mammalian top carnivore)	7800	39000	mg/kg		SOIL_RF(f)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SOIL	Montane shrew (Mammalian insectivore)	15	79	mg/kg		SOIL_MS(i)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	SOIL	Mountain cottontail (Mammalian herbivore)	1.6	8	mg/kg		SOIL_DC(p)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	WATER	American kestrel (water)	1600000	16000000	µg/L		WATER_AK(w)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	WATER	American robin (water)	1400000	14000000	µg/L		WATER_AR(w)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	WATER	Aquatic community organisms - water	1500	15000	µg/L	MINIMUM	WATER_AQ(w)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	WATER	Deer mouse (water)	52000	260000	µg/L		WATER_DM(w)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	WATER	Gray fox (water)	110000	580000	µg/L		WATER_RF(w)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	WATER	Montane shrew (water)	44000	220000	µg/L		WATER_MS(w)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	WATER	Mountain cottontail (water)	100000	510000	µg/L		WATER_DC(w)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	WATER	Occult little brown myotis bat (water)	62000	310000	µg/L		WATER_BA(w)_67-64-1
NONRAD	Volatile Organic Compound	Acetone	67-64-1	WATER	Violet-green Swallow (water)	830000	8300000	µg/L		WATER_VGS(w)_67-64-1
NONRAD	Volatile Organic Compound	Benzene	71-43-2	AIR	Botta's Pocket Gopher (Burrowing mammal)	25		mg/m^3	MINIMUM	AIR_BPG(a)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	SEDIMENT	Aquatic community organisms - sediment	0.01	0.1	mg/kg	MINIMUM	SEDIMENT_AQ(s)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	54	550	mg/kg		SEDIMENT_BA(i)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	SOIL	Deer mouse (Mammalian omnivore)	24	240	mg/kg	MINIMUM	SOIL_DM(ip)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	SOIL	Gray fox (Mammalian top carnivore)	18000	180000	mg/kg		SOIL_RF(f)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	SOIL	Montane shrew (Mammalian insectivore)	49	490	mg/kg		SOIL_MS(i)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	SOIL	Mountain cottontail (Mammalian herbivore)	38	380	mg/kg		SOIL_DC(p)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	WATER	Aquatic community organisms - water	46	460	µg/L	MINIMUM	WATER_AQ(w)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	WATER	Deer mouse (water)	130000	1300000	µg/L		WATER_DM(w)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	WATER	Gray fox (water)	300000	3000000	µg/L		WATER_RF(w)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	WATER	Montane shrew (water)	110000	1100000	µg/L		WATER_MS(w)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	WATER	Mountain cottontail (water)	270000	2700000	µg/L		WATER_DC(w)_71-43-2
NONRAD	Volatile Organic Compound	Benzene	71-43-2	WATER	Occult little brown myotis bat (water)	160000	1600000	µg/L		WATER_BA(w)_71-43-2
NONRAD	Volatile Organic Compound	Benzyl Alcohol	100-51-6	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	300	3000	mg/kg	MINIMUM	SEDIMENT_BA(i)_100-51-6
NONRAD	Volatile Organic Compound	Benzyl Alcohol	100-51-6	SOIL	Deer mouse (Mammalian omnivore)	120	1200	mg/kg	MINIMUM	SOIL_DM(ip)_100-51-6
NONRAD	Volatile Organic Compound	Benzyl Alcohol	100-51-6	SOIL	Gray fox (Mammalian top carnivore)	110000	1100000	mg/kg		SOIL_RF(f)_100-51-6
NONRAD	Volatile Organic Compound	Benzyl Alcohol	100-51-6	SOIL	Montane shrew (Mammalian insectivore)	270	2700	mg/kg		SOIL_MS(i)_100-51-6

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Volatile Organic Compound	Benzyl Alcohol	100-51-6	SOIL	Mountain cottontail (Mammalian herbivore)	190	1900	mg/kg		SOIL_DC(p)_100-51-6
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	3000	7800	mg/kg	MINIMUM	SEDIMENT_BA(i)_78-93-3
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	SOIL	Deer mouse (Mammalian omnivore)	350	920	mg/kg	MINIMUM	SOIL_DM(ip)_78-93-3
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	SOIL	Gray fox (Mammalian top carnivore)	1300000	3500000	mg/kg		SOIL_RF(f)_78-93-3
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	SOIL	Montane shrew (Mammalian insectivore)	2700	6900	mg/kg		SOIL_MS(i)_78-93-3
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	SOIL	Mountain cottontail (Mammalian herbivore)	470	1200	mg/kg		SOIL_DC(p)_78-93-3
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	WATER	Aquatic community organisms - water	7200	71000	µg/L	MINIMUM	WATER_AQ(w)_78-93-3
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	WATER	Deer mouse (water)	9300000	24000000	µg/L		WATER_DM(w)_78-93-3
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	WATER	Gray fox (water)	20000000	53000000	µg/L		WATER_RF(w)_78-93-3
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	WATER	Montane shrew (water)	7900000	20000000	µg/L		WATER_MS(w)_78-93-3
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	WATER	Mountain cottontail (water)	18000000	47000000	µg/L		WATER_DC(w)_78-93-3
NONRAD	Volatile Organic Compound	Butanone[2-]	78-93-3	WATER	Occult little brown myotis bat (water)	11000000	28000000	µg/L		WATER_BA(w)_78-93-3
NONRAD	Volatile Organic Compound	Carbon Disulfide	75-15-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1.3	13	mg/kg	MINIMUM	SEDIMENT_BA(i)_75-15-0
NONRAD	Volatile Organic Compound	Carbon Disulfide	75-15-0	SOIL	Deer mouse (Mammalian omnivore)	0.81	8.1	mg/kg	MINIMUM	SOIL_DM(ip)_75-15-0
NONRAD	Volatile Organic Compound	Carbon Disulfide	75-15-0	SOIL	Gray fox (Mammalian top carnivore)	190	1900	mg/kg		SOIL_RF(f)_75-15-0
NONRAD	Volatile Organic Compound	Carbon Disulfide	75-15-0	SOIL	Montane shrew (Mammalian insectivore)	1.2	12	mg/kg		SOIL_MS(i)_75-15-0
NONRAD	Volatile Organic Compound	Carbon Disulfide	75-15-0	SOIL	Mountain cottontail (Mammalian herbivore)	1.4	14	mg/kg		SOIL_DC(p)_75-15-0
NONRAD	Volatile Organic Compound	Carbon Tetrachloride	56-23-5	AIR	Botta's Pocket Gopher (Burrowing mammal)	5.7		mg/m^3	MINIMUM	AIR_BPG(a)_56-23-5
NONRAD	Volatile Organic Compound	Chloroaniline[4-]	106-47-8	SOIL	Earthworm (Soil-dwelling invertebrate)	1.8	18	mg/kg		SOIL_EW_106-47-8
NONRAD	Volatile Organic Compound	Chloroaniline[4-]	106-47-8	SOIL	Generic plant (Terrestrial autotroph - producer)	1	10	mg/kg	MINIMUM	SOIL_GP_106-47-8
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	AIR	Botta's Pocket Gopher (Burrowing mammal)	20		mg/m^3	MINIMUM	AIR_BPG(a)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	9.2	25	mg/kg	MINIMUM	SEDIMENT_BA(i)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	SOIL	Deer mouse (Mammalian omnivore)	8	21	mg/kg	MINIMUM	SOIL_DM(ip)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	SOIL	Gray fox (Mammalian top carnivore)	8900	24000	mg/kg		SOIL_RF(f)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	SOIL	Montane shrew (Mammalian insectivore)	8.2	22	mg/kg		SOIL_MS(i)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	SOIL	Mountain cottontail (Mammalian herbivore)	19	52	mg/kg		SOIL_DC(p)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	WATER	Aquatic community organisms - water	1.8	18	µg/L	MINIMUM	WATER_AQ(w)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	WATER	Deer mouse (water)	78000	210000	µg/L		WATER_DM(w)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	WATER	Gray fox (water)	170000	470000	µg/L		WATER_RF(w)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	WATER	Montane shrew (water)	67000	180000	µg/L		WATER_MS(w)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	WATER	Mountain cottontail (water)	150000	420000	µg/L		WATER_DC(w)_67-66-3
NONRAD	Volatile Organic Compound	Chloroform	67-66-3	WATER	Occult little brown myotis bat (water)	94000	250000	µg/L		WATER_BA(w)_67-66-3
NONRAD	Volatile Organic Compound	Chloromethane	74-87-3	AIR	Botta's Pocket Gopher (Burrowing mammal)	21		mg/m^3	MINIMUM	AIR_BPG(a)_74-87-3
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,2-]	95-50-1	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1	10	mg/kg	MINIMUM	SEDIMENT_BA(i)_95-50-1
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,2-]	95-50-1	SOIL	Deer mouse (Mammalian omnivore)	1.5	15	mg/kg		SOIL_DM(ip)_95-50-1
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,2-]	95-50-1	SOIL	Gray fox (Mammalian top carnivore)	480	4800	mg/kg		SOIL_RF(f)_95-50-1
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,2-]	95-50-1	SOIL	Montane shrew (Mammalian insectivore)	0.92	9.2	mg/kg	MINIMUM	SOIL_MS(i)_95-50-1
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,2-]	95-50-1	SOIL	Mountain cottontail (Mammalian herbivore)	12	120	mg/kg		SOIL_DC(p)_95-50-1
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,3-]	541-73-1	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.82	8.2	mg/kg	MINIMUM	SEDIMENT_BA(i)_541-73-1
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,3-]	541-73-1	SOIL	Deer mouse (Mammalian omnivore)	1.2	12	mg/kg		SOIL_DM(ip)_541-73-1
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,3-]	541-73-1	SOIL	Gray fox (Mammalian top carnivore)	380	3800	mg/kg		SOIL_RF(f)_541-73-1
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,3-]	541-73-1	SOIL	Montane shrew (Mammalian insectivore)	0.74	7.4	mg/kg	MINIMUM	SOIL_MS(i)_541-73-1
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,3-]	541-73-1	SOIL	Mountain cottontail (Mammalian herbivore)	13	130	mg/kg		SOIL_DC(p)_541-73-1
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	SEDIMENT	Aquatic community organisms - sediment	0.03	0.3	mg/kg	MINIMUM	SEDIMENT_AQ(s)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.99	3.9	mg/kg		SEDIMENT_BA(i)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	SOIL	Deer mouse (Mammalian omnivore)	1.5	6	mg/kg		SOIL_DM(ip)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	SOIL	Earthworm (Soil-dwelling invertebrate)	1.2	12	mg/kg		SOIL_EW_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	SOIL	Gray fox (Mammalian top carnivore)	470	1800	mg/kg		SOIL_RF(f)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	SOIL	Montane shrew (Mammalian insectivore)	0.89	3.5	mg/kg	MINIMUM	SOIL_MS(i)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	SOIL	Mountain cottontail (Mammalian herbivore)	12	49	mg/kg		SOIL_DC(p)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	WATER	Aquatic community organisms - water	15	150	µg/L	MINIMUM	WATER_AQ(w)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	WATER	Deer mouse (water)	13000	52000	µg/L		WATER_DM(w)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	WATER	Gray fox (water)	29000	110000	µg/L		WATER_RF(w)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	WATER	Montane shrew (water)	11000	44000	µg/L		WATER_MS(w)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	WATER	Mountain cottontail (water)	25000	100000	µg/L		WATER_DC(w)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorobenzene[1,4-]	106-46-7	WATER	Occult little brown myotis bat (water)	15000	62000	µg/L		WATER_BA(w)_106-46-7
NONRAD	Volatile Organic Compound	Dichlorodifluoromethane	75-71-8	AIR	Botta's Pocket Gopher (Burrowing mammal)	2600		mg/m^3	MINIMUM	AIR_BPG(a)_75-71-8
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	AIR	Botta's Pocket Gopher (Burrowing mammal)	5600		mg/m^3	MINIMUM	AIR_BPG(a)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	SEDIMENT	Aquatic community organisms - sediment	0.02	0.2	mg/kg	MINIMUM	SEDIMENT_AQ(s)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	330	3300	mg/kg		SEDIMENT_BA(i)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	SOIL	Deer mouse (Mammalian omnivore)	210	2100	mg/kg	MINIMUM	SOIL_DM(ip)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	SOIL	Gray fox (Mammalian top carnivore)	250000	2500000	mg/kg		SOIL_RF(f)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	SOIL	Montane shrew (Mammalian insectivore)	290	2900	mg/kg		SOIL_MS(i)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	SOIL	Mountain cottontail (Mammalian herbivore)	410	4100	mg/kg		SOIL_DC(p)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	WATER	Aquatic community organisms - water	47	470	µg/L	MINIMUM	WATER_AQ(w)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	WATER	Deer mouse (water)	2000000	20000000	µg/L		WATER_DM(w)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	WATER	Gray fox (water)	4400000	44000000	µg/L		WATER_RF(w)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	WATER	Montane shrew (water)	1700000	17000000	µg/L		WATER_MS(w)_75-34-3

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	WATER	Mountain cottontail (water)	3900000	39000000	µg/L		WATER_DC(w)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,1-]	75-34-3	WATER	Occult little brown myotis bat (water)	2400000	24000000	µg/L		WATER_BA(w)_75-34-3
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	AIR	Botta's Pocket Gopher (Burrowing mammal)	41		mg/m^3	MINIMUM	AIR_BPG(a)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	100	1000	mg/kg		SEDIMENT_BA(i)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	6.1	12	mg/kg	MINIMUM	SEDIMENT_VGS(i)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SOIL	American kestrel (Avian top carnivore)	1300	2700	mg/kg		SOIL_AK(f)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SOIL	American kestrel (insectivore / carnivore)	22	44	mg/kg		SOIL_AK(fi)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SOIL	American robin (Avian herbivore)	0.85	1.6	mg/kg	MINIMUM	SOIL_AR(p)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SOIL	American robin (Avian insectivore)	4.5	9	mg/kg		SOIL_AR(i)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SOIL	American robin (Avian omnivore)	1.4	2.8	mg/kg		SOIL_AR(ip)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SOIL	Deer mouse (Mammalian omnivore)	27	270	mg/kg		SOIL_DM(ip)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SOIL	Gray fox (Mammalian top carnivore)	36000	360000	mg/kg		SOIL_RF(f)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SOIL	Montane shrew (Mammalian insectivore)	91	910	mg/kg		SOIL_MS(i)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	SOIL	Mountain cottontail (Mammalian herbivore)	39	390	mg/kg		SOIL_DC(p)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	WATER	American kestrel (water)	38000	75000	µg/L		WATER_AK(w)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	WATER	American robin (water)	32000	65000	µg/L		WATER_AR(w)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	WATER	Aquatic community organisms - water	100	1000	µg/L	MINIMUM	WATER_AQ(w)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	WATER	Deer mouse (water)	260000	2600000	µg/L		WATER_DM(w)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	WATER	Gray fox (water)	570000	5700000	µg/L		WATER_RF(w)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	WATER	Montane shrew (water)	220000	2200000	µg/L		WATER_MS(w)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	WATER	Mountain cottontail (water)	510000	5100000	µg/L		WATER_DC(w)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	WATER	Occult little brown myotis bat (water)	310000	3100000	µg/L		WATER_BA(w)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethane[1,2-]	107-06-2	WATER	Violet-green Swallow (water)	19000	37000	µg/L		WATER_VGS(w)_107-06-2
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	AIR	Botta's Pocket Gopher (Burrowing mammal)	5.7		mg/m^3	MINIMUM	AIR_BPG(a)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	SEDIMENT	Aquatic community organisms - sediment	0.1	1	mg/kg	MINIMUM	SEDIMENT_AQ(s)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	13	130	mg/kg		SEDIMENT_BA(i)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	SOIL	Deer mouse (Mammalian omnivore)	14	140	mg/kg		SOIL_DM(ip)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	SOIL	Gray fox (Mammalian top carnivore)	14000	140000	mg/kg		SOIL_RF(f)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	SOIL	Montane shrew (Mammalian insectivore)	11	110	mg/kg	MINIMUM	SOIL_MS(i)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	SOIL	Mountain cottontail (Mammalian herbivore)	44	440	mg/kg		SOIL_DC(p)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	WATER	Aquatic community organisms - water	25	250	µg/L	MINIMUM	WATER_AQ(w)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	WATER	Deer mouse (water)	150000	1500000	µg/L		WATER_DM(w)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	WATER	Gray fox (water)	340000	3400000	µg/L		WATER_RF(w)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	WATER	Montane shrew (water)	130000	1300000	µg/L		WATER_MS(w)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	WATER	Mountain cottontail (water)	300000	3000000	µg/L		WATER_DC(w)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[1,1-]	75-35-4	WATER	Occult little brown myotis bat (water)	180000	1800000	µg/L		WATER_BA(w)_75-35-4
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	SEDIMENT	Aquatic community organisms - sediment	0.2	2	mg/kg	MINIMUM	SEDIMENT_AQ(s)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	26	260	mg/kg		SEDIMENT_BA(i)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	SOIL	Deer mouse (Mammalian omnivore)	25	250	mg/kg		SOIL_DM(ip)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	SOIL	Gray fox (Mammalian top carnivore)	25000	250000	mg/kg		SOIL_RF(f)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	SOIL	Montane shrew (Mammalian insectivore)	24	240	mg/kg	MINIMUM	SOIL_MS(i)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	SOIL	Mountain cottontail (Mammalian herbivore)	64	640	mg/kg		SOIL_DC(p)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	WATER	Aquatic community organisms - water	590	1100	µg/L	MINIMUM	WATER_AQ(w)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	WATER	Deer mouse (water)	230000	2300000	µg/L		WATER_DM(w)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	WATER	Gray fox (water)	520000	5200000	µg/L		WATER_RF(w)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	WATER	Montane shrew (water)	200000	2000000	µg/L		WATER_MS(w)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	WATER	Mountain cottontail (water)	460000	4600000	µg/L		WATER_DC(w)_540-59-0
NONRAD	Volatile Organic Compound	Dichloroethene[cis/trans-1,2-]	540-59-0	WATER	Occult little brown myotis bat (water)	280000	2800000	µg/L		WATER_BA(w)_540-59-0
NONRAD	Volatile Organic Compound	Diphenylamine	122-39-4	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	13	22	mg/kg	MINIMUM	SEDIMENT_VGS(i)_122-39-4
NONRAD	Volatile Organic Compound	Diphenylamine	122-39-4	SOIL	American kestrel (Avian top carnivore)	3900	6500	mg/kg		SOIL_AK(f)_122-39-4
NONRAD	Volatile Organic Compound	Diphenylamine	122-39-4	SOIL	American kestrel (insectivore / carnivore)	49	81	mg/kg		SOIL_AK(fi)_122-39-4
NONRAD	Volatile Organic Compound	Diphenylamine	122-39-4	SOIL	American robin (Avian herbivore)	78	130	mg/kg		SOIL_AR(p)_122-39-4
NONRAD	Volatile Organic Compound	Diphenylamine	122-39-4	SOIL	American robin (Avian insectivore)	10	16	mg/kg	MINIMUM	SOIL_AR(i)_122-39-4
NONRAD	Volatile Organic Compound	Diphenylamine	122-39-4	SOIL	American robin (Avian omnivore)	17	29	mg/kg		SOIL_AR(ip)_122-39-4
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.22	2.2	mg/kg		SEDIMENT_BA(i)_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.1	1	mg/kg	MINIMUM	SEDIMENT_VGS(i)_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	American kestrel (Avian top carnivore)	12	120	mg/kg		SOIL_AK(f)_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	American kestrel (insectivore / carnivore)	0.37	3.7	mg/kg		SOIL_AK(fi)_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	American robin (Avian herbivore)	83	830	mg/kg		SOIL_AR(p)_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	American robin (Avian insectivore)	0.079	0.79	mg/kg	MINIMUM	SOIL_AR(i)_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	American robin (Avian omnivore)	0.15	1.5	mg/kg		SOIL_AR(ip)_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	Deer mouse (Mammalian omnivore)	0.39	3.9	mg/kg		SOIL_DM(ip)_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	Earthworm (Soil-dwelling invertebrate)	10	100	mg/kg		SOIL_EW_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	Generic plant (Terrestrial autotroph - producer)	10	100	mg/kg		SOIL_GP_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	Gray fox (Mammalian top carnivore)	59	590	mg/kg		SOIL_RF(f)_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	Montane shrew (Mammalian insectivore)	0.2	2	mg/kg		SOIL_MS(i)_118-74-1
NONRAD	Volatile Organic Compound	Hexachlorobenzene	118-74-1	SOIL	Mountain cottontail (Mammalian herbivore)	910	9100	mg/kg		SOIL_DC(p)_118-74-1
NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	6	23	mg/kg		SEDIMENT_BA(i)_591-78-6
NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.47	4.7	mg/kg	MINIMUM	SEDIMENT_VGS(i)_591-78-6
NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SOIL	American kestrel (Avian top carnivore)	290	2900	mg/kg		SOIL_AK(f)_591-78-6
NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SOIL	American kestrel (insectivore / carnivore)	1.7	17	mg/kg		SOIL_AK(fi)_591-78-6

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SOIL	American robin (Avian herbivore)	0.47	4.7	mg/kg		SOIL_AR(p)_591-78-6
NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SOIL	American robin (Avian insectivore)	0.36	3.6	mg/kg	MINIMUM	SOIL_AR(i)_591-78-6
NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SOIL	American robin (Avian omnivore)	0.41	4.1	mg/kg		SOIL_AR(ip)_591-78-6
NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SOIL	Deer mouse (Mammalian omnivore)	6.1	23	mg/kg		SOIL_DM(ip)_591-78-6
NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SOIL	Gray fox (Mammalian top carnivore)	5900	22000	mg/kg		SOIL_RF(f)_591-78-6
NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SOIL	Montane shrew (Mammalian insectivore)	5.4	20	mg/kg		SOIL_MS(i)_591-78-6
NONRAD	Volatile Organic Compound	Hexanone[2-]	591-78-6	SOIL	Mountain cottontail (Mammalian herbivore)	17	65	mg/kg		SOIL_DC(p)_591-78-6
NONRAD	Volatile Organic Compound	Iodomethane	74-88-4	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.081	0.16	mg/kg	MINIMUM	SEDIMENT_VGS(i)_74-88-4
NONRAD	Volatile Organic Compound	Iodomethane	74-88-4	SOIL	American kestrel (Avian top carnivore)	46	92	mg/kg		SOIL_AK(f)_74-88-4
NONRAD	Volatile Organic Compound	Iodomethane	74-88-4	SOIL	American kestrel (Insectivore / carnivore)	0.29	0.59	mg/kg		SOIL_AK(fi)_74-88-4
NONRAD	Volatile Organic Compound	Iodomethane	74-88-4	SOIL	American robin (Avian herbivore)	0.038	0.076	mg/kg	MINIMUM	SOIL_AR(p)_74-88-4
NONRAD	Volatile Organic Compound	Iodomethane	74-88-4	SOIL	American robin (Avian insectivore)	0.062	0.12	mg/kg		SOIL_AR(i)_74-88-4
NONRAD	Volatile Organic Compound	Iodomethane	74-88-4	SOIL	American robin (Avian omnivore)	0.047	0.095	mg/kg		SOIL_AR(ip)_74-88-4
NONRAD	Volatile Organic Compound	Methyl-2-pentanone[4-]	108-10-1	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	17	170	mg/kg	MINIMUM	SEDIMENT_BA(i)_108-10-1
NONRAD	Volatile Organic Compound	Methyl-2-pentanone[4-]	108-10-1	SOIL	Deer mouse (Mammalian omnivore)	9.7	97	mg/kg	MINIMUM	SOIL_DM(ip)_108-10-1
NONRAD	Volatile Organic Compound	Methyl-2-pentanone[4-]	108-10-1	SOIL	Gray fox (Mammalian top carnivore)	18000	180000	mg/kg		SOIL_RF(f)_108-10-1
NONRAD	Volatile Organic Compound	Methyl-2-pentanone[4-]	108-10-1	SOIL	Montane shrew (Mammalian insectivore)	15	150	mg/kg		SOIL_MS(i)_108-10-1
NONRAD	Volatile Organic Compound	Methyl-2-pentanone[4-]	108-10-1	SOIL	Mountain cottontail (Mammalian herbivore)	17	170	mg/kg		SOIL_DC(p)_108-10-1
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	AIR	Botta's Pocket Gopher (Burrowing mammal)	1300		mg/m^3	MINIMUM	AIR_BPG(a)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	SEDIMENT	Aquatic community organisms - sediment	0.018	0.18	mg/kg	MINIMUM	SEDIMENT_AQ(s)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	10	88	mg/kg		SEDIMENT_BA(i)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	SOIL	Deer mouse (Mammalian omnivore)	2.6	22	mg/kg	MINIMUM	SOIL_DM(ip)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	SOIL	Generic plant (Terrestrial autotroph - producer)	1600	16000	mg/kg		SOIL_GP_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	SOIL	Gray fox (Mammalian top carnivore)	4300	36000	mg/kg		SOIL_RF(f)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	SOIL	Montane shrew (Mammalian insectivore)	9.2	79	mg/kg		SOIL_MS(i)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	SOIL	Mountain cottontail (Mammalian herbivore)	3.8	32	mg/kg		SOIL_DC(p)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	WATER	Aquatic community organisms - water	210	2100	µg/L	MINIMUM	WATER_AQ(w)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	WATER	Deer mouse (water)	30000	260000	µg/L		WATER_DM(w)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	WATER	Gray fox (water)	68000	580000	µg/L		WATER_RF(w)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	WATER	Montane shrew (water)	26000	220000	µg/L		WATER_MS(w)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	WATER	Mountain cottontail (water)	60000	510000	µg/L		WATER_DC(w)_75-09-2
NONRAD	Volatile Organic Compound	Methylene Chloride	75-09-2	WATER	Occult little brown myotis bat (water)	36000	310000	µg/L		WATER_BA(w)_75-09-2
NONRAD	Volatile Organic Compound	Styrene	100-42-5	SOIL	Earthworm (Soil-dwelling invertebrate)	1.2	12	mg/kg	MINIMUM	SOIL_EW_100-42-5
NONRAD	Volatile Organic Compound	Styrene	100-42-5	SOIL	Generic plant (Terrestrial autotroph - producer)	3.2	32	mg/kg		SOIL_GP_100-42-5
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	AIR	Botta's Pocket Gopher (Burrowing mammal)	73		mg/m^3	MINIMUM	AIR_BPG(a)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	SEDIMENT	Aquatic community organisms - sediment	0.002	0.02	mg/kg	MINIMUM	SEDIMENT_AQ(s)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.2	1	mg/kg		SEDIMENT_BA(i)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	SOIL	Deer mouse (Mammalian omnivore)	0.35	1.7	mg/kg		SOIL_DM(ip)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	SOIL	Generic plant (Terrestrial autotroph - producer)	10	100	mg/kg		SOIL_GP_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	SOIL	Gray fox (Mammalian top carnivore)	120	630	mg/kg		SOIL_RF(f)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	SOIL	Montane shrew (Mammalian insectivore)	0.18	0.94	mg/kg	MINIMUM	SOIL_MS(i)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	SOIL	Mountain cottontail (Mammalian herbivore)	9.5	47	mg/kg		SOIL_DC(p)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	WATER	Aquatic community organisms - water	98	830	µg/L	MINIMUM	WATER_AQ(w)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	WATER	Deer mouse (water)	10000	52000	µg/L		WATER_DM(w)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	WATER	Gray fox (water)	23000	110000	µg/L		WATER_RF(w)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	WATER	Montane shrew (water)	8900	44000	µg/L		WATER_MS(w)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	WATER	Mountain cottontail (water)	20000	100000	µg/L		WATER_DC(w)_127-18-4
NONRAD	Volatile Organic Compound	Tetrachloroethene	127-18-4	WATER	Occult little brown myotis bat (water)	12000	62000	µg/L		WATER_BA(w)_127-18-4
NONRAD	Volatile Organic Compound	Toluene	108-88-3	AIR	Botta's Pocket Gopher (Burrowing mammal)	60		mg/m^3	MINIMUM	AIR_BPG(a)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	SEDIMENT	Aquatic community organisms - sediment	0.01	0.1	mg/kg	MINIMUM	SEDIMENT_AQ(s)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	25	250	mg/kg		SEDIMENT_BA(i)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	SOIL	Deer mouse (Mammalian omnivore)	25	250	mg/kg		SOIL_DM(ip)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	SOIL	Generic plant (Terrestrial autotroph - producer)	200	2000	mg/kg		SOIL_GP_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	SOIL	Gray fox (Mammalian top carnivore)	12000	120000	mg/kg		SOIL_RF(f)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	SOIL	Montane shrew (Mammalian insectivore)	23	230	mg/kg	MINIMUM	SOIL_MS(i)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	SOIL	Mountain cottontail (Mammalian herbivore)	66	660	mg/kg		SOIL_DC(p)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	WATER	Aquatic community organisms - water	9.8	98	µg/L	MINIMUM	WATER_AQ(w)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	WATER	Deer mouse (water)	130000	1300000	µg/L		WATER_DM(w)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	WATER	Gray fox (water)	300000	3000000	µg/L		WATER_RF(w)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	WATER	Montane shrew (water)	110000	1100000	µg/L		WATER_MS(w)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	WATER	Mountain cottontail (water)	260000	2600000	µg/L		WATER_DC(w)_108-88-3
NONRAD	Volatile Organic Compound	Toluene	108-88-3	WATER	Occult little brown myotis bat (water)	160000	1600000	µg/L		WATER_BA(w)_108-88-3
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	SEDIMENT	Aquatic community organisms - sediment	0.011	0.11	mg/kg	MINIMUM	SEDIMENT_AQ(s)_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.3	3	mg/kg		SEDIMENT_BA(i)_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	SOIL	Deer mouse (Mammalian omnivore)	0.51	5.1	mg/kg		SOIL_DM(ip)_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	SOIL	Earthworm (Soil-dwelling invertebrate)	1.2	12	mg/kg		SOIL_EW_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	SOIL	Gray fox (Mammalian top carnivore)	110	1100	mg/kg		SOIL_RF(f)_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	SOIL	Montane shrew (Mammalian insectivore)	0.27	2.7	mg/kg	MINIMUM	SOIL_MS(i)_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	SOIL	Mountain cottontail (Mammalian herbivore)	12	120	mg/kg		SOIL_DC(p)_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	WATER	Aquatic community organisms - water	24	240	µg/L	MINIMUM	WATER_AQ(w)_120-82-1

LANL RECEPTOR-SPECIFIC ESLS

NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	WATER	Deer mouse (water)	7700	77000	µg/L		WATER_DM(w)_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	WATER	Gray fox (water)	17000	170000	µg/L		WATER_RF(w)_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	WATER	Montane shrew (water)	6600	66000	µg/L		WATER_MS(w)_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	WATER	Mountain cottontail (water)	15000	150000	µg/L		WATER_DC(w)_120-82-1
NONRAD	Volatile Organic Compound	Trichlorobenzene[1,2,4-]	120-82-1	WATER	Occult little brown myotis bat (water)	9300	93000	µg/L		WATER_BA(w)_120-82-1
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	AIR	Botta's Pocket Gopher (Burrowing mammal)	240		mg/m^3	MINIMUM	AIR_BPG(a)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	SEDIMENT	Aquatic community organisms - sediment	0.07	0.7	mg/kg	MINIMUM	SEDIMENT_AQ(s)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	290	2900	mg/kg		SEDIMENT_BA(i)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	SOIL	Deer mouse (Mammalian omnivore)	400	4000	mg/kg		SOIL_DM(ip)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	SOIL	Gray fox (Mammalian top carnivore)	310000	3100000	mg/kg		SOIL_RF(f)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	SOIL	Montane shrew (Mammalian insectivore)	260	2600	mg/kg	MINIMUM	SOIL_MS(i)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	SOIL	Mountain cottontail (Mammalian herbivore)	2000	20000	mg/kg		SOIL_DC(p)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	WATER	Aquatic community organisms - water	11	110	µg/L	MINIMUM	WATER_AQ(w)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	WATER	Deer mouse (water)	5200000	52000000	µg/L		WATER_DM(w)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	WATER	Gray fox (water)	11000000	110000000	µg/L		WATER_RF(w)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	WATER	Montane shrew (water)	4400000	44000000	µg/L		WATER_MS(w)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	WATER	Mountain cottontail (water)	10000000	100000000	µg/L		WATER_DC(w)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethane[1,1,1-]	71-55-6	WATER	Occult little brown myotis bat (water)	6200000	62000000	µg/L		WATER_BA(w)_71-55-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	AIR	Botta's Pocket Gopher (Burrowing mammal)	19		mg/m^3	MINIMUM	AIR_BPG(a)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	SEDIMENT	Aquatic community organisms - sediment	0.078	0.78	mg/kg	MINIMUM	SEDIMENT_AQ(s)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	46	460	mg/kg		SEDIMENT_BA(i)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	SOIL	Deer mouse (Mammalian omnivore)	54	540	mg/kg		SOIL_DM(ip)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	SOIL	Gray fox (Mammalian top carnivore)	42000	420000	mg/kg		SOIL_RF(f)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	SOIL	Montane shrew (Mammalian insectivore)	42	420	mg/kg	MINIMUM	SOIL_MS(i)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	SOIL	Mountain cottontail (Mammalian herbivore)	190	1900	mg/kg		SOIL_DC(p)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	WATER	Aquatic community organisms - water	21	210	µg/L	MINIMUM	WATER_AQ(w)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	WATER	Deer mouse (water)	520000	5200000	µg/L		WATER_DM(w)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	WATER	Gray fox (water)	1100000	11000000	µg/L		WATER_RF(w)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	WATER	Montane shrew (water)	440000	4400000	µg/L		WATER_MS(w)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	WATER	Mountain cottontail (water)	1000000	10000000	µg/L		WATER_DC(w)_79-01-6
NONRAD	Volatile Organic Compound	Trichloroethene	79-01-6	WATER	Occult little brown myotis bat (water)	620000	6200000	µg/L		WATER_BA(w)_79-01-6
NONRAD	Volatile Organic Compound	Trichlorofluoromethane	75-69-4	AIR	Botta's Pocket Gopher (Burrowing mammal)	820		mg/m^3	MINIMUM	AIR_BPG(a)_75-69-4
NONRAD	Volatile Organic Compound	Trichlorofluoromethane	75-69-4	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	58	390	mg/kg	MINIMUM	SEDIMENT_BA(i)_75-69-4
NONRAD	Volatile Organic Compound	Trichlorofluoromethane	75-69-4	SOIL	Deer mouse (Mammalian omnivore)	97	650	mg/kg		SOIL_DM(ip)_75-69-4
NONRAD	Volatile Organic Compound	Trichlorofluoromethane	75-69-4	SOIL	Gray fox (Mammalian top carnivore)	62000	420000	mg/kg		SOIL_RF(f)_75-69-4
NONRAD	Volatile Organic Compound	Trichlorofluoromethane	75-69-4	SOIL	Montane shrew (Mammalian insectivore)	52	350	mg/kg	MINIMUM	SOIL_MS(i)_75-69-4
NONRAD	Volatile Organic Compound	Trichlorofluoromethane	75-69-4	SOIL	Mountain cottontail (Mammalian herbivore)	1800	12000	mg/kg		SOIL_DC(p)_75-69-4
NONRAD	Volatile Organic Compound	Vinyl Chloride	75-01-4	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	0.14	1.4	mg/kg	MINIMUM	SEDIMENT_BA(i)_75-01-4
NONRAD	Volatile Organic Compound	Vinyl Chloride	75-01-4	SOIL	Deer mouse (Mammalian omnivore)	0.13	1.3	mg/kg		SOIL_DM(ip)_75-01-4
NONRAD	Volatile Organic Compound	Vinyl Chloride	75-01-4	SOIL	Gray fox (Mammalian top carnivore)	110	1100	mg/kg		SOIL_RF(f)_75-01-4
NONRAD	Volatile Organic Compound	Vinyl Chloride	75-01-4	SOIL	Montane shrew (Mammalian insectivore)	0.12	1.2	mg/kg	MINIMUM	SOIL_MS(i)_75-01-4
NONRAD	Volatile Organic Compound	Vinyl Chloride	75-01-4	SOIL	Mountain cottontail (Mammalian herbivore)	0.34	3.4	mg/kg		SOIL_DC(p)_75-01-4
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	AIR	Botta's Pocket Gopher (Burrowing mammal)	87		mg/m^3	MINIMUM	AIR_BPG(a)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SEDIMENT	Aquatic community organisms - sediment	0.13	1.3	mg/kg	MINIMUM	SEDIMENT_AQ(s)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1.6	2	mg/kg		SEDIMENT_BA(i)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	53	530	mg/kg		SEDIMENT_VGS(i)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SOIL	American kestrel (Avian top carnivore)	13000	130000	mg/kg		SOIL_AK(f)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SOIL	American kestrel (insectivore / carnivore)	190	1900	mg/kg		SOIL_AK(fi)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SOIL	American robin (Avian herbivore)	89	890	mg/kg		SOIL_AR(p)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SOIL	American robin (Avian insectivore)	41	410	mg/kg		SOIL_AR(i)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SOIL	American robin (Avian omnivore)	56	560	mg/kg		SOIL_AR(ip)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SOIL	Deer mouse (Mammalian omnivore)	1.9	2.4	mg/kg		SOIL_DM(ip)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SOIL	Generic plant (Terrestrial autotroph - producer)	100	1000	mg/kg		SOIL_GP_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SOIL	Gray fox (Mammalian top carnivore)	750	930	mg/kg		SOIL_RF(f)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SOIL	Montane shrew (Mammalian insectivore)	1.4	1.8	mg/kg	MINIMUM	SOIL_MS(i)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	SOIL	Mountain cottontail (Mammalian herbivore)	7.6	9.5	mg/kg		SOIL_DC(p)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	WATER	American kestrel (water)	880000	8900000	µg/L		WATER_AK(w)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	WATER	American robin (water)	760000	7600000	µg/L		WATER_AR(w)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	WATER	Aquatic community organisms - water	13	130	µg/L	MINIMUM	WATER_AQ(w)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	WATER	Deer mouse (water)	11000	1300000	µg/L		WATER_DM(w)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	WATER	Gray fox (water)	24000	3000000	µg/L		WATER_RF(w)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	WATER	Montane shrew (water)	9400	1100000	µg/L		WATER_MS(w)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	WATER	Mountain cottontail (water)	21000	2600000	µg/L		WATER_DC(w)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	WATER	Occult little brown myotis bat (water)	13000	1600000	µg/L		WATER_BA(w)_1330-20-7
NONRAD	Volatile Organic Compound	Xylene (Total)	1330-20-7	WATER	Violet-green Swallow (water)	440000	4400000	µg/L		WATER_VGS(w)_1330-20-7
RAD	Radionuclide	Americium-241	AM-241	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	66000	660000	pCi/g		SEDIMENT_A(s)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	66000	660000	pCi/g		SEDIMENT_AS(s)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	66000	660000	pCi/g		SEDIMENT_D(s)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	66000	660000	pCi/g		SEDIMENT_GF(s)_AM-241

LANL RECEPTOR-SPECIFIC ESLS

RAD	Radionuclide	Americium-241	AM-241	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	3500	35000 pCi/g		SEDIMENT_BA(i)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	1000	10000 pCi/g	MINIMUM	SEDIMENT_VGS(i)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	American kestrel (Avian top carnivore)	57000	570000 pCi/g		SOIL_AK(f)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	American kestrel (insectivore / carnivore)	43000	430000 pCi/g		SOIL_AK(fi)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	American robin (Avian herbivore)	4600	46000 pCi/g		SOIL_AR(p)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	American robin (Avian insectivore)	10000	100000 pCi/g		SOIL_AR(i)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	American robin (Avian omnivore)	6100	61000 pCi/g		SOIL_AR(ip)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	Deer mouse (Mammalian omnivore)	33000	330000 pCi/g		SOIL_DM(ip)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	Earthworm (Soil-dwelling invertebrate)	190	1900 pCi/g	MINIMUM	SOIL_EW_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	Generic plant (Terrestrial autotroph - producer)	500	5000 pCi/g		SOIL_GP_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	Gray fox (Mammalian top carnivore)	26000	260000 pCi/g		SOIL_RF(f)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	Montane shrew (Mammalian insectivore)	34000	340000 pCi/g		SOIL_MS(i)_AM-241
RAD	Radionuclide	Americium-241	AM-241	SOIL	Mountain cottontail (Mammalian herbivore)	26000	260000 pCi/g		SOIL_DC(p)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	Algae (Aquatic autotroph - producer) - water	5.8	58 pCi/L	MINIMUM	WATER_A(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	American kestrel (water)	76000000	760000000 pCi/L		WATER_AK(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	American robin (water)	75000000	750000000 pCi/L		WATER_AR(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	170	1700 pCi/L		WATER_AS(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	170	1700 pCi/L		WATER_D(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	Deer mouse (water)	1300000000	13000000000 pCi/L		WATER_DM(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	Fish (Aquatic intermediate carnivore) - water	170	1700 pCi/L		WATER_GF(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	Gray fox (water)	5700000	57000000 pCi/L		WATER_RF(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	Montane shrew (water)	780000000	7800000000 pCi/L		WATER_MS(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	Mountain cottontail (water)	91000000	910000000 pCi/L		WATER_DC(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	Occult little brown myotis bat (water)	170000000	1700000000 pCi/L		WATER_BA(w)_AM-241
RAD	Radionuclide	Americium-241	AM-241	WATER	Violet-green Swallow (water)	180000000	1800000000 pCi/L		WATER_VGS(w)_AM-241
RAD	Radionuclide	Cesium-134	CS-134	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	2200	22000 pCi/g		SEDIMENT_A(s)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	2200	22000 pCi/g		SEDIMENT_AS(s)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	2200	22000 pCi/g		SEDIMENT_D(s)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	2200	22000 pCi/g		SEDIMENT_GF(s)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1200	12000 pCi/g		SEDIMENT_BA(i)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	320	3200 pCi/g	MINIMUM	SEDIMENT_VGS(i)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	American kestrel (Avian top carnivore)	980	9800 pCi/g		SOIL_AK(f)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	American kestrel (insectivore / carnivore)	1000	10000 pCi/g		SOIL_AK(fi)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	American robin (Avian herbivore)	680	6800 pCi/g	MINIMUM	SOIL_AR(p)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	American robin (Avian insectivore)	2100	21000 pCi/g		SOIL_AR(i)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	American robin (Avian omnivore)	1200	12000 pCi/g		SOIL_AR(ip)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	Deer mouse (Mammalian omnivore)	1100	11000 pCi/g		SOIL_DM(ip)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	Earthworm (Soil-dwelling invertebrate)	1000	10000 pCi/g		SOIL_EW_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	Generic plant (Terrestrial autotroph - producer)	700	7000 pCi/g		SOIL_GP_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	Gray fox (Mammalian top carnivore)	730	7300 pCi/g		SOIL_RF(f)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	Montane shrew (Mammalian insectivore)	1100	11000 pCi/g		SOIL_MS(i)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	SOIL	Mountain cottontail (Mammalian herbivore)	790	7900 pCi/g		SOIL_DC(p)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	Algae (Aquatic autotroph - producer) - water	1900	19000 pCi/L		WATER_A(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	American kestrel (water)	140000000	1400000000 pCi/L		WATER_AK(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	American robin (water)	140000000	1400000000 pCi/L		WATER_AR(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	9400	94000 pCi/L		WATER_AS(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	9400	94000 pCi/L		WATER_D(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	Deer mouse (water)	330000000	3300000000 pCi/L		WATER_DM(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	Fish (Aquatic intermediate carnivore) - water	470	4700 pCi/L	MINIMUM	WATER_GF(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	Gray fox (water)	7500000	75000000 pCi/L		WATER_RF(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	Montane shrew (water)	300000000	3000000000 pCi/L		WATER_MS(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	Mountain cottontail (water)	27000000	270000000 pCi/L		WATER_DC(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	Occult little brown myotis bat (water)	990000000	9900000000 pCi/L		WATER_BA(w)_CS-134
RAD	Radionuclide	Cesium-134	CS-134	WATER	Violet-green Swallow (water)	270000000	2700000000 pCi/L		WATER_VGS(w)_CS-134
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	5000	50000 pCi/g		SEDIMENT_A(s)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	5000	50000 pCi/g		SEDIMENT_AS(s)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	5000	50000 pCi/g		SEDIMENT_D(s)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	5000	50000 pCi/g		SEDIMENT_GF(s)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2600	26000 pCi/g		SEDIMENT_BA(i)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	720	7200 pCi/g	MINIMUM	SEDIMENT_VGS(i)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	American kestrel (Avian top carnivore)	3700	37000 pCi/g		SOIL_AK(f)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	American kestrel (insectivore / carnivore)	4200	42000 pCi/g		SOIL_AK(fi)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	American robin (Avian herbivore)	1400	14000 pCi/g	MINIMUM	SOIL_AR(p)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	American robin (Avian insectivore)	4500	45000 pCi/g		SOIL_AR(i)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	American robin (Avian omnivore)	2600	26000 pCi/g		SOIL_AR(ip)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	Deer mouse (Mammalian omnivore)	2300	23000 pCi/g		SOIL_DM(ip)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	Earthworm (Soil-dwelling invertebrate)	2300	23000 pCi/g		SOIL_EW_CS-137/ BA-137

LANL RECEPTOR-SPECIFIC ESLS

RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	Generic plant (Terrestrial autotroph - producer)	1500	15000	pCi/g		SOIL_GP_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	Gray fox (Mammalian top carnivore)	1500	15000	pCi/g		SOIL_RF(f)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	Montane shrew (Mammalian insectivore)	2400	24000	pCi/g		SOIL_MS(i)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	Mountain cottontail (Mammalian herbivore)	1700	17000	pCi/g		SOIL_DC(p)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	Algae (Aquatic autotroph - producer) - water	4600	46000	pCi/L		WATER_A(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	American kestrel (water)	310000000	3100000000	pCi/L		WATER_AK(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	American robin (water)	310000000	3100000000	pCi/L		WATER_AR(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	23000	230000	pCi/L		WATER_AS(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	23000	230000	pCi/L		WATER_D(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	Deer mouse (water)	730000000	7300000000	pCi/L		WATER_DM(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	Fish (Aquatic intermediate carnivore) - water	1100	11000	pCi/L	MINIMUM	WATER_GF(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	Gray fox (water)	16000000	160000000	pCi/L		WATER_RF(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	Montane shrew (water)	650000000	6500000000	pCi/L		WATER_MS(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	Mountain cottontail (water)	59000000	590000000	pCi/L		WATER_DC(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	Occult little brown myotis bat (water)	2100000000	21000000000	pCi/L		WATER_BA(w)_CS-137/ BA-137
RAD	Radionuclide	Cesium-137 + Barium-137	CS-137/ BA-137	WATER	Violet-green Swallow (water)	580000000	5800000000	pCi/L		WATER_VGS(w)_CS-137/ BA-137
RAD	Radionuclide	Cobalt-60	CO-60	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	1400	14000	pCi/g		SEDIMENT_A(s)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	1400	14000	pCi/g		SEDIMENT_AS(s)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	1400	14000	pCi/g		SEDIMENT_D(s)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	1400	14000	pCi/g		SEDIMENT_GF(s)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	760	7600	pCi/g		SEDIMENT_BA(i)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	200	2000	pCi/g	MINIMUM	SEDIMENT_VGS(i)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	American kestrel (Avian top carnivore)	1500	15000	pCi/g		SOIL_AK(f)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	American kestrel (Insectivore / carnivore)	1500	15000	pCi/g		SOIL_AK(fi)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	American robin (Avian herbivore)	1500	15000	pCi/g		SOIL_AR(p)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	American robin (Avian insectivore)	1500	15000	pCi/g		SOIL_AR(i)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	American robin (Avian omnivore)	1500	15000	pCi/g		SOIL_AR(ip)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	Deer mouse (Mammalian omnivore)	760	7600	pCi/g	MINIMUM	SOIL_DM(ip)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	Earthworm (Soil-dwelling invertebrate)	760	7600	pCi/g	MINIMUM	SOIL_EW_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	Generic plant (Terrestrial autotroph - producer)	760	7600	pCi/g	MINIMUM	SOIL_GP_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	Gray fox (Mammalian top carnivore)	760	7600	pCi/g	MINIMUM	SOIL_RF(f)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	Montane shrew (Mammalian insectivore)	760	7600	pCi/g	MINIMUM	SOIL_MS(i)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	SOIL	Mountain cottontail (Mammalian herbivore)	760	7600	pCi/g	MINIMUM	SOIL_DC(p)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	Algae (Aquatic autotroph - producer) - water	760	7600	pCi/L		WATER_A(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	American kestrel (water)	1900000000	19000000000	pCi/L		WATER_AK(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	American robin (water)	1800000000	18000000000	pCi/L		WATER_AR(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	380	3800	pCi/L	MINIMUM	WATER_AS(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	380	3800	pCi/L	MINIMUM	WATER_D(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	Deer mouse (water)	3900000000	39000000000	pCi/L		WATER_DM(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	Fish (Aquatic intermediate carnivore) - water	2300	23000	pCi/L		WATER_GF(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	Gray fox (water)	97000000	970000000	pCi/L		WATER_RF(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	Montane shrew (water)	3700000000	37000000000	pCi/L		WATER_MS(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	Mountain cottontail (water)	330000000	3300000000	pCi/L		WATER_DC(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	Occult little brown myotis bat (water)	12000000000	1.2E+11	pCi/L		WATER_BA(w)_CO-60
RAD	Radionuclide	Cobalt-60	CO-60	WATER	Violet-green Swallow (water)	3400000000	34000000000	pCi/L		WATER_VGS(w)_CO-60
RAD	Radionuclide	Europium-152	EU-152	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	1000	10000	pCi/g		SEDIMENT_A(s)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	1000	10000	pCi/g		SEDIMENT_AS(s)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	1000	10000	pCi/g		SEDIMENT_D(s)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	1000	10000	pCi/g		SEDIMENT_GF(s)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	120	1200	pCi/g		SEDIMENT_BA(i)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	34	340	pCi/g	MINIMUM	SEDIMENT_VGS(i)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	American kestrel (Avian top carnivore)	1000	10000	pCi/g		SOIL_AK(f)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	American kestrel (Insectivore / carnivore)	1000	10000	pCi/g		SOIL_AK(fi)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	American robin (Avian herbivore)	1000	10000	pCi/g		SOIL_AR(p)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	American robin (Avian insectivore)	1000	10000	pCi/g		SOIL_AR(i)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	American robin (Avian omnivore)	1000	10000	pCi/g		SOIL_AR(ip)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	Deer mouse (Mammalian omnivore)	530	5300	pCi/g		SOIL_DM(ip)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	Earthworm (Soil-dwelling invertebrate)	530	5300	pCi/g		SOIL_EW_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	Generic plant (Terrestrial autotroph - producer)	520	5200	pCi/g	MINIMUM	SOIL_GP_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	Gray fox (Mammalian top carnivore)	520	5200	pCi/g	MINIMUM	SOIL_RF(f)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	Montane shrew (Mammalian insectivore)	530	5300	pCi/g		SOIL_MS(i)_EU-152
RAD	Radionuclide	Europium-152	EU-152	SOIL	Mountain cottontail (Mammalian herbivore)	520	5200	pCi/g		SOIL_DC(p)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	Algae (Aquatic autotroph - producer) - water	100	1000	pCi/L	MINIMUM	WATER_A(w)_EU-152

LANL RECEPTOR-SPECIFIC ESLS

RAD	Radionuclide	Europium-152	EU-152	WATER	American kestrel (water)	220000000	2200000000 pCi/L		WATER_AK(w)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	American robin (water)	220000000	2200000000 pCi/L		WATER_AR(w)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	170	1700 pCi/L		WATER_AS(w)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	170	1700 pCi/L		WATER_D(w)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	Deer mouse (water)	1200000000	12000000000 pCi/L		WATER_DM(w)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	Fish (Aquatic intermediate carnivore) - water	1700	17000 pCi/L		WATER_GF(w)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	Gray fox (water)	12000000	120000000 pCi/L		WATER_RF(w)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	Montane shrew (water)	830000000	8300000000 pCi/L		WATER_MS(w)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	Mountain cottontail (water)	90000000	900000000 pCi/L		WATER_DC(w)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	Occult little brown myotis bat (water)	1400000000	14000000000 pCi/L		WATER_BA(w)_EU-152
RAD	Radionuclide	Europium-152	EU-152	WATER	Violet-green Swallow (water)	420000000	4200000000 pCi/L		WATER_VGS(w)_EU-152
RAD	Radionuclide	Lead-210	PB-210	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	9000	90000 pCi/g		SEDIMENT_A(s)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	9000	90000 pCi/g		SEDIMENT_AS(s)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	9000	90000 pCi/g		SEDIMENT_D(s)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	9000	90000 pCi/g		SEDIMENT_GF(s)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	7400	74000 pCi/g		SEDIMENT_BA(i)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	2100	21000 pCi/g	MINIMUM	SEDIMENT_VGS(i)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	American kestrel (Avian top carnivore)	8900	88000 pCi/g		SOIL_AK(f)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	American kestrel (Insectivore / carnivore)	8500	85000 pCi/g		SOIL_AK(fi)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	American robin (Avian herbivore)	6000	60000 pCi/g		SOIL_AR(p)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	American robin (Avian insectivore)	6200	61000 pCi/g		SOIL_AR(i)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	American robin (Avian omnivore)	5600	56000 pCi/g		SOIL_AR(ip)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	Deer mouse (Mammalian omnivore)	4500	45000 pCi/g		SOIL_DM(ip)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	Earthworm (Soil-dwelling invertebrate)	1200	12000 pCi/g	MINIMUM	SOIL_EW_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	Generic plant (Terrestrial autotroph - producer)	3400	34000 pCi/g		SOIL_GP_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	Gray fox (Mammalian top carnivore)	4400	44000 pCi/g		SOIL_RF(f)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	Montane shrew (Mammalian insectivore)	4500	45000 pCi/g		SOIL_MS(i)_PB-210
RAD	Radionuclide	Lead-210	PB-210	SOIL	Mountain cottontail (Mammalian herbivore)	4400	44000 pCi/g		SOIL_DC(p)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	Algae (Aquatic autotroph - producer) - water	250	2500 pCi/L	MINIMUM	WATER_A(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	American kestrel (water)	290000000	2900000000 pCi/L		WATER_AK(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	American robin (water)	280000000	2800000000 pCi/L		WATER_AR(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	1000	10000 pCi/L		WATER_AS(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	1000	10000 pCi/L		WATER_D(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	Deer mouse (water)	2700000000	27000000000 pCi/L		WATER_DM(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	Fish (Aquatic intermediate carnivore) - water	250	2500 pCi/L	MINIMUM	WATER_GF(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	Gray fox (water)	17000000	170000000 pCi/L		WATER_RF(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	Montane shrew (water)	1600000000	16000000000 pCi/L		WATER_MS(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	Mountain cottontail (water)	190000000	1900000000 pCi/L		WATER_DC(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	Occult little brown myotis bat (water)	1600000000	16000000000 pCi/L		WATER_BA(w)_PB-210
RAD	Radionuclide	Lead-210	PB-210	WATER	Violet-green Swallow (water)	590000000	5900000000 pCi/L		WATER_VGS(w)_PB-210
RAD	Radionuclide	Neptunium-237	NP-237	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	7600	76000 pCi/g		SEDIMENT_A(s)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	7600	76000 pCi/g		SEDIMENT_AS(s)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	7600	76000 pCi/g		SEDIMENT_D(s)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	7600	76000 pCi/g		SEDIMENT_GF(s)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	190	1900 pCi/g		SEDIMENT_BA(i)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	56	560 pCi/g	MINIMUM	SEDIMENT_VGS(i)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	American kestrel (Avian top carnivore)	1700	17000 pCi/g		SOIL_AK(f)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	American kestrel (Insectivore / carnivore)	1100	11000 pCi/g		SOIL_AK(fi)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	American robin (Avian herbivore)	590	5900 pCi/g		SOIL_AR(p)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	American robin (Avian insectivore)	210	2100 pCi/g		SOIL_AR(i)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	American robin (Avian omnivore)	200	2000 pCi/g		SOIL_AR(ip)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	Deer mouse (Mammalian omnivore)	3300	33000 pCi/g		SOIL_DM(ip)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	Earthworm (Soil-dwelling invertebrate)	50	500 pCi/g	MINIMUM	SOIL_EW_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	Generic plant (Terrestrial autotroph - producer)	2700	27000 pCi/g		SOIL_GP_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	Gray fox (Mammalian top carnivore)	740	7400 pCi/g		SOIL_RF(f)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	Montane shrew (Mammalian insectivore)	3600	36000 pCi/g		SOIL_MS(i)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	SOIL	Mountain cottontail (Mammalian herbivore)	3200	32000 pCi/g		SOIL_DC(p)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	Algae (Aquatic autotroph - producer) - water	65	650 pCi/L		WATER_A(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	American kestrel (water)	4100000	41000000 pCi/L		WATER_AK(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	American robin (water)	4000000	40000000 pCi/L		WATER_AR(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	650	6500 pCi/L		WATER_AS(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	650	6500 pCi/L		WATER_D(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	Deer mouse (water)	75000000	750000000 pCi/L		WATER_DM(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	Fish (Aquatic intermediate carnivore) - water	7.9	79 pCi/L	MINIMUM	WATER_GF(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	Gray fox (water)	310000	3100000 pCi/L		WATER_RF(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	Montane shrew (water)	43000000	430000000 pCi/L		WATER_MS(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	Mountain cottontail (water)	5100000	51000000 pCi/L		WATER_DC(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	Occult little brown myotis bat (water)	8900000	89000000 pCi/L		WATER_BA(w)_NP-237
RAD	Radionuclide	Neptunium-237	NP-237	WATER	Violet-green Swallow (water)	9900000	99000000 pCi/L		WATER_VGS(w)_NP-237
RAD	Radionuclide	Plutonium-238	PU-238	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	400000	4000000 pCi/g		SEDIMENT_A(s)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	400000	4000000 pCi/g		SEDIMENT_AS(s)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	400000	4000000 pCi/g		SEDIMENT_D(s)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	400000	4000000 pCi/g		SEDIMENT_GF(s)_PU-238

LANL RECEPTOR-SPECIFIC ESLS

RAD	Radionuclide	Plutonium-238	PU-238	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1700	17000	pCi/g		SEDIMENT_BA(l)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	500	5000	pCi/g	MINIMUM	SEDIMENT_VGS(i)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	American kestrel (Avian top carnivore)	110000	1100000	pCi/g		SOIL_AK(f)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	American kestrel (Insectivore / carnivore)	100000	1000000	pCi/g		SOIL_AK(fl)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	American robin (Avian herbivore)	4300	43000	pCi/g		SOIL_AR(p)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	American robin (Avian insectivore)	10000	100000	pCi/g		SOIL_AR(i)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	American robin (Avian omnivore)	5900	59000	pCi/g		SOIL_AR(ip)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	Deer mouse (Mammalian omnivore)	170000	1700000	pCi/g		SOIL_DM(ip)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	Earthworm (Soil-dwelling invertebrate)	820	8200	pCi/g	MINIMUM	SOIL_EW_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	Generic plant (Terrestrial autotroph - producer)	1800	18000	pCi/g		SOIL_GP_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	Gray fox (Mammalian top carnivore)	45000	450000	pCi/g		SOIL_RF(f)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	Montane shrew (Mammalian insectivore)	190000	1900000	pCi/g		SOIL_MS(i)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	SOIL	Mountain cottontail (Mammalian herbivore)	75000	750000	pCi/g		SOIL_DC(p)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	Algae (Aquatic autotroph - producer) - water	19	190	pCi/L	MINIMUM	WATER_A(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	American kestrel (water)	37000000	370000000	pCi/L		WATER_AK(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	American robin (water)	37000000	370000000	pCi/L		WATER_AR(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	170	1700	pCi/L		WATER_AS(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	170	1700	pCi/L		WATER_D(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	Deer mouse (water)	660000000	6600000000	pCi/L		WATER_DM(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	Fish (Aquatic intermediate carnivore) - water	69	690	pCi/L		WATER_GF(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	Gray fox (water)	2800000	28000000	pCi/L		WATER_RF(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	Montane shrew (water)	380000000	3800000000	pCi/L		WATER_MS(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	Mountain cottontail (water)	45000000	450000000	pCi/L		WATER_DC(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	Occult little brown myotis bat (water)	85000000	850000000	pCi/L		WATER_BA(w)_PU-238
RAD	Radionuclide	Plutonium-238	PU-238	WATER	Violet-green Swallow (water)	89000000	890000000	pCi/L		WATER_VGS(w)_PU-238
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	710000	7100000	pCi/g		SEDIMENT_A(s)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	710000	7100000	pCi/g		SEDIMENT_AS(s)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	710000	7100000	pCi/g		SEDIMENT_D(s)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	710000	7100000	pCi/g		SEDIMENT_GF(s)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1800	18000	pCi/g		SEDIMENT_BA(l)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	520	5200	pCi/g	MINIMUM	SEDIMENT_VGS(i)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	American kestrel (Avian top carnivore)	130000	1300000	pCi/g		SOIL_AK(f)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	American kestrel (Insectivore / carnivore)	120000	1200000	pCi/g		SOIL_AK(fl)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	American robin (Avian herbivore)	4400	44000	pCi/g		SOIL_AR(p)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	American robin (Avian insectivore)	10000	100000	pCi/g		SOIL_AR(i)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	American robin (Avian omnivore)	6100	61000	pCi/g		SOIL_AR(ip)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	Deer mouse (Mammalian omnivore)	280000	2800000	pCi/g		SOIL_DM(ip)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	Earthworm (Soil-dwelling invertebrate)	870	8700	pCi/g	MINIMUM	SOIL_EW_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	Generic plant (Terrestrial autotroph - producer)	1900	19000	pCi/g		SOIL_GP_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	Gray fox (Mammalian top carnivore)	51000	510000	pCi/g		SOIL_RF(f)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	Montane shrew (Mammalian insectivore)	320000	3200000	pCi/g		SOIL_MS(i)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	SOIL	Mountain cottontail (Mammalian herbivore)	94000	930000	pCi/g		SOIL_DC(p)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	Algae (Aquatic autotroph - producer) - water	20	200	pCi/L	MINIMUM	WATER_A(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	American kestrel (water)	38000000	380000000	pCi/L		WATER_AK(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	American robin (water)	37000000	370000000	pCi/L		WATER_AR(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	180	1800	pCi/L		WATER_AS(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	180	1800	pCi/L		WATER_D(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	Deer mouse (water)	700000000	7000000000	pCi/L		WATER_DM(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	Fish (Aquatic intermediate carnivore) - water	74	740	pCi/L		WATER_GF(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	Gray fox (water)	2900000	29000000	pCi/L		WATER_RF(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	Montane shrew (water)	400000000	4000000000	pCi/L		WATER_MS(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	Mountain cottontail (water)	48000000	480000000	pCi/L		WATER_DC(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	Occult little brown myotis bat (water)	81000000	810000000	pCi/L		WATER_BA(w)_PU-239/240
RAD	Radionuclide	Plutonium-239, 240	PU-239/240	WATER	Violet-green Swallow (water)	92000000	920000000	pCi/L		WATER_VGS(w)_PU-239/240
RAD	Radionuclide	Plutonium-241	PU-241	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	760000	7600000	pCi/g		SEDIMENT_A(s)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	760000	7600000	pCi/g		SEDIMENT_AS(s)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	760000	7600000	pCi/g		SEDIMENT_D(s)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	760000	7600000	pCi/g		SEDIMENT_GF(s)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1000000	10000000	pCi/g		SEDIMENT_BA(l)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	270000	2700000	pCi/g	MINIMUM	SEDIMENT_VGS(i)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	American kestrel (Avian top carnivore)	730000	7300000	pCi/g		SOIL_AK(f)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	American kestrel (Insectivore / carnivore)	730000	7300000	pCi/g		SOIL_AK(fl)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	American robin (Avian herbivore)	700000	7000000	pCi/g		SOIL_AR(p)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	American robin (Avian insectivore)	720000	7200000	pCi/g		SOIL_AR(i)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	American robin (Avian omnivore)	710000	7100000	pCi/g		SOIL_AR(ip)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	Deer mouse (Mammalian omnivore)	370000	3700000	pCi/g		SOIL_DM(ip)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	Earthworm (Soil-dwelling invertebrate)	17000	170000	pCi/g	MINIMUM	SOIL_EW_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	Generic plant (Terrestrial autotroph - producer)	36000	360000	pCi/g		SOIL_GP_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	Gray fox (Mammalian top carnivore)	360000	3600000	pCi/g		SOIL_RF(f)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	Montane shrew (Mammalian insectivore)	370000	3700000	pCi/g		SOIL_MS(i)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	SOIL	Mountain cottontail (Mammalian herbivore)	360000	3600000	pCi/g		SOIL_DC(p)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	Algae (Aquatic autotroph - producer) - water	420	4200	pCi/L	MINIMUM	WATER_A(w)_PU-241

LANL RECEPTOR-SPECIFIC ESLS

RAD	Radionuclide	Plutonium-241	PU-241	WATER	American kestrel (water)	1.2E+11	1.2E+12	pCi/L	WATER_AK(w)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	American robin (water)	1.2E+11	1.2E+12	pCi/L	WATER_AR(w)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	3700	37000	pCi/L	WATER_AS(w)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	3700	37000	pCi/L	WATER_D(w)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	Deer mouse (water)	2.5E+11	2.5E+12	pCi/L	WATER_DM(w)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	Fish (Aquatic intermediate carnivore) - water	1500	15000	pCi/L	WATER_GF(w)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	Gray fox (water)	6400000000	64000000000	pCi/L	WATER_RF(w)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	Montane shrew (water)	2.4E+11	2.4E+12	pCi/L	WATER_MS(w)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	Mountain cottontail (water)	22000000000	2.2E+11	pCi/L	WATER_DC(w)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	Occult little brown myotis bat (water)	8.4E+11	8.4E+12	pCi/L	WATER_BA(w)_PU-241
RAD	Radionuclide	Plutonium-241	PU-241	WATER	Violet-green Swallow (water)	2.2E+11	2.2E+12	pCi/L	WATER_VGS(w)_PU-241
RAD	Radionuclide	Radium-226	RA-226	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	1400	14000	pCi/g	SEDIMENT_A(s)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	1400	14000	pCi/g	SEDIMENT_AS(s)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	1400	14000	pCi/g	SEDIMENT_D(s)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	1400	14000	pCi/g	SEDIMENT_GF(s)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	3.2	32	pCi/g	SEDIMENT_BA(i)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.94	9.4	pCi/g	MINIMUM SEDIMENT_VGS(i)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	American kestrel (Avian top carnivore)	870	8700	pCi/g	SOIL_AK(f)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	American kestrel (insectivore / carnivore)	61	610	pCi/g	SOIL_AK(fi)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	American robin (Avian herbivore)	34	340	pCi/g	SOIL_AR(p)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	American robin (Avian insectivore)	8.2	82	pCi/g	SOIL_AR(i)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	American robin (Avian omnivore)	8.4	84	pCi/g	SOIL_AR(ip)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	Deer mouse (Mammalian omnivore)	380	3800	pCi/g	SOIL_DM(ip)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	Earthworm (Soil-dwelling invertebrate)	1.5	15	pCi/g	MINIMUM SOIL_EW_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	Generic plant (Terrestrial autotroph - producer)	54	540	pCi/g	SOIL_GP_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	Gray fox (Mammalian top carnivore)	370	3700	pCi/g	SOIL_RF(f)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	Montane shrew (Mammalian insectivore)	510	5100	pCi/g	SOIL_MS(i)_RA-226
RAD	Radionuclide	Radium-226	RA-226	SOIL	Mountain cottontail (Mammalian herbivore)	340	3400	pCi/g	SOIL_DC(p)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	Algae (Aquatic autotroph - producer) - water	0.1	1	pCi/L	MINIMUM WATER_A(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	American kestrel (water)	750000	7500000	pCi/L	WATER_AK(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	American robin (water)	740000	7400000	pCi/L	WATER_AR(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	3.2	32	pCi/L	WATER_AS(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	3.2	32	pCi/L	WATER_D(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	Deer mouse (water)	12000000	120000000	pCi/L	WATER_DM(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	Fish (Aquatic intermediate carnivore) - water	64	640	pCi/L	WATER_GF(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	Gray fox (water)	55000	550000	pCi/L	WATER_RF(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	Montane shrew (water)	7200000	72000000	pCi/L	WATER_MS(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	Mountain cottontail (water)	850000	8500000	pCi/L	WATER_DC(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	Occult little brown myotis bat (water)	2000000	20000000	pCi/L	WATER_BA(w)_RA-226
RAD	Radionuclide	Radium-226	RA-226	WATER	Violet-green Swallow (water)	1700000	17000000	pCi/L	WATER_VGS(w)_RA-226
RAD	Radionuclide	Radium-228	RA-228	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	2800	28000	pCi/g	SEDIMENT_A(s)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	2800	28000	pCi/g	SEDIMENT_AS(s)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	2800	28000	pCi/g	SEDIMENT_D(s)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	2800	28000	pCi/g	SEDIMENT_GF(s)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2.9	29	pCi/g	SEDIMENT_BA(i)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	0.85	8.5	pCi/g	MINIMUM SEDIMENT_VGS(i)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	American kestrel (Avian top carnivore)	1400	14000	pCi/g	SOIL_AK(f)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	American kestrel (insectivore / carnivore)	83	830	pCi/g	SOIL_AK(fi)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	American robin (Avian herbivore)	46	460	pCi/g	SOIL_AR(p)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	American robin (Avian insectivore)	11	110	pCi/g	SOIL_AR(i)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	American robin (Avian omnivore)	11	110	pCi/g	SOIL_AR(ip)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	Deer mouse (Mammalian omnivore)	490	4900	pCi/g	SOIL_DM(ip)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	Earthworm (Soil-dwelling invertebrate)	1.2	12	pCi/g	MINIMUM SOIL_EW_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	Generic plant (Terrestrial autotroph - producer)	48	480	pCi/g	SOIL_GP_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	Gray fox (Mammalian top carnivore)	560	5600	pCi/g	SOIL_RF(f)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	Montane shrew (Mammalian insectivore)	770	7700	pCi/g	SOIL_MS(i)_RA-228
RAD	Radionuclide	Radium-228	RA-228	SOIL	Mountain cottontail (Mammalian herbivore)	420	4200	pCi/g	SOIL_DC(p)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	Algae (Aquatic autotroph - producer) - water	0.09	0.9	pCi/L	MINIMUM WATER_A(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	American kestrel (water)	1000000	10000000	pCi/L	WATER_AK(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	American robin (water)	990000	9900000	pCi/L	WATER_AR(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	2.7	27	pCi/L	WATER_AS(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	2.7	27	pCi/L	WATER_D(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	Deer mouse (water)	11000000	110000000	pCi/L	WATER_DM(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	Fish (Aquatic intermediate carnivore) - water	54	540	pCi/L	WATER_GF(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	Gray fox (water)	64000	640000	pCi/L	WATER_RF(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	Montane shrew (water)	6700000	67000000	pCi/L	WATER_MS(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	Mountain cottontail (water)	760000	7600000	pCi/L	WATER_DC(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	Occult little brown myotis bat (water)	5100000	51000000	pCi/L	WATER_BA(w)_RA-228
RAD	Radionuclide	Radium-228	RA-228	WATER	Violet-green Swallow (water)	2100000	21000000	pCi/L	WATER_VGS(w)_RA-228
RAD	Radionuclide	Sodium-22	NA-22	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	18000	180000	pCi/g	SEDIMENT_A(s)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	18000	180000	pCi/g	SEDIMENT_AS(s)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	18000	180000	pCi/g	SEDIMENT_D(s)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	18000	180000	pCi/g	SEDIMENT_GF(s)_NA-22

LANL RECEPTOR-SPECIFIC ESLS

RAD	Radionuclide	Sodium-22	NA-22	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	38000	380000	pCi/g	SEDIMENT_BA(i)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	10000	100000	pCi/g MINIMUM	SEDIMENT_VGS(i)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	American kestrel (Avian top carnivore)	11000	110000	pCi/g	SOIL_AK(f)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	American kestrel (insectivore / carnivore)	14000	140000	pCi/g	SOIL_AK(fi)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	American robin (Avian herbivore)	17000	170000	pCi/g	SOIL_AR(p)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	American robin (Avian insectivore)	16000	160000	pCi/g	SOIL_AR(i)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	American robin (Avian omnivore)	16000	160000	pCi/g	SOIL_AR(ip)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	Deer mouse (Mammalian omnivore)	9000	90000	pCi/g	SOIL_DM(ip)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	Earthworm (Soil-dwelling invertebrate)	6500	65000	pCi/g	SOIL_EW_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	Generic plant (Terrestrial autotroph - producer)	8900	89000	pCi/g	SOIL_GP_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	Gray fox (Mammalian top carnivore)	4600	46000	pCi/g MINIMUM	SOIL_RF(f)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	Montane shrew (Mammalian insectivore)	9000	90000	pCi/g	SOIL_MS(i)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	SOIL	Mountain cottontail (Mammalian herbivore)	9000	90000	pCi/g	SOIL_DC(p)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	Algae (Aquatic autotroph - producer) - water	90000	900000	pCi/L MINIMUM	WATER_A(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	American kestrel (water)	4800000000	48000000000	pCi/L	WATER_AK(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	American robin (water)	4700000000	47000000000	pCi/L	WATER_AR(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	90000	900000	pCi/L MINIMUM	WATER_AS(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	90000	900000	pCi/L MINIMUM	WATER_D(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	Deer mouse (water)	10000000000	1E+11	pCi/L	WATER_DM(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	Fish (Aquatic intermediate carnivore) - water	90000	900000	pCi/L MINIMUM	WATER_GF(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	Gray fox (water)	240000000	2400000000	pCi/L	WATER_RF(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	Montane shrew (water)	9600000000	96000000000	pCi/L	WATER_MS(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	Mountain cottontail (water)	850000000	8500000000	pCi/L	WATER_DC(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	Occult little brown myotis bat (water)	32000000000	3.2E+11	pCi/L	WATER_BA(w)_NA-22
RAD	Radionuclide	Sodium-22	NA-22	WATER	Violet-green Swallow (water)	8800000000	88000000000	pCi/L	WATER_VGS(w)_NA-22
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	3400	34000	pCi/g	SEDIMENT_A(s)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	3400	34000	pCi/g	SEDIMENT_AS(s)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	3400	34000	pCi/g	SEDIMENT_D(s)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	3400	34000	pCi/g	SEDIMENT_GF(s)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2100	21000	pCi/g	SEDIMENT_BA(i)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	630	6300	pCi/g MINIMUM	SEDIMENT_VGS(i)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	American kestrel (Avian top carnivore)	1700	17000	pCi/g	SOIL_AK(f)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	American kestrel (insectivore / carnivore)	2400	24000	pCi/g	SOIL_AK(fi)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	American robin (Avian herbivore)	340	3400	pCi/g MINIMUM	SOIL_AR(p)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	American robin (Avian insectivore)	2800	28000	pCi/g	SOIL_AR(i)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	American robin (Avian omnivore)	790	7900	pCi/g	SOIL_AR(ip)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	Deer mouse (Mammalian omnivore)	1600	16000	pCi/g	SOIL_DM(ip)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	Earthworm (Soil-dwelling invertebrate)	1700	17000	pCi/g	SOIL_EW_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	Generic plant (Terrestrial autotroph - producer)	1100	11000	pCi/g	SOIL_GP_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	Gray fox (Mammalian top carnivore)	800	8000	pCi/g	SOIL_RF(f)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	Montane shrew (Mammalian insectivore)	1700	17000	pCi/g	SOIL_MS(i)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	Mountain cottontail (Mammalian herbivore)	1300	13000	pCi/g	SOIL_DC(p)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	Algae (Aquatic autotroph - producer) - water	570	5700	pCi/L MINIMUM	WATER_A(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	American kestrel (water)	52000000	520000000	pCi/L	WATER_AK(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	American robin (water)	51000000	510000000	pCi/L	WATER_AR(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	17000	170000	pCi/L	WATER_AS(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	17000	170000	pCi/L	WATER_D(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	Deer mouse (water)	830000000	8300000000	pCi/L	WATER_DM(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	Fish (Aquatic intermediate carnivore) - water	33000	330000	pCi/L	WATER_GF(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	Gray fox (water)	3800000	38000000	pCi/L	WATER_RF(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	Montane shrew (water)	480000000	4800000000	pCi/L	WATER_MS(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	Mountain cottontail (water)	57000000	570000000	pCi/L	WATER_DC(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	Occult little brown myotis bat (water)	150000000	1500000000	pCi/L	WATER_BA(w)_SR-90/ Y-90
RAD	Radionuclide	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER	Violet-green Swallow (water)	120000000	1200000000	pCi/L	WATER_VGS(w)_SR-90/ Y-90
RAD	Radionuclide	Thorium-228	TH-228	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	1600	16000	pCi/g	SEDIMENT_A(s)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	1600	16000	pCi/g	SEDIMENT_AS(s)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	1600	16000	pCi/g	SEDIMENT_D(s)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	1600	16000	pCi/g	SEDIMENT_GF(s)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2200	22000	pCi/g	SEDIMENT_BA(i)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	640	6400	pCi/g MINIMUM	SEDIMENT_VGS(i)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	American kestrel (Avian top carnivore)	1600	16000	pCi/g	SOIL_AK(f)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	American kestrel (insectivore / carnivore)	1600	16000	pCi/g	SOIL_AK(fi)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	American robin (Avian herbivore)	1100	11000	pCi/g	SOIL_AR(p)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	American robin (Avian insectivore)	1300	13000	pCi/g	SOIL_AR(i)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	American robin (Avian omnivore)	1200	12000	pCi/g	SOIL_AR(ip)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	Deer mouse (Mammalian omnivore)	820	8200	pCi/g	SOIL_DM(ip)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	Earthworm (Soil-dwelling invertebrate)	43	430	pCi/g MINIMUM	SOIL_EW_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	Generic plant (Terrestrial autotroph - producer)	140	1400	pCi/g	SOIL_GP_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	Gray fox (Mammalian top carnivore)	830	8300	pCi/g	SOIL_RF(f)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	Montane shrew (Mammalian insectivore)	830	8300	pCi/g	SOIL_MS(i)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	SOIL	Mountain cottontail (Mammalian herbivore)	800	8000	pCi/g	SOIL_DC(p)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	Algae (Aquatic autotroph - producer) - water	5.9	59	pCi/L MINIMUM	WATER_A(w)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	American kestrel (water)	120000000	1200000000	pCi/L	WATER_AK(w)_TH-228

LANL RECEPTOR-SPECIFIC ESLS

RAD	Radionuclide	Thorium-228	TH-228	WATER	American robin (water)	120000000	1200000000	pCi/L	WATER_AR(w)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	170	1700	pCi/L	WATER_AS(w)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	170	1700	pCi/L	WATER_D(w)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	Deer mouse (water)	800000000	8000000000	pCi/L	WATER_DM(w)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	Fish (Aquatic intermediate carnivore) - water	170	1700	pCi/L	WATER_GF(w)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	Gray fox (water)	6800000	68000000	pCi/L	WATER_RF(w)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	Montane shrew (water)	520000000	5200000000	pCi/L	WATER_MS(w)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	Mountain cottontail (water)	57000000	570000000	pCi/L	WATER_DC(w)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	Occult little brown myotis bat (water)	800000000	8000000000	pCi/L	WATER_BA(w)_TH-228
RAD	Radionuclide	Thorium-228	TH-228	WATER	Violet-green Swallow (water)	230000000	2300000000	pCi/L	WATER_VGS(w)_TH-228
RAD	Radionuclide	Thorium-229	TH-229	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	3200	32000	pCi/g	SEDIMENT_A(s)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	3200	32000	pCi/g	SEDIMENT_AS(s)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	3200	32000	pCi/g	SEDIMENT_D(s)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	3200	32000	pCi/g	SEDIMENT_GF(s)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1800	18000	pCi/g	SEDIMENT_BA(I)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	540	5400	pCi/g	MINIMUM SEDIMENT_VGS(I)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	American kestrel (Avian top carnivore)	3100	31000	pCi/g	SOIL_AK(f)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	American kestrel (insectivore / carnivore)	2600	26000	pCi/g	SOIL_AK(fi)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	American robin (Avian herbivore)	850	8500	pCi/g	SOIL_AR(p)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	American robin (Avian insectivore)	1200	12000	pCi/g	SOIL_AR(i)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	American robin (Avian omnivore)	950	9500	pCi/g	SOIL_AR(ip)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	Deer mouse (Mammalian omnivore)	1500	15000	pCi/g	SOIL_DM(ip)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	Earthworm (Soil-dwelling invertebrate)	47	470	pCi/g	MINIMUM SOIL_EW_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	Generic plant (Terrestrial autotroph - producer)	170	1700	pCi/g	SOIL_GP_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	Gray fox (Mammalian top carnivore)	1500	15000	pCi/g	SOIL_RF(f)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	Montane shrew (Mammalian insectivore)	1500	15000	pCi/g	SOIL_MS(i)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	SOIL	Mountain cottontail (Mammalian herbivore)	1400	14000	pCi/g	SOIL_DC(p)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	Algae (Aquatic autotroph - producer) - water	6.3	63	pCi/L	MINIMUM WATER_A(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	American kestrel (water)	39000000	390000000	pCi/L	WATER_AK(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	American robin (water)	39000000	390000000	pCi/L	WATER_AR(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	180	1800	pCi/L	WATER_AS(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	180	1800	pCi/L	WATER_D(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	Deer mouse (water)	720000000	7200000000	pCi/L	WATER_DM(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	Fish (Aquatic intermediate carnivore) - water	180	1800	pCi/L	WATER_GF(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	Gray fox (water)	3000000	30000000	pCi/L	WATER_RF(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	Montane shrew (water)	410000000	4100000000	pCi/L	WATER_MS(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	Mountain cottontail (water)	49000000	490000000	pCi/L	WATER_DC(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	Occult little brown myotis bat (water)	85000000	850000000	pCi/L	WATER_BA(w)_TH-229
RAD	Radionuclide	Thorium-229	TH-229	WATER	Violet-green Swallow (water)	95000000	950000000	pCi/L	WATER_VGS(w)_TH-229
RAD	Radionuclide	Thorium-230	TH-230	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	270000	2700000	pCi/g	SEDIMENT_A(s)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	270000	2700000	pCi/g	SEDIMENT_AS(s)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	270000	2700000	pCi/g	SEDIMENT_D(s)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	270000	2700000	pCi/g	SEDIMENT_GF(s)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2000	20000	pCi/g	SEDIMENT_BA(I)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	580	5800	pCi/g	MINIMUM SEDIMENT_VGS(I)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	American kestrel (Avian top carnivore)	170000	1700000	pCi/g	SOIL_AK(f)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	American kestrel (insectivore / carnivore)	17000	170000	pCi/g	SOIL_AK(fi)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	American robin (Avian herbivore)	1200	12000	pCi/g	SOIL_AR(p)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	American robin (Avian insectivore)	2200	22000	pCi/g	SOIL_AR(i)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	American robin (Avian omnivore)	1400	14000	pCi/g	SOIL_AR(ip)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	Deer mouse (Mammalian omnivore)	78000	780000	pCi/g	SOIL_DM(ip)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	Earthworm (Soil-dwelling invertebrate)	52	520	pCi/g	MINIMUM SOIL_EW_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	Generic plant (Terrestrial autotroph - producer)	200	2000	pCi/g	SOIL_GP_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	Gray fox (Mammalian top carnivore)	68000	680000	pCi/g	SOIL_RF(f)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	Montane shrew (Mammalian insectivore)	110000	1100000	pCi/g	SOIL_MS(i)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	SOIL	Mountain cottontail (Mammalian herbivore)	21000	210000	pCi/g	SOIL_DC(p)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	Algae (Aquatic autotroph - producer) - water	6.8	68	pCi/L	MINIMUM WATER_A(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	American kestrel (water)	42000000	420000000	pCi/L	WATER_AK(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	American robin (water)	42000000	420000000	pCi/L	WATER_AR(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	200	2000	pCi/L	WATER_AS(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	200	2000	pCi/L	WATER_D(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	Deer mouse (water)	780000000	7800000000	pCi/L	WATER_DM(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	Fish (Aquatic intermediate carnivore) - water	200	2000	pCi/L	WATER_GF(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	Gray fox (water)	3200000	32000000	pCi/L	WATER_RF(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	Montane shrew (water)	450000000	4500000000	pCi/L	WATER_MS(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	Mountain cottontail (water)	53000000	530000000	pCi/L	WATER_DC(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	Occult little brown myotis bat (water)	90000000	900000000	pCi/L	WATER_BA(w)_TH-230
RAD	Radionuclide	Thorium-230	TH-230	WATER	Violet-green Swallow (water)	100000000	1000000000	pCi/L	WATER_VGS(w)_TH-230
RAD	Radionuclide	Thorium-232	TH-232	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	320000	3200000	pCi/g	SEDIMENT_A(s)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	320000	3200000	pCi/g	SEDIMENT_AS(s)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	320000	3200000	pCi/g	SEDIMENT_D(s)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	320000	3200000	pCi/g	SEDIMENT_GF(s)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	240	2400	pCi/g	SEDIMENT_BA(I)_TH-232

LANL RECEPTOR-SPECIFIC ESLS

RAD	Radionuclide	Thorium-232	TH-232	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	69	690 pCi/g	MINIMUM	SEDIMENT_VGS(i)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	American kestrel (Avian top carnivore)	50000	500000 pCi/g		SOIL_AK(f)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	American kestrel (insectivore / carnivore)	2200	22000 pCi/g		SOIL_AK(fi)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	American robin (Avian herbivore)	150	1500 pCi/g		SOIL_AR(p)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	American robin (Avian insectivore)	260	2600 pCi/g		SOIL_AR(i)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	American robin (Avian omnivore)	170	1700 pCi/g		SOIL_AR(ip)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	Deer mouse (Mammalian omnivore)	19000	190000 pCi/g		SOIL_DM(ip)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	Earthworm (Soil-dwelling invertebrate)	6.2	62 pCi/g	MINIMUM	SOIL_EW_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	Generic plant (Terrestrial autotroph - producer)	24	240 pCi/g		SOIL_GP_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	Gray fox (Mammalian top carnivore)	14000	140000 pCi/g		SOIL_RF(f)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	Montane shrew (Mammalian insectivore)	49000	490000 pCi/g		SOIL_MS(i)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	SOIL	Mountain cottontail (Mammalian herbivore)	2900	29000 pCi/g		SOIL_DC(p)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	Algae (Aquatic autotroph - producer) - water	0.81	8.1 pCi/L	MINIMUM	WATER_A(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	American kestrel (water)	5000000	50000000 pCi/L		WATER_AK(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	American robin (water)	5000000	50000000 pCi/L		WATER_AR(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	24	240 pCi/L		WATER_AS(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	24	240 pCi/L		WATER_D(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	Deer mouse (water)	92000000	920000000 pCi/L		WATER_DM(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	Fish (Aquatic intermediate carnivore) - water	24	240 pCi/L		WATER_GF(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	Gray fox (water)	380000	3800000 pCi/L		WATER_RF(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	Montane shrew (water)	53000000	530000000 pCi/L		WATER_MS(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	Mountain cottontail (water)	6300000	63000000 pCi/L		WATER_DC(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	Occult little brown myotis bat (water)	10000000	100000000 pCi/L		WATER_BA(w)_TH-232
RAD	Radionuclide	Thorium-232	TH-232	WATER	Violet-green Swallow (water)	12000000	120000000 pCi/L		WATER_VGS(w)_TH-232
RAD	Radionuclide	Tritium	H-3	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	660000	6600000 pCi/g		SEDIMENT_A(s)_H-3
RAD	Radionuclide	Tritium	H-3	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	660000	6600000 pCi/g		SEDIMENT_AS(s)_H-3
RAD	Radionuclide	Tritium	H-3	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	660000	6600000 pCi/g	MINIMUM	SEDIMENT_D(s)_H-3
RAD	Radionuclide	Tritium	H-3	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	660000	6600000 pCi/g		SEDIMENT_GF(s)_H-3
RAD	Radionuclide	Tritium	H-3	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	1000000000	10000000000 pCi/g		SEDIMENT_BA(i)_H-3
RAD	Radionuclide	Tritium	H-3	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	290000000	2900000000 pCi/g		SEDIMENT_VGS(i)_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	American kestrel (Avian top carnivore)	550000	5500000 pCi/g		SOIL_AK(f)_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	American kestrel (insectivore / carnivore)	610000	6100000 pCi/g		SOIL_AK(fi)_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	American robin (Avian herbivore)	300000	3000000 pCi/g		SOIL_AR(p)_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	American robin (Avian insectivore)	600000	6000000 pCi/g		SOIL_AR(i)_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	American robin (Avian omnivore)	440000	4400000 pCi/g		SOIL_AR(ip)_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	Deer mouse (Mammalian omnivore)	330000	3300000 pCi/g		SOIL_DM(ip)_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	Earthworm (Soil-dwelling invertebrate)	48000	480000 pCi/g		SOIL_EW_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	Generic plant (Terrestrial autotroph - producer)	36000	360000 pCi/g	MINIMUM	SOIL_GP_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	Gray fox (Mammalian top carnivore)	240000	2400000 pCi/g		SOIL_RF(f)_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	Montane shrew (Mammalian insectivore)	340000	3400000 pCi/g		SOIL_MS(i)_H-3
RAD	Radionuclide	Tritium	H-3	SOIL	Mountain cottontail (Mammalian herbivore)	270000	2700000 pCi/g		SOIL_DC(p)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	Algae (Aquatic autotroph - producer) - water	160000000	1600000000 pCi/L	MINIMUM	WATER_A(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	American kestrel (water)	1.3E+12	1.3E+13 pCi/L		WATER_AK(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	American robin (water)	1.3E+12	1.3E+13 pCi/L	MINIMUM	WATER_AR(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	160000000	1600000000 pCi/L	MINIMUM	WATER_AS(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	160000000	1600000000 pCi/L	MINIMUM	WATER_D(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	Deer mouse (water)	2.7E+12	2.7E+13 pCi/L		WATER_DM(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	Fish (Aquatic intermediate carnivore) - water	160000000	1600000000 pCi/L	MINIMUM	WATER_GF(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	Gray fox (water)	68000000000	6.8E+11 pCi/L		WATER_RF(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	Montane shrew (water)	2.6E+12	2.6E+13 pCi/L		WATER_MS(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	Mountain cottontail (water)	2.3E+11	2.3E+12 pCi/L		WATER_DC(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	Occult little brown myotis bat (water)	9E+12	9E+13 pCi/L		WATER_BA(w)_H-3
RAD	Radionuclide	Tritium	H-3	WATER	Violet-green Swallow (water)	2.4E+12	2.4E+13 pCi/L		WATER_VGS(w)_H-3
RAD	Radionuclide	Uranium-233	U-233	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	1000000	10000000 pCi/g		SEDIMENT_A(s)_U-233
RAD	Radionuclide	Uranium-233	U-233	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	1000000	10000000 pCi/g		SEDIMENT_AS(s)_U-233
RAD	Radionuclide	Uranium-233	U-233	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	1000000	10000000 pCi/g		SEDIMENT_D(s)_U-233
RAD	Radionuclide	Uranium-233	U-233	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	1000000	10000000 pCi/g		SEDIMENT_GF(s)_U-233
RAD	Radionuclide	Uranium-233	U-233	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2200	22000 pCi/g		SEDIMENT_BA(i)_U-233
RAD	Radionuclide	Uranium-233	U-233	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	610	6100 pCi/g	MINIMUM	SEDIMENT_VGS(i)_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	American kestrel (Avian top carnivore)	680000	6800000 pCi/g		SOIL_AK(f)_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	American kestrel (insectivore / carnivore)	660000	6600000 pCi/g		SOIL_AK(fi)_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	American robin (Avian herbivore)	14000	140000 pCi/g		SOIL_AR(p)_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	American robin (Avian insectivore)	82000	820000 pCi/g		SOIL_AR(i)_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	American robin (Avian omnivore)	28000	280000 pCi/g		SOIL_AR(ip)_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	Deer mouse (Mammalian omnivore)	290000	2900000 pCi/g		SOIL_DM(ip)_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	Earthworm (Soil-dwelling invertebrate)	2200	22000 pCi/g		SOIL_EW_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	Generic plant (Terrestrial autotroph - producer)	440	4400 pCi/g	MINIMUM	SOIL_GP_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	Gray fox (Mammalian top carnivore)	230000	2300000 pCi/g		SOIL_RF(f)_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	Montane shrew (Mammalian insectivore)	500000	5000000 pCi/g		SOIL_MS(i)_U-233
RAD	Radionuclide	Uranium-233	U-233	SOIL	Mountain cottontail (Mammalian herbivore)	43000	430000 pCi/g		SOIL_DC(p)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	Algae (Aquatic autotroph - producer) - water	22	220 pCi/L	MINIMUM	WATER_A(w)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	American kestrel (water)	270000000	2700000000 pCi/L		WATER_AK(w)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	American robin (water)	260000000	2600000000 pCi/L		WATER_AR(w)_U-233

LANL RECEPTOR-SPECIFIC ESLS

RAD	Radionuclide	Uranium-233	U-233	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	190	1900	pCi/L		WATER_AS(w)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	190	1900	pCi/L		WATER_D(w)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	Deer mouse (water)	610000000	6100000000	pCi/L		WATER_DM(w)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	Fish (Aquatic intermediate carnivore) - water	39	390	pCi/L		WATER_GF(w)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	Gray fox (water)	14000000	140000000	pCi/L		WATER_RF(w)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	Montane shrew (water)	550000000	5500000000	pCi/L		WATER_MS(w)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	Mountain cottontail (water)	50000000	500000000	pCi/L		WATER_DC(w)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	Occult little brown myotis bat (water)	1800000000	18000000000	pCi/L		WATER_BA(w)_U-233
RAD	Radionuclide	Uranium-233	U-233	WATER	Violet-green Swallow (water)	500000000	5000000000	pCi/L		WATER_VGS(w)_U-233
RAD	Radionuclide	Uranium-234	U-234	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	300000	3000000	pCi/g		SEDIMENT_A(s)_U-234
RAD	Radionuclide	Uranium-234	U-234	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	300000	3000000	pCi/g		SEDIMENT_AS(s)_U-234
RAD	Radionuclide	Uranium-234	U-234	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	300000	3000000	pCi/g		SEDIMENT_D(s)_U-234
RAD	Radionuclide	Uranium-234	U-234	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	300000	3000000	pCi/g		SEDIMENT_GF(s)_U-234
RAD	Radionuclide	Uranium-234	U-234	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2200	22000	pCi/g		SEDIMENT_BA(i)_U-234
RAD	Radionuclide	Uranium-234	U-234	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	610	6100	pCi/g	MINIMUM	SEDIMENT_VGS(i)_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	American kestrel (Avian top carnivore)	260000	2600000	pCi/g		SOIL_AK(f)_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	American kestrel (insectivore / carnivore)	260000	2600000	pCi/g		SOIL_AK(fi)_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	American robin (Avian herbivore)	14000	140000	pCi/g		SOIL_AR(p)_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	American robin (Avian insectivore)	69000	690000	pCi/g		SOIL_AR(i)_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	American robin (Avian omnivore)	27000	270000	pCi/g		SOIL_AR(ip)_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	Deer mouse (Mammalian omnivore)	120000	1200000	pCi/g		SOIL_DM(ip)_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	Earthworm (Soil-dwelling invertebrate)	2200	22000	pCi/g		SOIL_EW_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	Generic plant (Terrestrial autotroph - producer)	440	4400	pCi/g	MINIMUM	SOIL_GP_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	Gray fox (Mammalian top carnivore)	110000	1100000	pCi/g		SOIL_RF(f)_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	Montane shrew (Mammalian insectivore)	140000	1400000	pCi/g		SOIL_MS(i)_U-234
RAD	Radionuclide	Uranium-234	U-234	SOIL	Mountain cottontail (Mammalian herbivore)	36000	360000	pCi/g		SOIL_DC(p)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	Algae (Aquatic autotroph - producer) - water	22	220	pCi/L	MINIMUM	WATER_A(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	American kestrel (water)	270000000	2700000000	pCi/L		WATER_AK(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	American robin (water)	260000000	2600000000	pCi/L		WATER_AR(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	190	1900	pCi/L		WATER_AS(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	190	1900	pCi/L		WATER_D(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	Deer mouse (water)	610000000	6100000000	pCi/L		WATER_DM(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	Fish (Aquatic intermediate carnivore) - water	39	390	pCi/L		WATER_GF(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	Gray fox (water)	14000000	140000000	pCi/L		WATER_RF(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	Montane shrew (water)	550000000	5500000000	pCi/L		WATER_MS(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	Mountain cottontail (water)	50000000	500000000	pCi/L		WATER_DC(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	Occult little brown myotis bat (water)	1800000000	18000000000	pCi/L		WATER_BA(w)_U-234
RAD	Radionuclide	Uranium-234	U-234	WATER	Violet-green Swallow (water)	500000000	5000000000	pCi/L		WATER_VGS(w)_U-234
RAD	Radionuclide	Uranium-235	U-235	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	10000	100000	pCi/g		SEDIMENT_A(s)_U-235
RAD	Radionuclide	Uranium-235	U-235	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	10000	100000	pCi/g		SEDIMENT_AS(s)_U-235
RAD	Radionuclide	Uranium-235	U-235	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	10000	100000	pCi/g		SEDIMENT_D(s)_U-235
RAD	Radionuclide	Uranium-235	U-235	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	10000	100000	pCi/g		SEDIMENT_GF(s)_U-235
RAD	Radionuclide	Uranium-235	U-235	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2400	24000	pCi/g		SEDIMENT_BA(i)_U-235
RAD	Radionuclide	Uranium-235	U-235	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	660	6600	pCi/g	MINIMUM	SEDIMENT_VGS(i)_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	American kestrel (Avian top carnivore)	10000	100000	pCi/g		SOIL_AK(f)_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	American kestrel (insectivore / carnivore)	10000	100000	pCi/g		SOIL_AK(fi)_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	American robin (Avian herbivore)	6300	63000	pCi/g		SOIL_AR(p)_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	American robin (Avian insectivore)	9500	95000	pCi/g		SOIL_AR(i)_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	American robin (Avian omnivore)	7900	79000	pCi/g		SOIL_AR(ip)_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	Deer mouse (Mammalian omnivore)	5200	52000	pCi/g		SOIL_DM(ip)_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	Earthworm (Soil-dwelling invertebrate)	1600	16000	pCi/g		SOIL_EW_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	Generic plant (Terrestrial autotroph - producer)	440	4400	pCi/g	MINIMUM	SOIL_GP_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	Gray fox (Mammalian top carnivore)	5200	52000	pCi/g		SOIL_RF(f)_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	Montane shrew (Mammalian insectivore)	5200	52000	pCi/g		SOIL_MS(i)_U-235
RAD	Radionuclide	Uranium-235	U-235	SOIL	Mountain cottontail (Mammalian herbivore)	4700	47000	pCi/g		SOIL_DC(p)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	Algae (Aquatic autotroph - producer) - water	24	240	pCi/L	MINIMUM	WATER_A(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	American kestrel (water)	290000000	2900000000	pCi/L		WATER_AK(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	American robin (water)	290000000	2900000000	pCi/L		WATER_AR(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	210	2100	pCi/L		WATER_AS(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	210	2100	pCi/L		WATER_D(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	Deer mouse (water)	660000000	6600000000	pCi/L		WATER_DM(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	Fish (Aquatic intermediate carnivore) - water	43	430	pCi/L		WATER_GF(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	Gray fox (water)	15000000	150000000	pCi/L		WATER_RF(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	Montane shrew (water)	600000000	6000000000	pCi/L		WATER_MS(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	Mountain cottontail (water)	54000000	540000000	pCi/L		WATER_DC(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	Occult little brown myotis bat (water)	2000000000	20000000000	pCi/L		WATER_BA(w)_U-235
RAD	Radionuclide	Uranium-235	U-235	WATER	Violet-green Swallow (water)	540000000	5400000000	pCi/L		WATER_VGS(w)_U-235
RAD	Radionuclide	Uranium-236	U-236	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment			pCi/g		SEDIMENT_A(s)_U-236
RAD	Radionuclide	Uranium-236	U-236	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment			pCi/g		SEDIMENT_AS(s)_U-236
RAD	Radionuclide	Uranium-236	U-236	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment			pCi/g		SEDIMENT_D(s)_U-236
RAD	Radionuclide	Uranium-236	U-236	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment			pCi/g		SEDIMENT_GF(s)_U-236
RAD	Radionuclide	Uranium-236	U-236	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2400	24000	pCi/g		SEDIMENT_BA(I)_U-236
RAD	Radionuclide	Uranium-236	U-236	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	660	6600	pCi/g	MINIMUM	SEDIMENT_VGS(I)_U-236

LANL RECEPTOR-SPECIFIC ESLS

RAD	Radionuclide	Uranium-236	U-236	SOIL	American kestrel (Avian top carnivore)	2100000	21000000	pCi/g	SOIL_AK(f)_U-236
RAD	Radionuclide	Uranium-236	U-236	SOIL	American kestrel (insectivore / carnivore)	1900000	19000000	pCi/g	SOIL_AK(fi)_U-236
RAD	Radionuclide	Uranium-236	U-236	SOIL	American robin (Avian herbivore)	15000	150000	pCi/g	SOIL_AR(p)_U-236
RAD	Radionuclide	Uranium-236	U-236	SOIL	American robin (Avian insectivore)	96000	950000	pCi/g	SOIL_AR(i)_U-236
RAD	Radionuclide	Uranium-236	U-236	SOIL	American robin (Avian omnivore)	31000	310000	pCi/g	SOIL_AR(ip)_U-236
RAD	Radionuclide	Uranium-236	U-236	SOIL	Deer mouse (Mammalian omnivore)	720000	7200000	pCi/g	SOIL_DM(ip)_U-236
RAD	Radionuclide	Uranium-236	U-236	SOIL	Earthworm (Soil-dwelling invertebrate)	2400	24000	pCi/g	SOIL_EW_U-236
RAD	Radionuclide	Uranium-236	U-236	SOIL	Generic plant (Terrestrial autotroph - producer)	470	4700	pCi/g	MINIMUM SOIL_GP_U-236
RAD	Radionuclide	Uranium-236	U-236	SOIL	Gray fox (Mammalian top carnivore)	440000	4400000	pCi/g	SOIL_RF(f)_U-236
RAD	Radionuclide	Uranium-236	U-236	SOIL	Montane shrew (Mammalian insectivore)	15000000	150000000	pCi/g	SOIL_MS(i)_U-236
RAD	Radionuclide	Uranium-236	U-236	SOIL	Mountain cottontail (Mammalian herbivore)	50000	500000	pCi/g	SOIL_DC(p)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	Algae (Aquatic autotroph - producer) - water	23	230	pCi/L	MINIMUM WATER_A(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	American kestrel (water)	290000000	2900000000	pCi/L	WATER_AK(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	American robin (water)	280000000	2800000000	pCi/L	WATER_AR(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	210	2100	pCi/L	WATER_AS(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	210	2100	pCi/L	WATER_D(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	Deer mouse (water)	650000000	6500000000	pCi/L	WATER_DM(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	Fish (Aquatic intermediate carnivore) - water	42	420	pCi/L	WATER_GF(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	Gray fox (water)	15000000	150000000	pCi/L	WATER_RF(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	Montane shrew (water)	590000000	5900000000	pCi/L	WATER_MS(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	Mountain cottontail (water)	53000000	530000000	pCi/L	WATER_DC(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	Occult little brown myotis bat (water)	1900000000	19000000000	pCi/L	WATER_BA(w)_U-236
RAD	Radionuclide	Uranium-236	U-236	WATER	Violet-green Swallow (water)	530000000	5300000000	pCi/L	WATER_VGS(w)_U-236
RAD	Radionuclide	Uranium-238	U-238	SEDIMENT	Algae (Aquatic autotroph - producer) - sediment	4300	43000	pCi/g	SEDIMENT_A(s)_U-238
RAD	Radionuclide	Uranium-238	U-238	SEDIMENT	Aquatic snails (Aquatic herbivore - grazer) - sediment	4300	43000	pCi/g	SEDIMENT_AS(s)_U-238
RAD	Radionuclide	Uranium-238	U-238	SEDIMENT	Daphnids (Aquatic omnivore/ herbivore) - sediment	4300	43000	pCi/g	SEDIMENT_D(s)_U-238
RAD	Radionuclide	Uranium-238	U-238	SEDIMENT	Fish (Aquatic intermediate carnivore) - sediment	4300	43000	pCi/g	SEDIMENT_GF(s)_U-238
RAD	Radionuclide	Uranium-238	U-238	SEDIMENT	Occult little brown myotis bat (Mammalian aerial insectivore)	2500	25000	pCi/g	SEDIMENT_BA(i)_U-238
RAD	Radionuclide	Uranium-238	U-238	SEDIMENT	Violet-green Swallow (Avian aerial insectivore)	670	6700	pCi/g	MINIMUM SEDIMENT_VGS(i)_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	American kestrel (Avian top carnivore)	4200	42000	pCi/g	SOIL_AK(f)_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	American kestrel (insectivore / carnivore)	4200	42000	pCi/g	SOIL_AK(fi)_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	American robin (Avian herbivore)	3300	33000	pCi/g	SOIL_AR(p)_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	American robin (Avian insectivore)	4000	40000	pCi/g	SOIL_AR(i)_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	American robin (Avian omnivore)	9700	97000	pCi/g	SOIL_AR(ip)_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	Deer mouse (Mammalian omnivore)	2100	21000	pCi/g	SOIL_DM(ip)_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	Earthworm (Soil-dwelling invertebrate)	1100	11000	pCi/g	SOIL_EW_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	Generic plant (Terrestrial autotroph - producer)	400	4000	pCi/g	MINIMUM SOIL_GP_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	Gray fox (Mammalian top carnivore)	2100	21000	pCi/g	SOIL_RF(f)_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	Montane shrew (Mammalian insectivore)	2100	21000	pCi/g	SOIL_MS(i)_U-238
RAD	Radionuclide	Uranium-238	U-238	SOIL	Mountain cottontail (Mammalian herbivore)	2000	20000	pCi/g	SOIL_DC(p)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	Algae (Aquatic autotroph - producer) - water	24	240	pCi/L	MINIMUM WATER_A(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	American kestrel (water)	300000000	3000000000	pCi/L	WATER_AK(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	American robin (water)	290000000	2900000000	pCi/L	WATER_AR(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	Aquatic snails (Aquatic herbivore - grazer) - water	220	2200	pCi/L	WATER_AS(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	Daphnids (Aquatic omnivore/ herbivore) - water	220	2200	pCi/L	WATER_D(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	Deer mouse (water)	680000000	6800000000	pCi/L	WATER_DM(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	Fish (Aquatic intermediate carnivore) - water	44	440	pCi/L	WATER_GF(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	Gray fox (water)	15000000	150000000	pCi/L	WATER_RF(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	Montane shrew (water)	610000000	6100000000	pCi/L	WATER_MS(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	Mountain cottontail (water)	55000000	550000000	pCi/L	WATER_DC(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	Occult little brown myotis bat (water)	2000000000	20000000000	pCi/L	WATER_BA(w)_U-238
RAD	Radionuclide	Uranium-238	U-238	WATER	Violet-green Swallow (water)	550000000	5500000000	pCi/L	WATER_VGS(w)_U-238

Attachment D-8

ECODS N-1, CSSLP, and Ford Building OU Area Use Factors

This page intentionally left blank.

Area Use Factors

Receptor	AUF (ha)[1]	AUF (acre)	PAUF (ha)[2]	PAUF (acre)	ECODS Specific AUF[3]	ECODS Specific PAUF[4]	CSSLP Specific AUF[3]	CSSLP Specific PAUF[4]	CSSLP Surface Water Impoundment Area Specific AUF[3]	CSSLP Surface Water Impoundment Area Specific PAUF[4]	Ford Building Specific AUF[3]	Ford Building Specific PAUF[4]
American kestrel	106	262	4240	10477	1.51E-03	3.79E-05	1.27E-02	3.19E-04	3.28E-03	8.25E-05	8.55E-03	2.14E-04
American robin	0.42	1.04	16.8	42	3.82E-01	9.55E-03	3.21E+00	7.95E-02	8.27E-01	2.08E-02	2.15E+00	5.39E-02
Deer Mouse	0.077	0.19	3	7	2.08E+00	5.35E-02	1.76E+01	4.77E-01	4.53E+00	1.17E-01	1.18E+01	3.02E-01
Desert cottontail	3.1	7.7	124	306	5.18E-02	1.29E-03	4.34E-01	1.09E-02	1.12E-01	2.82E-03	2.91E-01	7.30E-03
Montane shrew	0.39	0.96	15.6	39	4.12E-01	1.03E-02	3.48E+00	8.56E-02	8.96E-01	2.24E-02	2.33E+00	5.80E-02
Red fox	1038	2565	41520	102596	1.55E-04	3.87E-06	1.30E-03	3.26E-05	3.35E-04	8.43E-06	8.73E-04	2.18E-05
Violet-green swallow	0.68	1.68	27.2	67	2.36E-01	5.90E-03	1.99E+00	4.99E-02	5.12E-01	1.29E-02	1.33E+00	3.33E-02
Occult little brown myotis bat	100	247	4000	9884	1.61E-03	4.01E-05	1.35E-02	3.38E-04	3.48E-03	8.75E-05	9.07E-03	2.26E-04

1 - Home range taken from Table 3.3-1 of LANL 2015 Screening Level Ecological Risk Assessment Methods, Revision 4
2 - Population area taken from Table 3.3-1 of LANL 2015 Screening Level Ecological Risk Assessment Methods, Revision 4
3 – Unit-specific Area Use Factor (AUF) = Site size (acres) / AUF (acres)
4 – Unit-specific Population Area Use Factor (PAUF) = Site size (ha) / PAUF (ha)

Unit Size	Ha	Acre
ECODS	0.1605	0.397
CSSLP	0.8354	3.34
Surface Water Impoundment Area	0.35	0.86
Ford Building	0.9055	2.24

This page intentionally left blank.

Attachment D-9

PAUF Adjusted Hazard Quotients

This page intentionally left blank.

Table 1. PAUF-Adjusted HQs for ECODS N-1 (Soil 0-1 ft)

Analyte[1]	Mean Concentration[2] *(mg/kg)*	RSV Source	American Robin (Avian herbivore)		American Robin (Avian omnivore)		American Robin (Avian insectivore)	
			RSV[4]	HQ[5]	RSV[4]	HQ[5]	RSV[4]	HQ[5]
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	1.00E-02	3	1.60E+02	6.06E-07	4.00E-01	2.43E-04	2.00E-01	4.85E-04
CYANIDE	9.32E-01	3	1.00E+00	9.04E-03	9.90E-01	9.14E-03	9.80E-01	9.23E-03
LEAD	4.67E+01	3	3.60E+01	1.26E-02	2.80E+01	1.62E-02	2.30E+01	1.97E-02
VANADIUM	3.16E+01	3	1.30E+01	2.36E-02	1.10E+01	2.79E-02	9.50E+00	3.23E-02

1 –COPCs identified in Table D-2 with receptor-specific RSVs available
2 – Mean concentration from Appendix A Table A.1.1 (0-1 ft)
3 – Los Alamos National Laboratory Low Effect ESL for soil media (2017)
4 – Species-specific RSV for receptor from Attachment D-7
5 – PAUF-adjusted value: Hazard Quotient (HQ) = (Mean/RSV) x PAUF); PAUF = Size of Unit in ha/Population Size in ha

Table 2. PAUF-Adjusted HQs for ECODS N-1 (Soil 1-4 ft)

Analyte[1]	Mean Concentration[2] *(mg/kg)*	RSV Source	American Robin (Avian Herbivore)		American Robin (Avian Omnivore)		American Robin (Avian Insectivore)	
			RSV[4]	HQ[5]	RSV[4]	HQ	RSV[4]	HQ[5]
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	1.77E+00	3	1.60E+02	1.06E-04	4.00E-01	4.23E-02	2.00E-01	8.45E-02
HEXAVALENT CHROMIUM 7199	2.90E+00	3	2.10E+03	1.32E-05	1.60E+03	1.73E-05	1.40E+03	1.98E-05
COPPER	3.23E+01	3	1.00E+02	3.09E-03	6.00E+01	5.14E-03	4.30E+01	7.18E-03
CYANIDE	1.02E+00	3	1.00E+00	9.74E-03	9.90E-01	9.83E-03	9.80E-01	9.93E-03
LEAD	3.89E+01	3	3.60E+01	1.03E-02	2.80E+01	1.33E-02	2.30E+01	1.62E-02
SELENIUM	8.83E+00	3	1.90E+00	4.44E-02	1.60E+00	5.27E-02	1.40E+00	6.03E-02
VANADIUM	4.42E+01	3	1.30E+01	3.25E-02	1.10E+01	3.84E-02	9.50E+00	4.45E-02

Analyte[1]	Mean Concentration[2] *(mg/kg)*	RSV Source[3]	Montane Shrew (Mammalian Insectivore)	
			RSV[4]	HQ[5]
CADMIUM	1.57E+00	b	3.00E+00	5.37E-03
SELENIUM	8.83E+00	3	1.00E+00	9.09E-02

1 –COPCs identified in Table D-4 with receptor-specific RSVs available
2 – Mean concentration from Appendix A Table A.1.2 (1-4 ft)
3 – Los Alamos National Laboratory Low Effect ESL for soil media (2017)
4 – Species-specific RSV for receptor from Attachment D-7
5 – PAUF-adjusted value: Hazard Quotient (HQ) = (Mean/RSV) x PAUF); PAUF = Size of Unit in ha/Population Size in ha

Table 3. PAUF-Adjusted HQs for CSSLP (Soil 0-1 ft)

Analyte[1]	Mean Concentration[2] *(mg/kg)*	RSV Source	American Robin (Avian Herbivore)		American Robin (Avian Omnivore)		American Robin (Avian Insectivore)	
			RSV[4]	HQ[5]	RSV[4]	HQ[5]	RSV[4]	HQ[5]
SELENIUM	8.06E-01	b	1.90E+00	3.37E-02	1.60E+00	4.01E-02	7.50E+00	3.37E-02
VANADIUM	2.27E+01	b	1.30E+01	1.39E-01	1.10E+01	1.64E-01	9.50E+00	1.90E-01

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source[3]	Deer mouse	
			RSV	HQ
SELENIUM	8.06E-01	b	1.20E+00	3.20E-01
VANADIUM	2.27E+01	b	1.00E+03	1.08E-02

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source[3]	American Kestrel (Insectivore/carnivore)	
			RSV	HQ
SELENIUM	8.06E-01	b	7.50E+00	3.43E-05
VANADIUM	2.27E+01	b	1.10E+02	6.57E-05

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source[3]	Montane Shrew	
			RSV	HQ
SELENIUM	8.06E-01	b	1.00E+00	6.90E-02
VANADIUM	2.27E+01	b	6.10E+02	3.18E-03

1 –COPCs identified in Table D-6 with receptor-specific RSVs available
2 – Mean concentration from Appendix A Table A.1.1 (0-1 ft)
3 – Los Alamos National Laboratory Low Effect ESL for soil media (2017)
4 – Species-specific RSV for receptor from Attachment D-7
5 – PAUF-adjusted value: Hazard Quotient (HQ) = (Mean/RSV) x PAUF); PAUF = Size of Unit in ha/Population Size in ha

Table 4. PAUF-Adjusted HQs for CSSLP (Soil 1-4 ft)

Analyte[1]	Mean Concentration[2] *(mg/kg)*	RSV Source	American Robin (Avian Herbivore)		American Robin (Avian Omnivore)		American Robin (Avian Insectivore)	
			RSV[4]	HQ[5]	RSV[4]	HQ[5]	RSV[4]	HQ[5]
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	9.43E-02	3	1.60E+02	4.69E-05	4.00E-01	1.87E-02	2.00E-01	2.54E-02
MERCURY	7.39E-02	3	6.70E-01	8.77E-03	2.20E-01	1.81E-02	1.30E-01	3.06E-02
SELENIUM	9.36E-01	b	1.90E+00	3.92E-02	1.60E+00	4.65E-02	1.40E+00	5.32E-02
VANADIUM	1.98E+01	3	1.30E+01	1.21E-01	1.10E+01	9.70E-02	9.50E+00	1.12E-01

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source[3]	Deer mouse	
			RSV	HQ
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	9.43E-02	b	1.10E+01	4.09E-03
MERCURY	7.39E-02	b	3.00E+01	1.18E-03
SELENIUM	9.36E-01	b	1.20E+00	3.72E-01
VANADIUM	1.98E+01	b	1.00E+03	9.44E-03

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source[3]	American Kestrel (Insectivore/carnivore)	
			RSV	HQ
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	9.43E-02	b	9.60E-01	3.13E-05
MERCURY	7.39E-02	b	3.20E+00	7.36E-06
SELENIUM	9.36E-01	b	1.40E+02	2.13E-06
VANADIUM	1.98E+01	b	2.30E+02	2.74E-05

Table 4. PAUF-Adjusted HQs for CSSLP (Soil 1-4 ft) *(continued/end)*

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source[3]	Montane Shrew	
			RSV	HQ
BIS(2-ETHYLHEXYL)PHTHALATE (DEPH)	9.43E-02	b	6.00E+00	1.35E-03
MERCURY	7.39E-02	b	1.70E+01	3.72E-04
SELENIUM	9.36E-01	b	1.00E+00	8.02E-02
VANADIUM	1.98E+01	b	6.10E+02	2.78E-03

1 –COPCs identified in Table D-8 with receptor-specific RSVs available
2 – Mean concentration from Appendix A Table A.1.2 (1-4 ft)
3 – Los Alamos National Laboratory Low Effect ESL for soil media (2017)
4 – Species-specific RSV for receptor from Attachment D-7
5 – PAUF-adjusted value: Hazard Quotient (HQ) = (Mean/RSV) x PAUF); PAUF = Size of Unit in ha/Population Size in ha

Table 5. PAUF-Adjusted HQs for CSSLP Surface Water Impoundment Area (Sediment 0-1 ft)

Analyte[1]	Mean Concentration[2] *(mg/kg)*	RSV Source	American Robin (Avian Herbivore)		American Robin (Avian Omnivore)		American Robin (Avian Insectivore)	
			RSV[4]	HQ[5]	RSV[4]	HQ[5]	RSV[4]	HQ[5]
VANADIUM	2.98E+01	3	1.30E+01	4.78E-02	1.10E+01	5.64E-02	9.50E+00	6.54E-02

Analyte[1]	Mean Concentration[2] *(mg/kg)*	RSV Source[3]	Little Brown Bat (Mammalian Aerial Insectivore)		Violet-Green Swallow (Avian Aerial Insectivore)	
			RSV[4]	HQ[5]	RSV[4]	HQ[5]
VANADIUM	2.98E+01	3	1.10E+03	2.37E-06	5.90E+01	6.50E-03

1 –COPCs identified in Table D-10 with receptor-specific RSVs available
2 – Mean concentration from Appendix A Table A.2.4 (0-1 ft)
3 – Los Alamos National Laboratory Low Effect ESL for soil media (2017)
4 – Species-specific RSV for receptor from Attachment D-7
5 – PAUF-adjusted value: Hazard Quotient (HQ) = (Mean/RSV) x PAUF);
PAUF = Size of Unit in ha/Population Size in ha

Table 6. HQs for CSSLP Surface Water Impoundment Area (Surface Water, Unfiltered)

Analyte[1]	Mean Concentration[2] *(µg/L)*	RSV Source[3]	Aquatic community organisms	
			RSV	HQ
ALUMINUM	3.67E+02	c	1.30E+03	2.82E-01
COPPER	2.84E+01	c	7.00E+00	4.05E+00
IRON	2.05E+03	c	1.00E+04	2.05E-01
LEAD	3.85E+00	c	1.00E+01	3.85E-01
MANGANESE	2.32E+02	c	2.30E+03	1.01E-01
ZINC	3.77E+01	c	8.50E+01	4.44E-01
Analyte[1]	**Mean Concentration[2] *(µg/L)***	**RSV Source[3]**	**Aquatic life**	
			RSV	**HQ**
ALUMINUM	3.67E+02	b	8.70E+01	4.22E+00
COPPER	2.84E+01	b	4.95E+00	5.73E+00
IRON	2.05E+03	b	1.00E+03	2.05E+00
LEAD	3.85E+00	b	3.01E+01	1.28E-01
MANGANESE	2.32E+02	b	9.30E+01	2.50E+00
ZINC	3.77E+01	b	6.60E+01	5.71E-01
Analyte[1]	**Mean Concentration[2] *(µg/L)***	**RSV Source[3]**	**Freshwater aquatic life**	
			RSV	**HQ**
COPPER	2.84E+01	a	2.90E+00	9.78E+00
LEAD	3.85E+00	a	5.40E-01	7.13E+00
ZINC	3.77E+01	a	3.70E+01	1.02E+00

1 –COPCs identified in Table D-12 with receptor-specific RSVs available
2 – Mean concentration from Appendix A Table A.2.7 Surface Water (unfiltered)
3: a = SCDHEC, R61-68, Water Classifications and Standards, chronic values for freshwater aquatic life (2020)
3: b = Table 1a in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
3: c = Los Alamos National Laboratory Ecorisk Database (Release 3.3) (2017)
Hazard Quotient (HQ) = Mean / RSV

Table 7. HQs for CSSLP Surface Water Impoundment Area (Surface Water, Filtered)

Analyte[1]	Mean Concentration[2] *(µg/L)*	RSV Source[3]	Aquatic community organisms	
			RSV	HQ
ALUMINUM	3.64E+02	c	1.30E+03	2.80E-01
COPPER	2.88E+01	c	7.00E+00	4.11E+00
IRON	1.96E+03	c	1.00E+04	1.96E-01
LEAD	2.90E+00	c	1.00E+01	2.90E-01
MANGANESE	2.32E+02	c	2.30E+03	1.01E-01
ZINC	3.59E+01	c	8.50E+01	4.22E-01
Analyte[1]	**Mean Concentration[2] *(µg/L)***	**RSV Source[3]**	**Aquatic life**	
			RSV	**HQ**
ALUMINUM	3.64E+02	b	8.70E+01	4.18E+00
COPPER	2.88E+01	b	4.95E+00	5.82E+00
IRON	1.96E+03	b	1.00E+03	1.96E+00
LEAD	2.90E+00	b	3.01E+01	9.64E-02
MANGANESE	2.32E+02	b	9.30E+01	2.50E+00
ZINC	3.59E+01	b	6.60E+01	5.43E-01
Analyte[1]	**Mean Concentration[2] *(µg/L)***	**RSV Source[3]**	**Freshwater aquatic life**	
			RSV	**HQ**
COPPER	2.88E+01	a	2.90E+00	9.93E+00
LEAD	2.90E+00	a	5.40E-01	5.38E+00
ZINC	3.59E+01	a	3.70E+01	9.69E-01

1 –COPCs identified in Table D-14 with receptor-specific RSVs available
2 – Mean concentration from Appendix A Table A.2.8Surface Water (filtered)
3: a = SCDHEC, R61-68, Water Classifications and Standards, chronic values for freshwater aquatic life (2020)
3: b = Table 1a in EPA Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update (2018)
3: c = Los Alamos National Laboratory Ecorisk Database (Release 3.3) (2017)
Hazard Quotient (HQ) = Mean / RSV

Table 8. PAUF-Adjusted HQs for Ford Building (Soil 0-1 ft)

Analyte[1]	Mean Concentration[2] *(mg/kg)*	RSV Source	American Robin (Avian Herbivore)		American Robin (Avian Omnivore)		American Robin (Avian Insectivore)	
			RSV[4]	HQ[5]	RSV[4]	HQ[5]	RSV[4]	HQ[5]
SELENIUM	9.32E-01	b	1.90E+00	2.64E-02	1.60E+00	3.14E-02	1.40E+00	3.59E-02
THALLIUM	1.82E+00	3	6.90E+01	1.42E-03	5.50E+01	1.78E-03	4.50E+01	2.18E-03
VANADIUM	3.95E+01	3	1.30E+01	1.64E-01	1.10E+01	1.93E-01	9.50E+00	2.24E-01

Analyte[1]	Mean Concentration[2] *(mg/kg)*	RSV Source[3]	Deer mouse	
			RSV[4]	HQ[5]
SELENIUM	9.32E-01	b	1.20E+00	2.34E-01
THALLIUM	1.82E+00	3	7.20E+00	7.62E-02
VANADIUM	3.95E+01	3	1.00E+03	1.19E-02

Analyte[1]	Mean Concentration[2] *(mg/kg)*	RSV Source[3]	American Kestrel (Insectivore/carnivore)	
			RSV[4]	HQ[5]
SELENIUM	9.32E-01	b	7.50E+00	2.65E-05
THALLIUM	1.82E+00	3	4.80E+02	8.08E-07
VANADIUM	3.95E+01	3	1.10E+02	7.66E-05

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source[3]	Montane Shrew	
			RSV	HQ
SELENIUM	9.32E-01	b	1.00E+00	2.03E-05
THALLIUM	1.82E+00	b	4.20E+00	9.43E-06
VANADIUM	3.95E+01	b	6.10E+02	1.41E-06

1 –COPCs identified in Table D-17 with receptor-specific RSVs available
2 – Mean concentration from Appendix A Table A.1.1 (0-1 ft)
3 – Los Alamos National Laboratory Low Effect ESL for soil media (2017)
4 – Species-specific RSV for receptor from Attachment D-7
5 – PAUF-adjusted value: Hazard Quotient (HQ) = (Mean/RSV) x PAUF); PAUF = Size of Unit in ha/Population Size in ha

Table 9. PAUF-Adjusted HQs for Ford Building (Soil 1-4 ft)

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source	American robin (Avian herbivore)		American robin (Avian omnivore)		American robin (Avian insectivore)	
			RSV[4]	HQ[5]	RSV[4]	HQ[5]	RSV[4]	HQ[5]
COPPER	1.69E+01	3	1.00E+02	9.08E-03	6.00E+01	1.51E-02	4.30E+01	2.11E-02
SELENIUM	1.47E+00	3	1.90E+00	4.16E-02	1.60E+01	4.94E-03	1.40E+00	5.64E-02
THALLIUM	3.09E+00	3	6.90E+01	2.41E-03	5.50E+01	3.03E-03	4.50E+01	3.70E-03

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source[3]	Deer mouse	
			RSV[4]	HQ[5]
SELENIUM	1.47E+00	3	1.20E+00	3.68E-01
THALLIUM	3.09E+00	3	7.20E+00	1.30E-01

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source[3]	American Kestrel (Insectivore/carnivore)	
			RSV[4]	HQ[5]
SELENIUM	1.47E+00	3	7.50E+00	4.17E-05
THALLIUM	3.09E+00	3	1.00E+03	6.60E-07

Analyte[1]	Mean Concentration[2] (mg/kg)	RSV Source[3]	Montane Shrew	
			RSV	HQ
SELENIUM	1.47E+00	b	1.00E+00	8.50E-02
THALLIUM	3.09E+00	b	4.20E+00	4.27E-02

1 – COPCs identified in Table D-19 with receptor-specific RSVs available
2 – Mean concentration from Appendix A Table A.1.1 (0-1 ft)
3 – Los Alamos National Laboratory Low Effect ESL for soil media (2017)
4 – Species-specific RSV for receptor from Attachment D-7
5 – PAUF-adjusted value: Hazard Quotient (HQ) = (Mean/RSV) x PAUF); PAUF = Size of Unit in ha/Population Size in ha

This page intentionally left blank.

APPENDIX E

PRINCIPAL THREAT SOURCE MATERIAL EVALUATION

This page was intentionally left blank.

TABLE OF CONTENTS

Section **Page**
List of Figures E-3
List of Tables E-3
List of Attachments E-4
List of Abbreviations and Acronyms E-5
E-1. Introduction E-7
E-2. PTSM Evaluation Process E-10
E-3. Uncertainty Evaluation E-11
E-4. Summary and Conclusions E-15
E-5. References E-16

LIST OF FIGURES

Figure **Page**
Figure E-1. ECODS N-1 Sample Location Map E-17
Figure E-2. Central Shops Scrap Lumber Pile (631-2G) Sample Location Map E-18
Figure E-3. ECODS N-1 Sample Location Map E-19

LIST OF TABLES

Table **Page**
Table E-1. PTSM Screening Evaluation for ECODS N-1 (soil; all depth intervals) E-21
Table E-2. PTSM Screening Evaluation for CSSLP Upland Area (soil; all depth intervals) E-23
Table E-3. PTSM Screening Evaluation for CSSLP Surface Water Impoundment Area (sediment; all depth intervals) E-27
Table E-4. PTSM Screening Evaluation for Ford Building (soil; all depth intervals) E-29

LIST OF ATTACHMENTS

Attachment		Page
Attachment E-1.	USEPA Regional Screening Levels Website: Default RSLs for Composite Worker (i.e., Industrial Worker) Scenario	E-33
Attachment E-2.	USEPA Radionuclide Preliminary Remediation Goals for Superfund Website: Default PRGs for Composite Worker (i.e., Industrial Worker) Scenario	E-39

LIST OF ABBREVIATIONS AND ACRONYMS

COC	constituent of concern
CSSLP	Central Shops Scrap Lumber Pile (631-2G)
ECODS	Early Construction and Operation Disposal Site
EPC	exposure point concentration
ft	feet
HI	hazard index
HQ	hazard quotient
m	meter
NORM	naturally occurring radioactive material
OU	Operable Unit
PRG	preliminary remediation goal
PTSM	principal threat source material
RSL	regional screening level
SRS	Savannah River Site
USEPA	U.S. Environmental Protection Agency

This page was intentionally left blank.

E-1. INTRODUCTION

The concept of principal threat waste and low-level threat waste as developed by the U.S. Environmental Protection Agency (USEPA) in the National Contingency Plan (40 *Code of Federal Regulations* 300.430(a)(1)(iii)) is to be applied on a site-specific basis when characterizing source material. Source materials are those materials that include or contain hazardous substances, pollutants, or contaminants that act as a reservoir for migration to surface water, or air, or that act as a source for direct exposure (USEPA 1991).

The determination of whether the source materials present at a waste unit would be classified as principal threat source material (PTSM) is based mainly on the USEPA guidance document (USEPA 1991). In this guidance, the USEPA defines principal threat wastes as "those source materials considered to be highly toxic or mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur." These include liquids and other highly mobile materials (e.g., materials that released from surface soil due to volatilization, leaching, or surface runoff) or materials having high concentrations of toxic compounds. No "threshold level" of toxicity/risk has been established to equate to "principal threat." However, the guidance does state that treatment alternatives for source materials should generally be evaluated where the combined toxicity and mobility pose a potential risk of 1E-03 or greater. According to USEPA, the PTSM concept expectation was to "help streamline and focus the remedy selection process, not as a mandatory waste classification requirement."

The USEPA, South Carolina Department of Health and Environmental Control, and U.S. Department of Energy evaluated the USEPA guidance with respect to toxicity and contaminant migration analysis performed at Savannah River Site (SRS). In practice, SRS risk assessment and contaminant migration evaluations identify constituents of concern (COCs) associated with source material or impacted media and determine the associated risk (i.e., adverse health impacts as measured by the hazard index [HI] and numerical estimate of risk) or potential impact to environmental media. If threshold risk levels are exceeded, problems are identified, and an evaluation of remedial alternatives is conducted in the Feasibility Study. Since the risk assessment does not evaluate human receptor exposure to subsurface soils, further reevaluation is needed to account for potentially highly toxic source material or contaminated soils at depth that would

results in unacceptable risk should exposure occur. Therefore, a quantitative determination of whether contamination exists above PTSM levels at the Early Construction and Operational Disposal Site (ECODS) N-1, Central Shops Scrap Lumber Pile (631-2G) (CSSLP), and the Ford Building Operable Unit (OU) in all soil depths was performed.

E-1.1 Background

E-1.1.1 ECODS N-1 (NBN)

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 located within the Pen Branch watershed and is 107 m (350 ft) long by 15 m (50 ft) wide (0.4 acres). Historical aerial photographs revealed that the area where the subunit is located was farmland prior to construction of the SRS (WSRC 2001a). The ECODS N-1 is 88 m (290 ft) above mean sea level (msl). Runoff from the subunit runs overland to the south and is collected by an unnamed tributary of Pen Branch approximately 366 m (1,200 ft) to the south. The subunit is currently comprised of a wooden area containing mature pine trees and provides moderate habitat quality for wildlife receptors.

A *Site Evaluation Report for Early Construction and Operation Disposal Site (ECODS) N-1 (NBN)* (WSRC 2001a) was conducted for this subunit in 2001. It was determined that potential impacts to human health or the environment from contaminants in soil could be present.

E-1.1.2 Central Shops Scrap Lumber Pile (631-2G)

CSSLP lies in the southwestern sloping plain adjacent to the Central Shops Burning/Rubble Pits (631-1G and 631-3G) (CSBRPs). The subunit measures 91.4 m (300 ft) by 91.4 m (300 ft) (2.07 acres). Prior to 1951, the area was used as farmland (WSRC 2003a). The CSSLP was historically used as an equipment laydown and rubble storage area in addition to an area for burning construction related materials. Historical burning of scrap lumber resulted in ash that was placed in the adjacent CSBRPs. A surface water impoundment area was constructed between 1992 and 1994 in the southern portion of the CSSLP.

E-1.1.3 Ford Building

Ford Building lies within the N-Area facility boundary in the Pen Branch watershed. During the early 1960s, the SRS reactors were operating at higher power levels and failure of heat exchangers prompted conversion of the facility from a testing facility to heat exchanger repair/work. A sealed shell was installed inside the original building frame with a ventilation and High Efficiency Particulate Air (HEPA) filter system in order to maintain a slight negative pressure to serve as a repair shop for the leaking contaminated process water heat exchangers from SRS reactors. This mission continued until the early 1970s with the procurement of new heat exchangers for the SRS reactors. In the 1980s, the Ford Building housed construction crews that performed minor repairs and to store miscellaneous equipment and supplies. During the early 1990s, the K-Reactor had a minor leak in a heat exchanger that resulted in reactivating the Ford Building repair work. The facility operated for about six months and was closed. The Ford Building was then utilized to store excess equipment (in waste containers [e.g., Sealands] and/or bagged/wrapped in plastic) that was chemically and/or radiologically contaminated. The primary area consisted of a machine shop with offices, storage rooms, restrooms, and a service area.

In 2019, representatives from the Department of Energy, USEPA, and SCDHEC reached agreement that the Ford Building, excluding the building slab, would undergo D&D using the Integrated Sampling Model (SRNS 2009).

Figures E-1 through E-3 show the ECODS N-1, CSSLP, Ford Building OU and the associated subunits.

E-1.2 Data

Characterization activities for soil, sediment, and surface water media were conducted at the ECODS N-1, CSSLP, and Ford Building OU in 2001, 2014, and 2019. A sampling and analysis plan was developed to address these data gaps and characterization activities were implemented from September 2020 through October 2020 (SRNS 2020). Characterization details for each subunit are provided in Chapter 3.

Appendix A presents the maximum detected constituent concentrations and activity concentrations for the ECODS N-1 soil (Table A.1.3); CSSLP Upland Area soil (Table A.2.3), CSSLP Surface

Water Impoundment Area sediment (Table A.2.6), and Ford Building (Table A.3.3) used in the PTSM evaluation.

E-1.3 Receptor

The USEPA default industrial worker receptor scenario (termed composite worker) is the receptor scenario evaluated under this PTSM evaluation for ECODS N-1, CSSLP, and Ford Building (690-N) OU. The principal exposure assumptions for the industrial worker are 25 years, 250 days/year, and 8 hours per day. Given the current and expected future land use of the area in which the ECODS N-1, CSSLP, and Ford Building OU is located, the industrial worker is the most likely receptor exposure.

E-1.4 Sources of Risk-Based Threshold Values

The USEPA Regional Screening Levels (RSLs) website (USEPA 2020a) is the source of chemical constituent, risk-based threshold values used in this evaluation. The website was accessed in February 2021. The threshold limits for the industrial worker scenario were obtained from the generic composite worker soil table. The RSLs for this scenario are provided in Attachment E-1.

The USEPA Superfund Radionuclide Preliminary Remediation Goals (PRGs) for Superfund website (USEPA 2020b) is the source of the radionuclide threshold values for the industrial worker used in this evaluation. Threshold limits for the composite worker were obtained by using the website calculator function with the default exposure parameters to derive PRGs. The website was accessed in February 2021. The PRGs for this scenario are provided in Attachment E-2.

E-2. PTSM EVALUATION PROCESS

To determine whether contaminated source material/soils/sediments should be preliminarily considered PTSM, a simple quantitative assessment evaluating the toxicity of the source is used where the results are compared to a threshold for determining PTSM.

In determining whether the source should be considered PTSM, the evaluation considers the cumulative effects of both the potential risk from carcinogenic constituents and the adverse effects from noncarcinogens to an industrial worker receptor. The source material (i.e., sediment and/or

soil) is preliminarily considered to be PTSM if the cumulative risk exceeds at least one of the following threshold screening criteria:

- Carcinogens – greater than 1E-03 industrial worker risk
- Noncarcinogens – industrial worker hazard index (HI) greater than 10

In the preliminary screen, the unit maximum concentration for every detected constituent for the sediment and/or soil media from the all-depth interval from all subunits in the ECODS N-1, CSSLP, and Ford Building is determined and used as the exposure point concentration (EPC).

For carcinogens, the individual risk associated with each constituent is calculated by multiplying the ratio of the EPC to the RSL or PRG by 1E-06. Each of these risks is summed to calculate the cumulative carcinogenic risk associated with the source. For noncarcinogens, a hazard quotient (HQ) associated with each constituent is calculated by dividing the EPC by the RSL. These HQs are summed to derive the cumulative HI. If neither threshold criteria for PTSM are exceeded based on the maximum detected concentrations and activity concentrations, then PTSM is not present and it is not necessary to evaluate further. If the threshold criteria are exceeded, then an uncertainty analysis may be conducted to further evaluate the constituents and source(s) that exceed the PTSM toxicity criteria.

E-3. UNCERTAINTY EVALUATION

A summary of the screening evaluation performed for PTSM is summarized below.

E-3.1 Screening Evaluation

For the screening evaluation for PTSM, maximum concentrations for nonradiological constituents and activity concentrations for radionuclides in soil and sediment (all depths), as appropriate, from each subunit was used to calculate HQs for noncarcinogens and numerical risk for carcinogens. The following equations are used to calculate HQs and risks for the PTSM evaluation:

$$noncarcinogen\ hazard\ quotient = \frac{[Maximum\ Concentration]}{[RSL]}$$

$$carcinogen\ risk\ estimate = \left(\frac{[Maximum\ Concentration]}{[RSL\ or\ PRG]}\right) \times 1E\text{-}06$$

E-3.2 Results

E-3.2.1 ECODS N-1 (Soil Media)

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 refined COCs are identified for the ECODS N-1 soil media. Table E-1 presents the results of the PTSM screening evaluation for soil at the ECODS N-1.

E-3.2.2 CSSLP Upland Area (Soil Media)

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. No PTSM refined COCs are identified for the CSSLP Upland Area soil media. Table E-2 presents the results of the PTSM screening evaluation for soil at the CSSLP Upland Area.

E-3.2.3 CSSLP Surface Water Impoundment Area (Sediment Media)

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. No PTSM refined COCs are identified for the CSSLP Surface Water Impoundment Area sediment media. Table E-3 presents the results of the PTSM screening evaluation for sediment at the CSSLP Surface Water Impoundment Area.

E-3.2.4 Ford Building (Soil Media)

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. Table E-4 presents the results of the PTSM screening evaluation for soil at the Ford Building. Since the PTSM threshold of 1E-03 was exceeded, an uncertainty analysis is presented to further evaluate the constituents and source(s) that exceed the PTSM criteria. The risk is driven by the Thorium Series with the maximum detected concentration for each analyte shown below. The PTSM threshold (1E-03) for thorium-232 is 15.3 pCi/g.

Analyte	Maximum Concentration	PRG	Risk
Thorium-232	3.97E+00	1.53E-02	1.13E-03
Actinium-228	1.55E+01	+D-Th	
Thorium-228	3.33E+00	+D-Th	
Lead-212	1.62E+01	+D-Th	
Bismuth-212	1.73E+01	+D-Th	
Thallium-208	4.56E+00	+D-Th	

E-3.3 Uncertainty Evaluations for Ford Building

The Thorium Series (thorium-232) evaluation includes not only the measured activity concentration of thorium-232 specifically, but also considers any analytical results from its daughter products (e.g. bismuth-212) since these isotopes are assumed to be present in secular equilibrium. Data screening performed using the highest detected activity concentration in the entire series and the cumulative risk evaluation is performed using the highest EPC of the highest EPC of the entire series. For this dataset, bismuth-212 had the maximum activity concentration 17.3 pCi/g. It was detected in 9/10 samples with eight results being estimated values (i.e., J-qualified). Concentrations range from 1.05 pCi/g to 17.3 pCi/g with a mean concentration 3.49 pCi/g. Sample location FBFA-7 at a depth interval of 8.4-9 m (28-30 ft) (Figure E-1). The daughter products are not evaluated separately since they are considered in the thorium-232 secular equilibrium PRG. The thorium-232 analytical result was 3.97 pCi/g FBFA-7 (8.4-9 m (28-30 ft).

Background comparisons for the thorium-232 series includes consideration of the range of activity concentrations for the entire decay chain (i.e. includes daughter products). The SRS Soil background maximum detected activity concentration is 6.75 pCi/g (based on the radium-228 results. Nine out of ten of the bismuth-212 concentration are below the SRS maximum concentration of radium-228 (6.75 pCi/g).

In terms of gross alpha, the highest concentration at the Ford Building is 90.2 pCi/g at a depth of interval of 8.4-9 m (28-30 ft) in location FBFA-7. Gross alpha is detected in 88/88 samples with no results being estimated. Only one of the 88 gross alpha results exceed the maximum SRS soil background for gross alpha (32.7 pCi/g).

In terms of nonvolatile beta, the highest concentration at the Ford Building is 40.3 pCi/g at a depth of interval of 8.4-9 m (28-30 ft) in location FBFA-7. Nonvolatile beta is detected in 88/88 samples

with no results being estimated. Only one of the 88 gross alpha results exceed the maximum SRS soil background for gross alpha (33 pCi/g).

Thorium-232 is a naturally occurring constituent of primordial origin with a half-life of 14 billion years. As previously discussed, primordial nuclides are those that are long lived and have existed in the earth's crust throughout history. The main contributors to external exposure from primordial nuclides are potassium-40, uranium-238, and thorium-232 (and their daughter products). Thorium series concentrations are typical of natural thorium.

Only low levels of man-made radionuclides (cesium-137 and cobalt-60) were observed in the surface (0-0.3 m [0-1 ft]) soil samples around the Ford Building. The elevated gross alpha (90.2 pCi/g) and nonvolatile beta (48.0 pCi/g) concentrations in the 28-30 ft sample interval are the result of natural-occurring radionuclides in the Uranium-238 series and Thorium-232 series. There are not elevated gross alpha and nonvolatile beta concentrations in the shallower sample intervals (0-0.3m [0-1 ft], 0.3-1.2 m [1-4 ft], 2.4-3 m [8-10 ft], or 5.4-6 m [18-20 ft]) relative to the 8.4-9 m (28-30 ft) sample interval gross alpha (90.2 pCi/g) and nonvolatile beta (40.3 pCi/g) concentrations in location FBFA-7. The distribution and type of radionuclide concentrations indicates naturally occurring radioactive material (NORM) rather than contamination from industrial operations. Heavy mineral deposits have been documented (Killeen, et. al 2012) in Castor Creek sediments, which resulted in elevated concentrations of Uranium-238 series and Thorium-232 series radionuclides in sediment and soil samples. As the Ford Building is approximately 3.22 km (2 mi) from these Castor Creek sediment locations, the elevated activity in the 8.4-9 m (28-30 ft) sample interval in the FBFA-07 core is most probably NORM.

Thorium-232 is not recommended for further remedial evaluation as a human health PTSM RCOC in soil at the Ford Building based on the following lines of evidence:

- The majority (99%) of the unit activity concentrations are within the SRS soil background activity concentration range
- It is a naturally occurring constituent that is common in SRS background soils
- It does not appear to be unit-related, but is most probably NORM

E-4. SUMMARY AND CONCLUSIONS

Based on the results of the PTSM evaluation, no PTSM refined COCs are identified for the ECODS N-1, CSSLP (Upland Area and Surface Water Impoundment Area), and Ford Building OU. The revised CSM is presented in Chapter 3.

Summary of the ECODS N-1, Central Shops Scrap Lumber Pile, and Ford Building (690-N) OU PTSM Assessment

Subunit	PTSM RCOCs
ECODS N-1 (NBN)	Soil (all depths) None
Central Shop Scrap Lumber Pile (631-2G)	Soil (all depths) None Sediment (all depths) None
Ford Building	Soil (all depths) None

E-5. REFERENCES

Killeen, T.P., J.A. Ross, M.R. Millings, M.E. Denham, and W.P. Kubilius, 2012. *Erosion and Heavy Mineral Deposit from Reactor Water Discharge (U)*, 2012 Clemson Hydrogeology Symposium, https://www.clemson.edu/cecas/departments/eees/symposium/programs/2012_CHS_program.pdf, PowerPoint Presentation

SRNS, 2020. *RFI/RI Work Plan for Early Construction and Operational Disposal Site N-1, 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 0, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

USEPA, 1991. *A Guide to Principal Threat and Low Level Threat Wastes*, Superfund Publication 9380.3-06FS, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 2020a. *USEPA Regional Screening Levels*, U.S. Environmental Protection Agency, National Center for Environmental Assessment, Arlington, VA, (November 2020 updated), 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

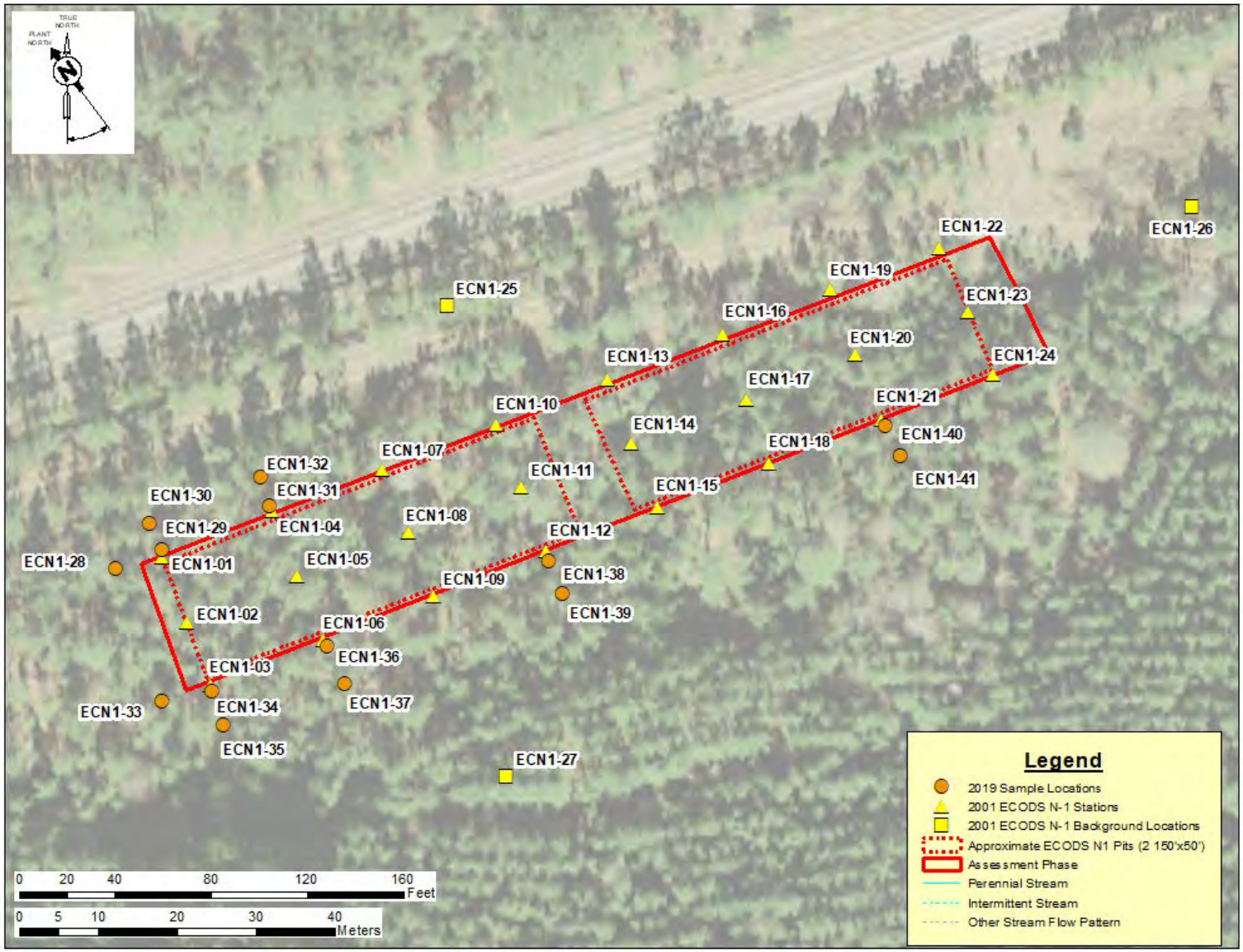


Figure E-1. ECODS N-1 Sample Location Map

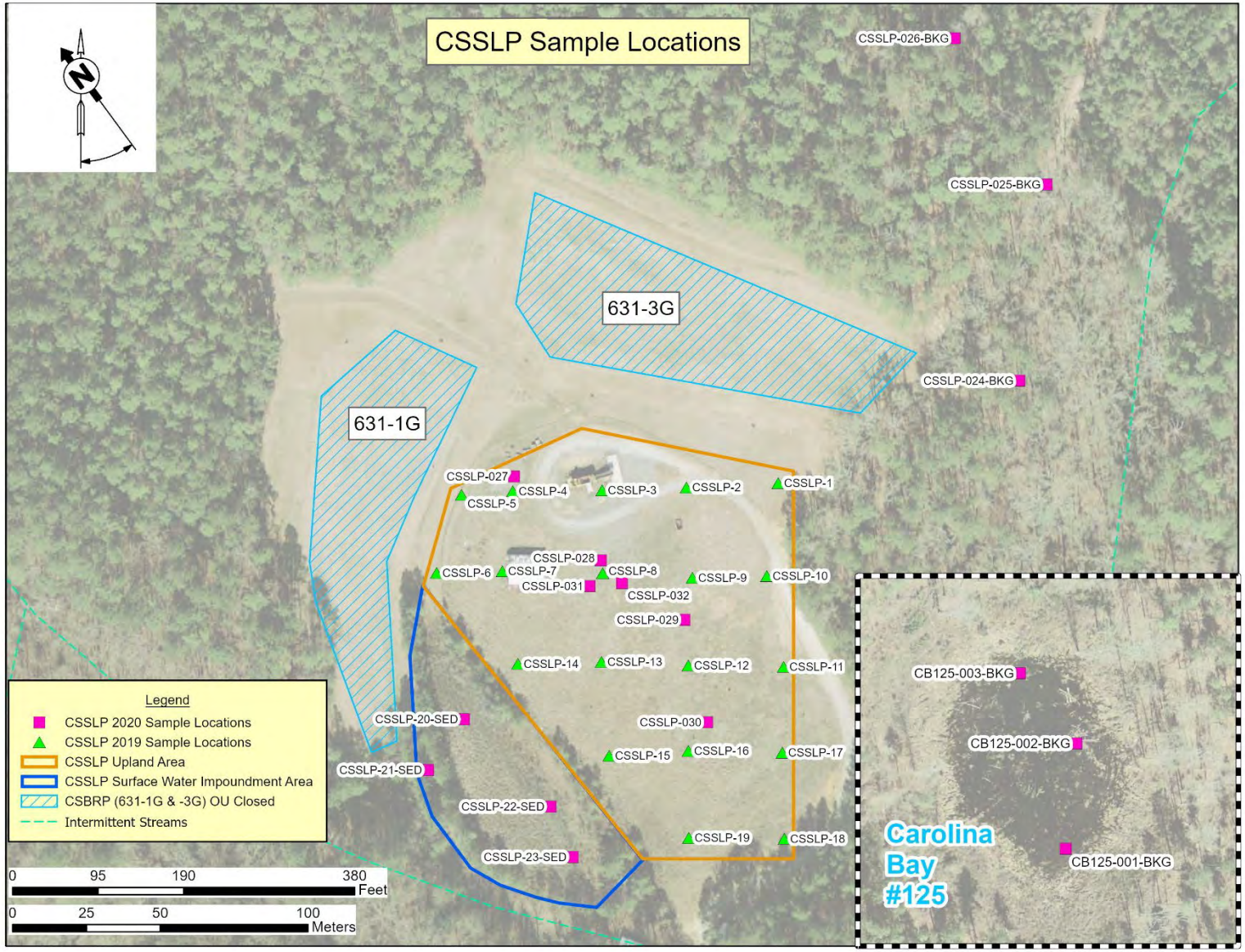


Figure E-2. Central Shops Scrap Lumber Pile (631-2G) Sample Location Map

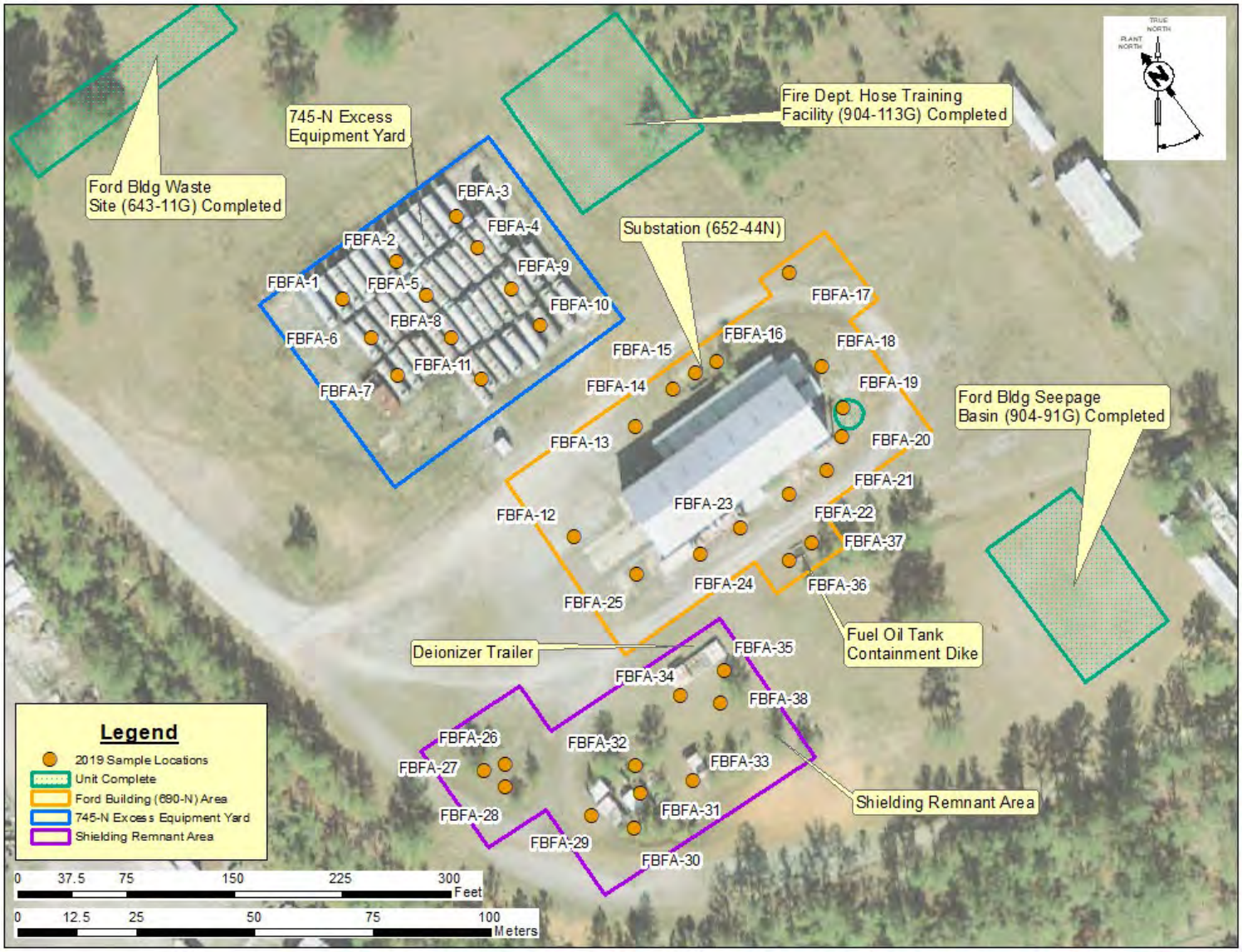


Figure E-3. Ford Building Sample Location Map

This page is intentionally left blank.

Table E-1. PTSM Screening Evaluation for ECODS N-1 (soil; all depth intervals)

Analyte	Exposure Point Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL[2]	Industrial Risk Estimate[4]
Inorganics (mg/kg)					
Aluminum	2.30E+04	1.12E+06	2.05E-02	--	--
Antimony	5.89E+01	4.67E+02	1.26E-01	--	--
Arsenic	1.91E+01	4.79E+02	3.99E-02	3.00E+00	6.37E-06
Barium	6.16E+01	2.17E+05	2.84E-04	--	--
Beryllium	5.01E-01	2.29E+03	2.19E-04	6.95E+03	7.21E-11
Cadmium	4.05E+01	9.82E+02	4.12E-02	9.26E+03	4.37E-09
Calcium	2.01E+03	EN	--	EN	--
Chromium	4.75E+02	1.75E-06	2.71E-04	--	--
Chromium VI - 7196A	2.90E+00	3.48E+03	8.33E-04	6.33E+00	4.58E-07
Chromium VI - 7199	3.90E+00	3.48E+03	1.12E-03	6.33E+00	6.16E-07
Cobalt	3.67E+00	3.47E+02	1.06E-02	1.85E+03	1.98E-09
Copper	1.77E+04	4.67E+04	3.79E-01	--	--
Iron	9.01E+04	8.18E+05	1.10E-01	--	--
Lead	1.47E+03	8.00E+02	1.84E+00	-	--
Magnesium	5.11E+02	EN	--	EN	--
Manganese	4.88E+02	2.56E+04	1.91E-02	--	--
Mercury	1.23E-01	4.56E+01	2.70E-03	--	--
Nickel	2.54E+01	2.24E+04	1.13E-03	6.41E+04	3.96E-10
Potassium	1.78E+02	EN	--	EN	--
Selenium	2.94E+02	5.84E+03	5.03E-02	--	--
Silver	3.04E-01	5.84E+03	5.21E-05	--	--
Sodium	1.26E+02	EN	--	EN	--
Thallium	6.05E+01	1.17E+01	5.17E+00	--	--
Vanadium	1.76E+02	5.83E+03	3.02E-02	--	--
Zinc	1.40E+03	3.50E+05	4.00E-03	--	--
Organics (mg/kg)					
1,1,2,2-Tetrachloroethane	1.62E-03	2.34E+04	6.92E-08	2.67E+00	6.07E-10
2-Methylnaphthalene	2.37E-02	3.01E+03	7.87E-06	--	--
Acetone	1.92E-01	6.70E+05	2.87E-07	--	--
Benzo[a]anthracene	9.85E-02	--	--	2.06E+01	4.78E-09
Benzo[a]pyrene	1.03E-01	2.22E+02	4.64E-04	2.11E+00	4.88E-08
Benzo[b]fluoranthene	1.27E-01	--	--	2.11E+01	6.02E-09
Benzo[g,h,i]perylene	5.65E-02	NA	--	NA	--

Table E-1. PTSM Screening Evaluation for ECODS N-1 (soil; all depth intervals) *(continued/end)*

Analyte	Exposure Point Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL[2]	Industrial Risk Estimate[4]
Organics (mg/kg) (continued)					
Benzo[k]fluoranthene	5.92E-02	--	--	2.11E+02	2.81E-10
Bis(2-ethylhexyl)phthalate (DEHP)	1.90E+00	1.64E+04	1.16E-04	1.64E+02	1.16E-08
Carbon disulfide	1.25E-02	3.47E+03	3.60E-06	--	--
Chrysene	1.34E-01	--	--	2.11E+03	6.35E-11
Cyanide	8.43E+00	1.47E+02	5.73E-02	--	--
Dibenz[a,h]anthracene	2.82E-02	--	--	2.11E+00	1.34E-08
Di-N-butyl phthalate	1.20E-01	8.21E+04	1.46E-06	--	--
Fluoranthene	1.03E-01	3.01E+04	3.42E-06	--	--
Indeno[1,2,3-cd]pyrene	5.30E-02	--	--	2.11E+01	2.51E-09
Methyl ethyl ketone	6.93E-03	1.93E+05	3.59E-08	--	--
Phenanthrene	4.43E-02	NA	--	NA	--
Pyrene	8.47E-02	2.26E+04	3.75E-06	--	--
Pesticides/PCBs (mg/kg)					
Aroclor 1254	4.69E-02	1.47E+01	3.19E-03	9.72E-01	4.83E-08
Aroclor 1260	4.80E-02	--	--	9.91E-01	4.84E-08
DDE	1.71E-03	3.50E+02	4.89E-06	9.28E+00	1.84E-10
DDT	2.25E-03	5.18E+02	4.34E-06	8.53E+00	2.64E-10
		Hazard Index	7.91E+00	**Cumulative Risk**	7.63E-06
		PTSM?[5]	no	**PTSM?[6]**	no

1 - EPC - maximum detected concentration from all depths, soil media from Table A.1.3 in Appendix A.
2 - Nonradiological RSLs are default industrial worker soil values from USEPA Regional Screening Levels (RSLs) website (November 2020).
3 - Hazard Estimate - EPC/RSL.
4 - Risk Estimate - EPC/RSL*1E-06.
5- Waste unit potentially has PTSM if HI ≥ 10 for noncarcinogenic constituents.
6 - Waste unit potentially has PTSM if cumulative risk ≥ 1E-03 for carcinogenic constituents.

EN - essential nutrient
NA - Not available

Table E-2. PTSM Screening Evaluation for CSSLP Upland Area (soil; all depth intervals)

Analyte	Exposure Point Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL/PRG[2]	Industrial Risk Estimate[4]
Inorganics (mg/kg)					
Aluminum	2.12E+04	1.12E+06	1.89E-02	--	--
Antimony	2.37E+01	4.67E+02	5.07E-02	--	--
Arsenic	6.31E+01	4.79E+02	1.32E-01	3.00E+00	2.10E-05
Barium	1.91E+02	2.17E+05	8.80E-04	--	--
Beryllium	5.24E-01	2.29E+03	2.29E-04	6.95E+03	7.54E-11
Cadmium	2.08E+00	9.82E+02	2.12E-03	9.26E+03	2.25E-10
Calcium	1.21E+04	EN	--	EN	--
Chromium	6.66E+01	1.75E+06	3.81E-05	--	--
Chromium VI – 7196A	9.86E-01	3.48E+03	2.84E-04	6.33E+00	1.56E-07
Cobalt	4.26E+00	3.47E+02	1.23E-02	1.85E+03	2.30E-09
Copper	1.19E+02	4.67E+04	2.55E-03	--	--
Iron	5.69E+04	8.18E+05	6.96E-02	--	--
Lead	2.41E+02	8.00E+02	3.01E-01	-	--
Magnesium	2.48E+03	EN	--	EN	--
Manganese	2.64E+02	2.56E+04	1.03E-02	--	--
Mercury	8.84E-01	4.56E+01	1.94E-02	--	--
Nickel	1.08E+02	2.24E+04	4.82E-03	6.41E+04	1.68E-09
Potassium	7.57E+02	EN	--	EN	--
Selenium	3.95E+00	5.84E+03	6.76E-04	--	--
Silver	5.85E-01	5.84E+03	1.00E-04	--	--
Sodium	1.65E+02	EN	--	EN	--
Thallium	1.08E+00	1.17E+01	9.23E-02	--	--
Vanadium	1.41E+02	5.83E+03	2.42E-02	--	--
Zinc	2.42E+02	3.50E+05	6.91E-04	--	--
Organics (mg/kg)					
1,2,3-Trichlorobenzen	4.00E-04	9.34E+02	4.28E-07	--	--
2-Methylnaphthalene	5.18E-02	3.01E+03	1.72E-05	--	--
Acenaphthene	1.29E-01	4.52E+04	2.85E-06	--	--
Acetone	5.79E-01	6.70E+05	8.64E-07	--	--
Anthracene	4.44E-01	2.26E+05	1.96E-06	--	--
Benzene	4.67E-04	4.23E+02	1.10E-06	5.08E+00	9.19E-11
Benzo[a]anthracene	4.74E-01	--	--	2.06E+01	2.30E-08
Benzo[a]pyrene	4.00E-01	2.22E+02	1.80E-03	2.11E+00	1.90E-07

Table E-2. PTSM Screening Evaluation for CSSLP Upland Area (soil; all depth intervals) *(continued)*

Analyte	Exposure Point Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL/PRG[2]	Industrial Risk Estimate[4]
Organics (mg/kg)					
Benzo[b]fluoranthene	7.19E-01	--	--	2.11E+01	3.41E-08
Benzo[g,h,i]perylene	8.40E-02	NA	--	NA	--
Benzo[k]fluoranthene	2.68E-01	--	--	2.11E+02	1.27E-09
Bis(2-ethylhexyl)phthalate (DEHP)	1.45E+00	1.64E+04	8.84E-05	1.64E+02	8.84E-09
Carbazole	8.93E-02	NA	--	NA	--
Chloroethane (Ethyl chloride)	2.69E-03	5.67E+04	4.74E-08	--	--
Chloroethene (Vinyl chloride)	4.22E-04	3.74E+02	1.13E-06	1.68E+00	2.51E-10
Chloromethane (Methyl chloride)	8.67E-04	4.63E+02	1.87E-06	--	--
Chrysene	4.74E-01	--	--	2.11E+03	2.25E-10
Cumene (Isopropylbenzene)	5.24E-01	9.95E+03	5.27E-05	--	--
Cyanide	2.03E-01	1.47E+02	1.38E-03	--	--
Cyclohexane	4.50E-03	2.74E+04	1.64E-07	--	--
Dibenz[a,h]anthracene	2.74E-02	--	--	2.11E+00	1.30E-08
Dibenzofuran	1.26E-01	1.17E+03	1.08E-04	--	--
Dichloromethane (Methylene chloride)	1.23E-02	3.16E+03	3.89E-06	1.02E+03	1.21E-11
Di-N-butyl phthalate	8.23E-02	8.21E+04	1.00E-06	--	--
Ethylbenzene	6.69E-01	2.05E+04	3.26E-05	2.54E+01	2.63E-08
Fluoranthene	1.76E+00	3.01E+04	5.85E-05	--	--
Fluorene	1.81E-01	3.01E+04	6.01E-06	--	--
Indeno[1,2,3-cd]pyrene	7.56E-02	--	--	2.11E+01	3.58E-09
m,p-Xylene	1.47E-01	2.49E+03	5090E-05	--	--
Methyl acetate	2.14E-01	1.17E+06	1.83E-07	--	--
Methyl ethyl ketone	2.59E-02	1.93E+05	1.34E-07	--	--
Methyl tertiary butyl ether (MTBE)	4.59E-03	6.44E+04	7.13E-08	2.05E+02	2.24E-11
Methylcyclohexane	2.17E-03	NA	--	NA	--
Naphthalene	7.73E-02	5.85E+02	1.32E-04	8.57E+00	9.02E-09
o-Xylene	1.75E-01	2.79E+03	6.27E-05	--	--
Pentachlorophenol	2.09E-01	2.84E+03	7.36E-05	3.97E+00	5.26E-08
Phenanthrene	1.52E+00	NA	--	NA	--
Pyrene	1.11E+00	2.26E+04	4.91E-05	--	--

Table E-2. PTSM Screening Evaluation for CSSLP Upland Area (soil; all depth intervals) *(continued/end)*

Analyte	Exposure Point Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL/PRG[2]	Industrial Risk Estimate[4]
Pesticides/PCBs (mg/kg)					
Aldrin	3.20E-03	3.50E+01	9.14E-05	1.84E-01	1.74E-08
alpha-Chlordane	8.10E-03	4.51E+02	1.80E-05	7.66E+00	1.06E-09
Aroclor 1248	2.30E-01	--	--	9.39E-01	2.45E-07
Aroclor 1254	4.28E-01	1.47E+01	2.91E-02	9.72E-01	4.40E-07
Aroclor 1260	1.01E-01	--	--	9.91E-01	1.02E-07
DDD	5.91E-03	2.46E+01	2.40E-04	9.57E+00	6.18E-10
DDE	5.43E-03	3.50E+02	1.55E-05	9.28E+00	5.85E-10
DDT	6.11E-04	5.18E+02	1.18E-06	8.53E+00	7.16E-11
Dieldrin	2.05E-02	4.10E+01	5.00E-04	1.44E-01	1.42E-07
gamma-Chlordane	8.72E-03	4.51E+02	1.93E-05	7.66E+00	1.14E-09
Lindane	2.82E-02	2.26E+04	9.40E-05	--	--
Radionuclides (pCi/g)					
Thorium-232	1.23E+00	--	--	1.53E-02	1.02E-04
Thorium-228[5]	1.56E+00	--	--	+D-Th	--
Uranium-238	ND	--	--	2.20E-02	5.09E-05
Thorium-230[6]	1.12E+00	--	--	+D-U	--
		Hazard Index	7.77E-01	**Cumulative Risk**	1.54E-04
		PTSM?[7]	no	**PTSM?[8]**	no

1 - EPC - maximum detected concentration from all depths, soil media from Table A.3.3 in Appendix A.
2 - Nonradiological RSLs are default industrial worker soil values from USEPA Regional Screening Levels (RSLs) website (November 2020). Radiological PRGs are default industrial worker soil values from the USEPA Preliminary Remediation Goals (PRGs) for Superfund calculator website (October 2020).
3 - Hazard Estimate - EPC/RSL.
4 - Risk Estimate - EPC/[PRG or RSL]*1E-06.
5 - Thorium-228 is a daughter product of thorium-232 and can be used to estimate its activity since the constituents are in secular equilibrium. The highest detected activity for these daughters (1.56E+01 [thorium-228]) was used in this assessment. The daughter products are not screened separately since they are considered in the thorium-232 peak PRG.
6 - Thorium-230 is a daughter product of uranium-238 and can be used to estimate its activity since the constituents are in secular equilibrium. The highest detected activity for the daughter (1.12E+00 [thorium-230]) was used in this assessment. The daughter products are generally not screened separately since they are considered in the uranium-238 peak PRG.
7 - Waste unit potentially has PTSM if HI ≥ 10 for noncarcinogenic constituents.
8 - Waste unit potentially has PTSM if cumulative risk ≥ 1E-03 for carcinogenic constituents.

EN - Essential nutrient
NA - Not available
ND - nondetect

This page is intentionally left blank.

Table E-3. PTSM Screening Evaluation for CSSLP Surface Water Impoundment Area (sediment; all depth intervals)

Analyte	Exposure Point Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL/PRG[2]	Industrial Risk Estimate[4]
Inorganics (mg/kg)					
Aluminum	1.09E+04	1.12E+06	9.73E-03	--	--
Antimony	1.95E+00	4.67E+02	4.18E-03	--	--
Arsenic	1.84E+01	4.79E+02	3.84E-02	3.00E+00	6.13E-06
Barium	3.34E+01	2.17E+05	1.54E-04	--	--
Beryllium	1.83E-01	2.29E+03	7.99E-05	6.95E+03	2.63E-11
Calcium	1.21E+03	EN	--	EN	--
Chromium	2.23E+01	1.75E+06	1.27E-05	--	--
Chromium VI - 7196A[5]	1.36E+00	3.48E+03	3.91E-04	6.33E+00	2.15E-07
Cobalt	7.78E-01	3.47E+02	2.24E-03	1.85E+03	4.21E-10
Copper	1.59E+01	4.67E+04	3.40E-04	--	--
Iron	2.03E+04	8.18E+05	2.48E-02	--	--
Lead	9.62E+00	8.00E+02	1.20E-02	-	--
Magnesium	2.54E+02	EN	--	EN	--
Manganese	8.10E+01	2.56E+04	3.16E-03	--	--
Mercury	5.13E-02	4.56E+01	1.13E-03	--	--
Nickel	3.53E+00	2.24E+04	1.58E-04	6.41E+04	5.51E-11
Potassium	2.74E+02	EN	--	EN	--
Selenium	7.54E-01	5.84E+03	1.29E-04	--	--
Sodium	7.26E+01	EN	--	EN	--
Thallium	6.19E-01	1.17E+01	5.29E-02	--	--
Vanadium	5.01E+01	5.83E+03	8.59E-03	--	--
Zinc	5.33E+01	3.50E+05	1.52E-04	--	--
Organics (mg/kg)					
Acetone	6.00E-02	6.70E+05	8.96E-08	--	--
Anthracene	1.31E-02	2.26E+05	5.80E-08	--	--
Benzo[a]anthracene	4.24E-02	--	--	2.06E+01	2.06E-09
Benzo[a]pyrene	2.53E-02	2.22E+02	1.14E-04	2.11E+00	1.20E-08
Benzo[b]fluoranthene	3.75E-02	--	--	2.11E+01	1.78E-09
Bis(2-ethylhexyl)phthalate (DEHP)	6.16E-02	1.64E+04	3.76E-06	1.64E+02	3.76E-10
Chrysene	3.43E-02	--	--	2.11E+03	1.63E-11
Dimethyl phthalate	1.89E-02	NA	--	NA	--

Table E-3. PTSM Screening Evaluation for CSSLP Surface Water Impoundment Area (sediment; all depth intervals) *(continued/end)*

Analyte	Exposure Point Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL/PRG[2]	Industrial Risk Estimate[4]
Organics (mg/kg) (continued)					
Fluoranthene	1.26E-01	3.01E+04	4.19E-06	--	--
Methyl ethyl ketone	8.30E-03	1.93E+05	4.30E-08	--	--
Phenanthrene	5.10E-02	NA	--	NA	--
Pyrene	8.65E-02	2.26E+04	3.83E-06	--	--
Toluene	4.00E-03	4.68E+04	8.55E-08	--	--
Radionuclides (pCi/g)					
Thorium-232	3.31E+00	--	--	1.53E-02	2.72E-04
Thorium-228[6]	4.16E+00	--	--	+D-Th	--
Uranium-238	1.19E+00	--	--	2.00E-02	7.20E-05
Uranium-233/234[5]	1.27E+00	--	--	+D-U	--
Thorium-230[7]	1.44E+00	--	--	+D-U	--
		Hazard Index	1.59E-01	**Cumulative Risk**	3.50E-04
		PTSM?[8]	no	**PTSM?[9]**	no

1 - EPC - maximum detected concentration from all depths, soil media from Table A.2.6 in Appendix A.
2 - Nonradiological RSLs are default industrial worker soil values from USEPA Regional Screening Levels (RSLs) website (November 2020). Radiological PRGs are default industrial worker soil values from the USEPA Preliminary Remediation Goals (PRGs) for Superfund calculator (October 2020).
3 - Hazard Estimate - EPC/RSL.
4 - Risk Estimate - EPC/[PRG or RSL]*1E-06.
5 - Uranium-233/234 assumed to be uranium-234 for evaluation purposes
6 - Thorium-228 are daughter products of thorium-232 and can be used to estimate its activity since the constituents are in secular equilibrium. The highest detected activity for these daughters (4.16E+00 [thorium-228]) was used in this assessment. The daughter products are not screened separately since they are considered in the thorium-232 peak PRG.
7 - Thorium-230 and uranium-233/234 are daughter products of uranium-238 and can be used to estimate its activity since the constituents are in secular equilibrium. The highest detected activity for these daughters (1.44E+00 [thorium-230]) was used in this assessment. The daughter products are not screened separately since they are considered in the uranium-238 peak PRG.
8 - Waste unit potentially has PTSM if HI ≥ 10 for noncarcinogenic constituents.
9 - Waste unit potentially has PTSM if cumulative risk ≥ 1E-03 for carcinogenic constituents.

EN - essential nutrient
NA - Not available
+D-Th = daughter product of thorium-232;
+D-U = daughter product of uranium-238.

Table E-4. PTSM Screening Evaluation for Ford Building (soil; all depth intervals)

Analyte	Exposure Point Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL/PRG[2]	Industrial Risk Estimate[4]
Inorganics (mg/kg)					
Aluminum	3.57E+04	1.12E+06	3.19E-02	--	--
Antimony	2.40E+00	4.67E+02	5.14E-03	--	--
Arsenic	1.45E+01	4.79E+02	3.03E-02	3.00E+00	4.83E-06
Barium	6.21E+01	2.17E+05	2.86E-04	--	--
Beryllium	4.55E+00	2.29E+03	1.99E-03	6.95E+03	6.55E-10
Cadmium	1.03E+00	9.82E+02	1.05E-03	9.26E+03	1.11E-10
Calcium	5.15E+03	EN	--	EN	--
Chromium	2.30E+02	3.48E+03	6.61E-02	6.33E+00	3.63E-05
Cobalt	9.45E+00	3.47E+02	2.72E-02	1.85E+03	5.11E-09
Copper	4.68E+02	4.67E+04	1.00E-02	--	--
Iron	4.72E+04	8.18E+05	5.77E-02	--	--
Lead	2.17E+01	8.00E+02	2.71E-02	-	--
Magnesium	2.88E+03	EN	--	EN	--
Manganese	5.40E+02	2.56E+04	2.11E-02	--	--
Mercury	1.44E-01	4.56E+01	3.16E-03	--	--
Nickel	1.72E+01	2.24E+04	7.68E-04	6.41E+04	2.68E-10
Potassium	2.17E+03	EN	--	EN	--
Selenium	2.62E+01	5.84E+03	4.49E-03	--	--
Silver	7.43E-01	5.84E+03	1.27E-04	--	--
Sodium	4.23E+01	EN	--	EN	--
Thallium	5.51E+01	1.17E+01	4.71E+00	--	--
Vanadium	1.87E+02	5.83E+03	3.21E-02	--	--
Zinc	4.26E+02	3.50E+05	1.22E-03	--	--
Organics (mg/kg)					
Acetone	8.53E-02	6.70E+05	1.27E-07	--	--
Anthracene	1.34E-01	2.26E+05	5.93E-07	--	--
Benzo[a]anthracene	6.84E-02	--	--	2.06E+01	3.32E-09
Benzo[a]pyrene	6.14E-02	2.22E+02	2.77E-04	2.11E+00	2.91E-08
Benzo[b]fluoranthene	1.63E-01	--	--	2.11E+01	7.73E-09
Benzo[g,h,i]perylene	7.16E-02	NA	--	NA	--
Benzo[k]fluoranthene	6.58E-02	--	--	2.11E+02	3.12E-10
Bis(2-ethylhexyl)phthalate (DEHP)	8.58E-02	1.64E+04	5.23E-06	1.64E+02	5.23E-10
Butyl benzyl phthalate	2.10E-02	1.64E+05	1.28E-07	1.21E+03	1.74E-11
Carbazole	1.73E-02	NA	--	NA	--
Chrysene	1.14E-01	--	--	2.11E+03	5.40E-11

Table E-4. PTSM Screening Evaluation for Ford Building (soil; all depth intervals) *(continued)*

Analyte	Exposure Point Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL/PRG[2]	Industrial Risk Estimate[4]
Organics (mg/kg) (continued)					
Cumene (Isopropylbenzene)	4.73E-02	9.95E+03	4.75E-06	--	--
Cyclohexane	6.00E-04	2.74E+04	2.19E-08	--	--
Dichloromethane (Methylene chloride)	1.78E-02	3.16E+03	5.63E-06	1.02E+03	1.75E-11
Di-N-butyl phthalate	3.38E-02	8.21E+04	4.12E-07	--	--
Fluoranthene	4.21E-01	3.01E+04	1.40E-05	--	--
Indeno[1,2,3-cd]pyrene	7.67E-02	--	--	2.11E+01	3.64E-09
Methyl ethyl ketone	7.30E-03	1.93E+05	3.78E-08	--	--
Methyl tertiary butyl ether (MTBE)	6.90E-03	6.44E+04	1.07E-07	2.05E+02	3.37E-11
N-Dioctyl phthalate	1.46E-02	8.21E+03	1.78E-06	--	--
Pentachlorophenol	2.29E-01	2.84E+03	8.06E-05	3.97E+00	5.77E-08
Phenanthrene	2.38E-01	NA	--	NA	--
Pyrene	3.09E-01	2.26E+04	1.37E-05	--	--
Styrene	5.00E-04	3.48E+04	1.44E-08	--	--
Tetrachloroethylene (PCE)	7.00E-04	3.89E+02	1.80E-06	1.03E+02	6.80E-12
Toluene	9.00E-04	4.68E+04	1.92E-08	--	--
TPH byGC/FID Diesel range organics	1.59E+02	4.23E+02	3.76E-01	--	--
Trichloroethylene (TCE)	1.50E-03	1.87E+01	8.02E-05	6.04E+00	2.48E-10
Pesticides/PCBs (mg/kg)					
Aroclor 1254	1.19E-01	1.47E+01	8.10E-03	9.72E-01	1.22E-07
Aroclor 1260	7.13E-02	--	--	9.91E-01	7.19E-08
Radionuclides (pCi/g)					
Cesium-137	1.53E-01	--	--	9.07E-02	1.69E-06
Cobalt-60	5.45E-01	--	--	4.83E-02	1.13E-05
Potassium-40	2.48E+01	--	--	2.19E-01	1.13E-04
Thorium-232	3.97E+00	--	--	1.53E-02	1.13E-03
Actinium-228[6]	1.55E+01	--	--	+D-Th	--
Bismuth-212[6]	1.73E+01	--	--	+D-Th	--
Lead-212[6]	1.62E+01	--	--	+D-Th	--
Thallium-208[6]	4.56E+00	--	--	+D-Th	--
Thorium-228[6]	3.33E+00	--	--	+D-Th	--

Table E-4. PTSM Screening Evaluation for Ford Building (soil; all depth intervals) *(continued/end)*

Analyte	Exposure Point Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL/PRG[2]	Industrial Risk Estimate[4]
Radionuclides (pCi/g) (continued)					
Uranium-238	2.57E+00	--	--	2.00E-02	3.69E-05
Bismuth-214[7]	6.16E+00	--	--	+D-U	--
Lead-214[7]	7.37E+00	--	--	+D-U	--
Thorium-230[7]	2.60E+00	--	--	+D-U	--
Uranium-233/234[5]	1.89E+00	--	--	+D-U	--
		Hazard Index	5.42E+00	**Cumulative Risk**	1.34E-03
		PTSM?[8]	no	**PTSM?[9]**	**YES**

1 - EPC - maximum detected concentration from all depths, soil media from Table A.3.3 in Appendix A.
2 - Nonradiological RSLs are default industrial worker soil values from USEPA Regional Screening Levels (RSLs) website (November 2020). Radiological PRGs are default industrial worker soil values from the USEPA Preliminary Remediation Goals (PRGs) for Superfund calculator (October 2020).
3 - Hazard Estimate - EPC/RSL.
4 - Risk Estimate - EPC/[PRG or RSL]*1E-06.
5 - Uranium-233/234 assumed to be uranium-234 for evaluation purposes
6 - Actinium-228, bismuth-212, lead-212, thallium-208 and thorium-228 are daughter products of thorium-232 and can be used to estimate its activity since the constituents are in secular equilibrium. The highest detected activity for these daughters (1.73E+01 [bismuth-212]) was used in this assessment. The daughter products are not screened separately since they are considered in the thorium-232 peak PRG.
7 - Bismuth-214, lead-214, thorium-230 and uranium-233/234 are daughter products of uranium-238 and can be used to estimate its activity since the constituents are in secular equilibrium. The highest detected activity for these daughters (7.37E+00 [lead-214]) was used in this assessment. The daughter products are not screened separately since they are considered in the uranium-238 peak PRG.
8 - Waste unit potentially has PTSM if HI ≥ 10 for noncarcinogenic constituents.
9 - Waste unit potentially has PTSM if cumulative risk ≥ 1E-03 for carcinogenic constituents.
EN - essential nutrient
NA - Not available
+D-Th - daughter product of thorium-232
+D-U - daughter product of uranium-238.

This page is intentionally left blank.

Attachment E-1

USEPA Regional Screening Levels Website: Default RSLs for Composite Worker (i.e., Industrial Worker) Scenario (November 2020) (Website accessed February 2021)

This page was intentionally left blank.

Default RSLs for Composite Worker (i.e., Industrial Worker)

Contaminant	Carcinogenic TR = 1E-06				Noncarcinogenic HI=1			
Analyte	Ingestion SL TR=1E-06 (mg/kg)	Dermal SL TR=1E-06 (mg/kg)	Inhalation SL TR=1E-06 (mg/kg)	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Dermal SL THQ=1 (mg/kg)	Inhalation SL THQ=1 (mg/kg)	Noncarcinogenic THQ=1 (mg/kg)
Inorganics								
Aluminum	--	--	--	--	1.17E+06	--	2.98E+07	1.12E+06
Anitmony	--	--	--	--	4.67E+02	--	1.79E+06	4.67E+02
Arsenic	3.63E+00	1.72E+01	3.88E+03	3.00E+00	5.84E+02	2.76E+03	8.93E+04	4.79E+02
Barium	--	--	--	--	2.34E+05	--	2.98E+06	2.17E+05
Beryllium	--	--	6.95E+03	6.95E+03	2.34E+03	--	1.19E+05	2.29E+03
Cadmium	--	--	9.26E+03	9.26E+03	1.17E+03	6.90E+03	5.95E+04	9.82E+02
Calcium	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	--	--	--	--	1.75E+06	--	--	1.75E+06
Chromium VI – 7196A	6.54E+00	--	1.98E+02	6.33E+00	3.50E+03	--	5.95E+05	3.48E+03
Cobalt	--	--	1.85E+03	1.85E+03	3.50E+02	--	3.57E+04	3.47E+02
Copper	--	--	--	--	4.67E+04	--	--	4.67E+04
Iron	--	--	--	--	8.18E+05	--	--	8.18E+05
Lead	-	-	-	-	8.00E+02	-	-	8.00E+02
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	--	--	--	--	2.80E+04	--	2.98E+05	2.56E+04
Mercury	--	--	--	--	--	--	4.56E+01	4.56E+01
Nickel	--	--	6.41E+04	6.41E+04	2.34E+04	--	5.36E+05	2.24E+04
Potassium	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	--	--	--	--	5.84E+03	--	1.19E+08	5.84E+03
Silver	--	--	--	--	5.84E+03	--	--	5.84E+03
Sodium	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	--	--	--	--	1.17E+01	--	--	1.17E+01
Vanadium	--	--	--	--	5.89E+03	--	5.95E+05	5.83E+03
Zinc	--	--	--	--	3.50E+05	--	--	3.50E+05
Organics								
1,1,2,2-Tetrachloroethane	1.64E+01	--	3.20E+00	2.67E+00	2.34E+04	--	--	2.34E+04

Default RSLs for Composite Worker (i.e., Industrial Worker) *(continued)*

Contaminant	Carcinogenic TR = 1E-06				Noncarcinogenic HI=1			
Analyte	Ingestion SL TR=1E-06 (mg/kg)	Dermal SL TR=1E-06 (mg/kg)	Inhalation SL TR=1E-06 (mg/kg)	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Dermal SL THQ=1 (mg/kg)	Inhalation SL THQ=1 (mg/kg)	Noncarcinogenic THQ=1 (mg/kg)
Organics (continued)								
2-Methylnaphthalene	--	--	--	--	4.67E+03	8.49E+03	--	3.01E+03
1,2,3-Trichlorobenzene	--	--	--	--	9.34E+02	--	--	9.34E+02
Acetone	--	--	--	--	1.05E+06	--	1.85E+06	6.70E+05
Acenaphthene	--	--	--	--	7.01E+04	1.27E+05	--	4.52E+04
Anthracene	--	--	--	--	3.50E+05	6.37E+05	--	2.26E+05
Benzo[g,h,i]perylene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	3.27E+01	5.94E+01	8.99E+02	2.06E+01	--	--	--	--
Benzo[a]pyrene	3.27E+00	5.94E+00	2.78E+04	2.11E+00	3.50E+02	6.37E+02	1.19E+04	2.22E+02
Benzo[b]fluoranthene	3.27E+01	5.94E+01	2.78E+05	2.11E+01	--	--	--	--
Benzo[k]fluoranthene	3.27E+02	5.94E+02	2.78E+06	2.11E+02	--	--	--	--
Bis(2-ethylhexyl)phthalate (DEHP)	2.34E+02	5.52E+02	6.95E+06	1.64E+02	2.34E+04	5.52E+04	--	1.64E+04
Butyl benzyl phthalate	1.72E+03	4.07E+03	--	1.21E+03	2.34E+05	5.52E+05	--	1.64E+05
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	--	--	--	--	1.17E+05	--	3.58E+03	3.47E+03
Chloroethane (Ethyl chloride)	--	--	--	--	--	--	5.67E+04	5.67E+04
Chloroethene (Vinyl chloride)	4.54E+00	--	2.66E+00	1.68E+00	3.50E+03	--	4.19E+02	3.74E+02
Chloromethane (Methyl chloride)	--	--	--	--	--	--	4.63E+02	4.63E+02
Chrysene	3.27E+03	5.94E+03	2.78E+07	2.11E+03	--	--	--	--
Cumene (Isopropylbenzene)	--	--	--	--	1.17E+05	--	1.09E+04	9.95E+03
Cyanide	--	--	--	--	7.01E+02	--	1.87E+02	1.47E+02
Cyclohexane	--	--	--	--	--	--	2.74E+04	2.74E+04
Dibenz[a,h]anthracene	3.27E+00	5.94E+00	2.78E+04	2.11E+00	--	--	--	--
Dichloromethane (Methylene chloride)	1.64E+03	--	2.69E+03	1.02E+03	7.01E+03	--	5.76E+03	3.16E+03
Di-N-butyl phthalate	--	--	--	--	1.17E+05	2.76E+05	--	8.21E+04
Fluoranthene	--	--	--	--	4.67E+04	8.49E+04	--	3.01E+04
Indeno[1,2,3-cd]pyrene	3.27E+01	5.94E+01	2.78E+05	2.11E+01	--	--	--	--

Default RSLs for Composite Worker (i.e., Industrial Worker) *(continued)*

Contaminant	Carcinogenic TR = 1E-06				Noncarcinogenic HI=1			
Analyte	Ingestion SL TR=1E-06 (mg/kg)	Dermal SL TR=1E-06 (mg/kg)	Inhalation SL TR=1E-06 (mg/kg)	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Dermal SL THQ=1 (mg/kg)	Inhalation SL THQ=1 (mg/kg)	Noncarcinogenic THQ=1 (mg/kg)
Organics (continued)								
m,p-Xylene	--	--	--	--	2.34E+05	--	2.51E+03	2.49E+03
Methyl ethyl ketone	--	--	--	--	7.01E+05	--	2.67E+05	1.93E+05
Methyl tertiary butyl ether (MTBE)	1.82E+03	--	2.31E+02	2.05E+02	--	--	6.44E+04	6.44E+04
N-Dioctyl phthalate	--	--	--	--	1.17E+04	2.76E+04	--	8.21E+03
o-Xylene	--	--	--	--	2.34E+05	--	2.83E+03	2.79E+03
Pentachlorophenol								
Phenanthrene	8.18E+00	7.73E+00	3.27E+06	3.97E+00	5.84E+03	5.52E+03	--	2.84E+03
Pyrene	--	--	--	--	3.50E+04	6.37E+04	--	2.26E+04
Styrene	--	--	--	--	2.34E+05	--	4.09E+04	3.48E+04
Tetrachloroethylene (PCE)	1.56E+03	--	1.11E+02	1.03E+02	7.01E+03	--	4.11E+02	3.89E+02
Toluene	--	--	--	--	9.34E+04	--	9.39E+04	4.68E+04
TPH by GC/FID Diesel range organics	--	--	--	--	4.67E+03	--	4.65E+02	4.23E+02
Trichloroethylene (TCE)	7.11E+01	--	6.61E+00	6.04E+00	5.84E+02	--	1.93E+01	1.87E+01
Organics								
alpha-Chlordane	9.34E+00	5.52E+01	1.87E+02	7.66E+00	5.84E+02	3.45E+03	4.68E+03	4.51E+02
Aroclor 1248	1.64E+00	2.76E+00	1.10E+01	9.39E-01	--	--	--	--
Aroclor 1254	1.64E+00	2.76E+00	1.81E+01	9.72E-01	2.34E+01	3.94E+01	--	1.47E+01
Aroclor 1260	1.64E+00	2.76E+00	2.82E+01	9.91E-01	--	--	--	--
DDD	1.36E+01	3.22E+01	2.42E+05	9.57E+00	3.50E+01	8.28E+01	--	2.46E+01
DDE	9.62E+00	--	2.65E+02	9.28E+00	3.50E+02	--	--	3.50E+02
DDT	9.62E+00	7.58E+01	1.72E+05	8.53E+00	5.84E+02	4.60E+03	--	5.18E+02
Dieldrin	2.04E-01	4.83E-01	3.62E+03	1.44E-01	5.84E+01	1.38E+02	--	4.10E+01
gamma-Chlordane	9.34E+00	5.52E+01	1.87E+02	7.66E+00	5.84E+02	3.45E+03	4.68E+03	4.51E+02
Lindane	2.97E+00	1.76E+01	5.38E+04	2.54E+00	3.50E+02	2.07E+03	--	3.00E+02

HI – hazard index
THI – target hazard index
TR – target result
SL – screening level
THQ – target hazard quotient

This page is intentionally left blank.

Attachment E-2

USEPA Radionuclide Preliminary Remediation Goal for Superfund Website: Default PRGs for Composite Worker (i.e., Industrial Worker) Scenario (October 2020) (Website accessed February 2021)

This page was intentionally left blank.

Default Composite Worker (i.e., Industrial Worker) PRGs for Soil

Isotope	Ingestion PRG (pCi/g)	Inhalation PRG (pCi/g)	External Exposure PRG (pCi/g)	Total PRG (pCi/g)
Peak PRG for Cesium-137	6.62E+01	1.27E+05	9.08E-02	9.07E-02
Peak PRG for Cobalt-60	7.46E+02	3.69E+05	4.83E-02	4.83E-02
Peak PRG for Potassium-40	1.06E+02	4.90E+04	2.19E-01	2.19E-01
Peak PRG for Thorium-232	1.74E+00	4.70E+01	1.54E-02	1.53E-02
Peak PRG for Uranium-238	6.36E-01	7.52E+01	2.06E-02	2.00E-02

Output generated February 2021
PRG – preliminary remediation goals

This page is intentionally left blank.

APPENDIX F

Risk-Based Cleanup Level Calculations

Preliminary Remediation Goals

This page was intentionally left blank.

TABLE OF CONTENTS

Section **Page**

List of Tables F-3

List of Abbreviations and Acronyms F-4

F-1. Introduction F-5

F-2. Applicable or Relevant and Appropriate Requirements PRGs F-5

F-3. Contaminant migration PRGs F-5

F-4. Human Health PRGs F-5

F-5. Ecological PRGs F-6

F-6. Principal Threat Source Material PRGs F-6

LIST OF TABLES

Table **Page**

Table F-1. Human Health Risk-Based PRGs for ECODS N-1, CSSLP, and Ford Building F-7

LIST OF ABBREVIATIONS AND ACRONYMS

ARAR	applicable or relevant and appropriate requirement
CM	contaminant migration
CSSLP	Central Shops Scrap Lumber Pile (631-2G)
ECO	ecological
ECODS	Early Construction and Operational Disposal Site
COC	constituent of concern
HH	human health
NBN	no building number
OU	operable unit
PRG	preliminary remediation goal
PTSM	principal threat source material
RCOC	refined constituent of concern

F-1. INTRODUCTION

Risk-based cleanup levels, i.e., preliminary remediation goals (PRGs) for the Early Construction and Operational Disposal Site (ECODS) N-1 (South of N Area) (NBN), Central Shops Scrap Lumber Pile (631-2G) (CSSLP), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (OU) are presented in this appendix.

F-2. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS PRGS

As presented in the Remedial Investigation (Chapter 3), there are no applicable or relevant and appropriate requirements (ARAR) refined constituents of concern (RCOCs) identified for any media (i.e., soil, sediment or surface water) within the ECODS, CSSLP, Ford Building OU. Therefore, no ARAR PRGs are presented.

F-3. CONTAMINANT MIGRATION PRGS

The contaminant migration (CM) analysis is presented in Appendix B of this document. No CM RCOCs were identified for any subunits within the ECODS N-1, CSSLP, Ford Building (690-N) OU. Therefore, CM PRGs are not developed in this appendix.

F-4. HUMAN HEALTH PRGS

The human health (HH) risk assessment is presented in Appendix C of this document. HH RCOCs were identified in soil and sediment media at the CSSLP for arsenic (resident and industrial worker). HH RCOCs were identified in soil at the Ford Building for cobalt-60 (resident and industrial worker).

Risk-based PRGs are based on the regional screening levels presented in Appendix C and are calculated for these two exposure scenarios at a hazard quotient (HQ) of 0.1, 1, and 3 for noncarcinogenic health effects and a various target risk levels (1E-06, 1E-05, 1E-04) for carcinogenic effects. The HH PRGs for the CSSLP (soil and sediment) and the Ford Building (690-N) (soil) are provided in Table F-1.

No HH RCOCs were identified for ECODS N-1 soil or CSSLP surface water media.

F-5. ECOLOGICAL PRGS

The ecological risk assessment is presented in Appendix D of this document. No ecological (ECO) RCOCs were identified for soil, sediment, or surface water media for ECODS N-1, CSSLP, Ford Building (690-N) OU. Therefore, ECO PRGs are not developed in this appendix.

F-6. PRINCIPAL THREAT SOURCE MATERIAL PRGS

The principal threat source material (PTSM) evaluation is presented in Appendix E of this document. No PTSM RCOCs were identified for ECODS N-1, CSSLP, Ford Building (690-N) OU. Therefore, no PTSM PRGs are presented.

Table F-1. Human Health Risk-Based PRGs for ECODS N-1, CSSLP, and Ford Building

	Resident (mg/kg)						Industrial Worker (mg/kg)					
HH RCOC	**Risk=1E-06**	**Risk=1E-05**	**Risk=1E-04**	**HQ = 0.1**	**HQ = 1**	**HQ = 3**	**Risk=1E-06**	**Risk=1E-05**	**Risk=1E-04**	**HQ = 0.1**	**HQ = 1**	**HQ = 3**
Central Shops Scrap Lumber Pile (631-2G) soil												
Arsenic	0.68	6.8	68	--	--	--	3	30	300	--	--	--
Central Shops Scrap Lumber Pile (631-2G) sediment												
Arsenic	0.68	6.8	68	--	--	--	3	30	300	--	--	--
Ford Building (690-N) soil												
Cobalt-60	0.033	0.33	3.3	--	--	--	0.048	0.48	4.8	--	--	--

-- = Not applicable

Note: Risk-based PRGs are based on the Regional Screening Levels (RSLs) (1E-06) from the USEPA RSLs website for nonradiological constituents and Preliminary Remediation Goals (PRGs) (1E-06) from the USEPA PRG website for radiological constituents that are provided in Appendix C.

This page is intentionally left blank.

APPENDIX G

NATURAL RESOURCE INJURY EVALUATION CHECKLIST

This page was intentionally left blank.

NATURAL RESOURCE INJURY EVALUATION CHECKLIST

This checklist is provided to assist project teams in determining the potential for natural resource injuries in the conduct and planning of remedial activities. For the most part, the questions only require a simple 'yes/no' or 'to be determined' response. Some require a short answer or explanation. However, it is in the best interest of the project team to be as complete as possible and add any relevant information.

Five main areas are being evaluated, as follows:

- Are there potential natural resource injuries and what do they consist of?
- What are the potential impacts from implementing the remedial alternatives?
- Are there potential residual injuries that will not be addressed by the alternative?
- Would implementation of the alternative cause additional injuries?
- What potential irreversible and irretrievable resources may be identified?

The checklist should be re-visited and revised as Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) activities continue and additional information from the Early Construction and Operational Disposal Site (ECODS) N-1 (South of N Area) (NBN), Central Shops Scrap Lumber Pile (631-2G) (CSSLP), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (OU) becomes available.

1. Has a release of a hazardous substance occurred?

Yes. OU-related constituents were identified in soil and sediment media (arsenic) associated with the CSSLP subunit, and in soil (cobalt-60) for the Ford Building subunit. Exposure to such constituents under a residential or industrial worker scenario may result in risk exceeding the upper bound of the CERCLA risk range. Additionally, asbestos containing materials were identified in subsurface soils at ECODS N-1.

2a. Have natural resources for which Federal or State agencies (or Indian Tribes) may assert trusteeship under CERCLA been or are likely to have been adversely affected by the release?

Yes. Natural resources are defined by Section 101(16) of CERCLA, as "land, fish, wildlife, biota, air, water, groundwater, drinking water supplies, and other such resources." The National Oil and Hazardous Substances Pollution Contingency Plan Section 300.600(b) indicates that natural resources may include not only the environmental organisms and abiotic resources, but the "supporting ecosystems associated with the biotic resources" as well. Resources are categorized into five groups: 1) surface water resources, 2) groundwater resources, 3) air resources, 4) geologic resources, and 5) biological resources. Resources can also be classified as direct use (i.e., drinking water, hunting, etc.) or nonuse (i.e., aesthetic value or existence). Nonuse services do not require physical or visual contact between people and the resource. Nonuse resources include resources that provide well-being for people (or other flora/fauna) because they exist (e.g., nesting sites, threatened and endangered species, natural areas, etc.).

While constituents are associated with soil and sediment media, there is no indication that constituents present in these media have migrated to surrounding soil or to underlying groundwater.

2b. List the potentially affected resources (e.g. ground water, waterfowl, etc.).

Localized soil and sediment.

3. Is the amount of hazardous substance released sufficient to potentially cause a natural resource injury?

Yes. Contaminants and asbestos containing materials will likely prevent unrestricted use of the land.

4. Will the remedial alternatives being considered, or action already taken, sufficiently address the injuries to natural resources (including residual injuries)?

Remedial alternatives are identified and evaluated in the Corrective Measures Study/Feasibility Study (Section 5) to address soil and sediment media associated with the CSSLP and Ford Building subunits. Each alternative will be evaluated as to whether it would be protective of human health and the environment.

5. Will the remedial alternatives being considered produce additional impacts to natural resources during remediation?

Each alternative for the ECODS N-1, CSSLP, Ford Building OU subunits is evaluated as to whether it would impact surrounding natural resources during and after implementation.

The potential costs for addressing resource injuries during remedial action implementation will be taken into consideration when selecting a remedial alternative. The liability (damage) associated with resource injuries could drive the cost of the intended best or lowest cost alternative.

6. Identify any irreversible and/or irretrievable resource losses in the appropriate documentation.

No irreversible and/or irretrievable resource losses are known to exist associated with the remedial action options developed for the ECODS N-1, CSSLP, Ford Building OU.

This page was intentionally left blank.

APPENDIX H

Hexavalent Chromium Uncertainty Analysis

This page was intentionally left blank.

TABLE OF CONTENTS

Section		Page
List of Figures		H-3
List of Tables		H-4
List of Attachments		H-4
List of Abbreviations and Acronyms		H-5
H-1.	Introduction	H-7
H-2.	Uncertainty Evaluation	H-8
H-3.	Summary and Conclusions	H-14
H-4.	References	H-15

LIST OF FIGURES

Figure		Page
Figure H-1.	ECODS N-1 Sample Location Map	H-17
Figure H-2.	Central Shops Scrap Lumber Pile (631-2G) Sample Location Map	H-18
Figure H-3.	ECODS N-1 and Background Cr(VI) Soil Data (0-1 ft)	H-19
Figure H-4.	ECODS N-1 and Background Cr(VI) Soil Data (1-4 ft)	H-20
Figure H-5.	ECODS N-1 and Background Cr(VI) Soil Data (8-10 ft)	H-21
Figure H-6.	ECODS N-1 and Background Cr(VI) Soil Data (10-12 ft)	H-22
Figure H-7.	CSSLP Upland Area and Background Cr(VI) Soil Data (0-1 ft)	H-23
Figure H-8.	CSSLP Upland Area and Background Cr(VI) Soil Data (1-4 ft)	H-24
Figure H-9.	CSSLP Upland Area and Background Cr(VI) Soil Data (8-10 ft)	H-25
Figure H-10.	CSSLP Upland Area and Background Cr(VI) Soil Data (10-12 ft)	H-26
Figure H-11.	CSSLP Surface Water Impoundment Area and Background Cr(VI) Sediment Data (0-1 ft)	H-27
Figure H-12.	CSSLP Surface Water Impoundment Area and Background Cr(VI) Sediment Data (1-4 ft)	H-28
Figure H-13.	Paired Sample Cr(VI) Data (EPA7196A and EPA7199)	H-29

LIST OF TABLES

Table		Page
Table H-1.	ProUCL Output for ECODS N-1 and Background Cr(VI) Soil Data by SW-846 Method 7196A.	H-31
Table H-2.	ProUCL Output for ECODS N-1 and Background Cr(VI) Soil Data by SW-846 Method 7199	H-32
Table H-3.	ProUCL Output ECODS N-1 and Background Cr(VI) Soil Data by SW-846 Methods 7196A and 7199	H-33
Table H-4.	ProUCL Output for CSSLP Upland Area and Background Cr(VI) Soil Data by SW-846 Method 7196A.	H-34
Table H-5.	ProUCL Output for CSSLP Upland Area and Background Cr(VI) Soil Data by SW-846 Method 7199.	H-35
Table H-6.	ProUCL Output for CSSLP Upland Area and Background Cr(VI) Soil Data by SW-846 Methods 7196A and 7199.	H-36
Table H-7.	ProUCL Output for CSSLP Surface Water Impoundment Area and Background Cr(VI) Sediment Data by SW-846 Method 7196A	H-37
Table H-8.	ProUCL Output for CSSLP Surface Water Impoundment Area and Background Cr(VI) Sediment Data by SW-846 Method 7199.	H-38
Table H-9.	ProUCL Output CSSLP Surface Water Impoundment Area and Background Cr(VI) Sediment Data by SW-846 Methods 7196A and 7199	H-39
Table H-10.	ProUCL Output for Paired Sample Data by SW-846 Methods 7196A and 7199	H-40
Table H-11.	ProUCL Output for Paired Sample Data by SW-846 Methods 7196A and 7199	H-41

LIST OF ATTACHMENTS

Attachment	Page
Attachment H-1. Hexavalent Chromium Data	H-45

LIST OF ABBREVIATIONS AND ACRONYMS

COC	constituent of concern
Cr(VI)	hexavalent chromium
CSBRPs	Central Shops Burning/Rubble Pits (631-1G and 631-3G)
CSSLP	Central Shops Scrap Lumber Pile (631-2G)
ECODS	Early Construction and Operation Disposal Site
EPC	exposure point concentration
ft	feet
HEPA	High Efficiency Particulate Air
HI	hazard index
HQ	hazard quotient
IC-ICP-MS	ion chromatography-inductively coupled plasma mass spectrometry
m	meter
msl	mean sea level
NORM	naturally occurring radioactive material
OU	Operable Unit
PRG	preliminary remediation goal
PTSM	principal threat source material
RSL	regional screening level
SRS	Savannah River Site
USEPA	U.S. Environmental Protection Agency

This page was intentionally left blank.

H-1. INTRODUCTION

At the Early Construction and Operational Disposal Site (ECODS) N-1, Central Shops Scrap Lumber Pile (631-2G) (CSSLP), and the Ford Building Operable Unit (OU), there was a concern that during years of operation, burning may have converted trivalent chromium (Cr[III]) into hexavalent chromium (Cr[VI]) which is a more toxic and mobile form of chromium for the ECODS N-1 and CSSLP subunits. The CSSLP subunit is comprised of the Upland Area, and the Surface Water Impoundment Area where runoff may have accumulated Cr(VI) over time. Since there is no SRS background value for Cr(VI), background samples were collected and analyzed for Cr(VI), and a statistical comparison performed to determine if unit-related samples were impacted by burning operations.

The ProUCL software was used to compare hexavalent chromium data from unit-related samples at the ECODS N-1 subunit and the CSSLP subunit (Upland and Surface Water Impoundment Areas) to OU-specific background samples. The Cr(VI) data are provided in Attachment H-1. The goal of this statistical review is to determine if Cr(VI) concentrations observed in samples were elevated from subunit operations (e.g. burning material containing Cr(III)), or if observed Cr(VI) sample concentrations are similar to OU-specific background Cr(VI) soil concentrations (USGS 2008 and Eary & Ral 1987).

H-1.1 Background

H-1.1.1 ECODS N-1 (NBN)

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 located within the Pen Branch watershed and is 107 m (350 ft) long by 15 m (50 ft) wide (0.4 acres). Historical aerial photographs revealed that the area where the subunit is located was farmland prior to construction of the SRS (WSRC 2001). The ECODS N-1 is 88 m (290 ft) above mean sea level (msl). Runoff from the subunit runs overland to the south and is collected by an unnamed tributary of Pen Branch approximately 366 m (1,200 ft) to the south. The subunit is currently comprised of a wooden area containing mature pine trees and provides moderate habitat quality for wildlife receptors.

A *Site Evaluation Report for Early Construction and Operation Disposal Site (ECODS) N-1 (NBN)* (WSRC 2001) was conducted for this subunit in 2001. It was determined that potential impacts to human health or the environment from contaminants in soil could be present.

H-1.1.2 Central Shops Scrap Lumber Pile (631-2G)

CSSLP 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 (southwestem portion of the subunit), a wetland (southwest of the impoundment area) and intermittent stream (located within the wetland area). The subunit measures 91.4 m (300 ft) by 91.4 m (300 ft) (2.07 acres). Prior to 1951, the SRS area was used as farmland (WSRC 2003). The CSSLP was historically used as an equipment laydown and rubble storage area in addition to an area for burning construction related materials. Historical burning of scrap lumber resulted in ash that was placed in the adjacent CSBRPs. A surface water impoundment area was constructed between 1992 and 1994 in the southern portion of the CSSLP.

Figures H-1 and H-2 show the ECODS N-1 and CSSLP and their associated areas, respectively.

H-2. UNCERTAINTY EVALUATION

A summary of the statistical evaluation performed for the hexavalent chromium data is summarized below.

H-2.1 Statistical Evaluation

The ProUCL software was used to compare hexavalent chromium data from operable unit (OU)-related samples at the ECODS N-1, the CSSLP (Upland and Surface Water Impoundment Areas) to OU-specific background samples. All of the Cr(VI) data are provided in Attachment H-1. The goal of this statistical review is to determine if Cr(VI) observed in samples were from subunit operations (e.g. burning material containing Cr(III)) or natural background soil concentrations (USGS 2008 and Eary & Ral 1987).

A ProUCL software two-sample hypothesis testing approach was used to compare the parameters and distributions of the two populations (e.g., OU vs. OU-Specific Background) based upon datasets collected from those populations. ProUCL statistical methods are available for datasets

with all results above detection as well as for datasets with results below the detection limits, which is important when analyzing background data. The nonparametric Gehan statistic within the ProUCL software is capable of comparing differences in the two datasets containing results above and below the detection limits. The SRS datasets contain Cr(VI) data from both USEPA SW-846 Test Method 7196A (colorimetric) (7196A) and USEPA SW-846 Test Method 7199 (ion chromatography-inductively coupled plasma-mass spectrometry [IC-ICP-MS]) (7199) methods that were collected as paired samples (i.e., aliquots from the same homogenized sample). The 7196A colorimetric method is known to be prone to matrix interferences and false positives. The 7199 IC-ICP-MS method uses ion chromatography to separate the hexavalent chromium and quality control samples to help understand redox reactions. ProUCL software was also used to determine if there is a statistical difference between the two methods.

H-2.2 Results

H-2.2.1 ECODS N-1 (Soil Media)

The Cr(VI) data from 14 OU-specific background samples were compared the Cr(VI) data from 21 ECODS N-1 unit-related samples using the ProUCL Gehan two-sample test for the 7196A results, 7199 results and then with the 7196A and 7199 results combined. The null-hypothesis for the two-sided test was that there was not a significant difference between the ECODS N-1 unit-related samples and the background samples.

The Gehan statistic compared the 7196A Cr(VI) data for the ECODS N-1 soil samples to the OU-specific background soil samples. Table H-1 contains the output for the 7196A Cr(VI) data from the ProUCL software. The statistical output indicates to not reject the null hypothesis and conclude the ECODS N-1 mean is not significantly different than the OU-specific background mean, as the p-value (0.264) is greater than the alpha (0.05) value at a 95% upper confidence limit. The 7196A Cr(VI) data concludes there is not a significant difference between the sample means from the ECODS N-1 unit-related samples (mean = 1.015 mg/kg) and the background samples (mean = 0.818 mg/kg).

The Gehan statistic compared the 7199 Cr(VI) data for the ECODS N-1 soil samples to the OU-specific background soil samples. Table H-2 contains the output for the 7199 Cr(VI) data from

the ProUCL software. The statistical output indicates to not reject the null hypothesis and conclude the ECODS N-1 mean is not significantly different than the OU-specific background mean, as the p-value (0.954) is greater than the alpha (0.05) value at a 95% upper confidence limit. The 7199 Cr(VI) data also concludes there is not a significant difference between the sample means from the ECODS N-1 unit-related samples (mean = 0.682 mg/kg) and the background samples (mean = 0.579 mg/kg).

The Gehan statistic compared the combined 7196A and 7199 Cr(VI) data for the ECODS N-1 soil samples to the OU-specific background soil samples. Table H-3 contains the output for the combined 7196A and 7199 Cr(VI) data from the ProUCL software. The statistical output indicates to not reject the null hypothesis and conclude the ECODS N-1 mean is not significantly different than the OU-specific background mean, as the p-value (0.3) is greater than the alpha (0.05) value at a 95% upper confidence limit. The combined 7196A and 7199 Cr(VI) data again concludes that there is not a significant difference between the sample means from the ECODS N-1 unit-related samples (mean = 0.872 mg/kg) and the OU-specific background samples (mean = 0.688 mg/kg).

The ProUCL Gehan statistic indicates the ECODS N-1 Cr(VI) unit-related soil concentrations are comparable to OU-specific background soil concentrations. Figure H-3 through Figure H-6 shows the 7196A and 7199 Cr(VI) data for the ECODS N-1. The Cr(VI) distribution between unit-related samples and background samples also indicates Cr(VI) soil concentrations are comparable to background concentrations.

H-2.2.2 CSSLP Upland Area (Soil Media)

The Cr(VI) data from 14 OU-specific background samples were compared the Cr(VI) data from nineteen CSSLP unit-related samples using the ProUCL Gehan two-sample test for the 7196A results, 7199 results, and finally the 7196A and 7199 results combined (alpha value = 0.05). The null-hypothesis for the two-sided test was that there was not a significant difference between the CSSLP unit-related samples and the OU-specific background samples.

The Gehan statistic compared the 7196A Cr(VI) data for the CSSLP soil samples to the OU-specific background soil samples. Table H-4 contains the output for the 7196A Cr(VI) data from the ProUCL software. The statistical output indicates to not reject the null hypothesis and conclude

the CSSLP mean is not significantly different than the OU-specific background mean, as the p-value (0.304) is greater than the alpha (0.05) value at a 95% upper confidence limit. The 7196A Cr(VI) data concludes there is not a significant difference between the sample means from the CSSLP unit-related samples (mean = 0.258 mg/kg) and the OU-specific background samples (mean = 0.354 mg/kg).

The Gehan statistic was used to compare the 7199 Cr(VI) data for the CSSLP soil samples to the OU-specific background soil samples. Table H-5 contains the output for the 7199 Cr(VI) data from the ProUCL software. The statistical output indicates to not reject the null hypothesis and conclude the CSSLP mean is not significantly different than the OU-specific background mean, as the p-value (0.244) is greater than the alpha (0.05) value at a 95% upper confidence limit. The 7196A Cr(VI) data also concludes there is not a significant difference between the sample means from the CSSLP unit-related samples (mean = not calculated) and the background samples (mean = 0.205 mg/kg). All CSSLP unit-related Cr(VI) results by the 7199 method were below detection, and the software did not determine a mean.

The Gehan statistic was also used to compare the combined 7196A and 7199 Cr(VI) data for the CSSLP soil samples to the OU-specific background soil samples. Table H-6 contains the output for the combined 7196A and 7199 Cr(VI) data from the ProUCL software. The statistical output indicates to not reject the null hypothesis and conclude the CSSLP mean is not significantly different than the OU-specific background mean, as the P value (0.538) is greater than the alpha (0.05) value at a 95% upper confidence limit. The combined 7196A Cr(VI) and 7199 Cr(VI) data again concludes there is not a significant difference between the sample means from the CSSLP unit-related samples (mean = 0.169 mg/kg) and the OU-specific background samples (mean = 0.264 mg/kg).

The ProUCL Gehan statistic results revealed that the CSSLP Cr(VI) unit-related soil concentrations are comparable to OU-specific background soil concentrations. Figures H-7 through H-10 show the 7196A and 7199 Cr(VI) data for the CSSLP soil samples. The Cr(VI) distribution between unit-related soil samples and OU-specific background soil samples also indicates Cr(VI) soil concentrations are comparable to background concentrations.

H-2.2.3 CSSLP Surface Water Impoundment Area (Sediment Media)

The Cr(VI) data from 7 OU-specific background sediment samples were compared the Cr(VI) data from ten CSSLP Surface Water Impoundment Area unit-related sediment samples using the ProUCL Gehan two-sample test for the EPA7196A results, EPA7199 results and then the 7196A and 7199 results combined (alpha value = 0.05). The null-hypothesis for the two-sided test was that there was not a significant difference between the CSSLP Surface Water Impoundment Area unit-related samples and the OU-specific background samples.

The Gehan statistic compared the 7196A Cr(VI) data for the CSSLP Surface Water Impoundment Area sediment samples to the OU-specific background sediment samples. Table H-7 contains the output for the 7196A Cr(VI) data from the ProUCL software. The statistical output indicates to not reject the null hypothesis and conclude the CSSLP Surface Water Impoundment Area mean is not significantly different than the OU-specific background mean, as the p-value (0.136) is greater than the alpha (0.05) value at a 95% upper confidence limit. The 7196A Cr(VI) data concludes there is not a significant difference between the sample means from the CSSLP Surface Water Impoundment Area unit-related samples (mean = 0.426 mg/kg) and the OU-specific background samples (mean = not calculated). All OU-specific background Cr(VI) results by the 7196A method were below detection, and the software did not calculate a mean.

The Gehan statistic compared the 7199 Cr(VI) data for the CSSLP Surface Water Impoundment Area sediment samples to the OU-specific background sediment samples. Table H-8 contains the output for the 7199 Cr(VI) data from the ProUCL software. The statistical output indicates to not reject the null hypothesis and conclude the CSSLP Surface Water Impoundment Area mean is not significantly different than the OU-specific background mean, as the p-value (0.403) is greater than the alpha (0.05) value at a 95% upper confidence limit. The 7199 Cr(VI) data concludes there is not a significant difference between the sample means from the CSSLP Surface Water Impoundment Area unit-related samples (mean = 0.244 mg/kg) and the background samples (mean = not calculated). All OU-specific background Cr(VI) results by the 7199 method were below detection, and the software did not calculate a mean.

The Gehan statistic compared the combined 7196A and 7199 Cr(VI) data for the CSSLP Surface Water Impoundment Area sediment samples to the OU-specific background sediment samples. Table H-9 contains the output for the combined 7196A and 7199 Cr(VI) data from the ProUCL software. The statistical output indicates to not reject the null hypothesis and conclude the CSSLP Surface Water Impoundment Area mean is not significantly different than the OU-specific background mean, as the p-value (0.0847) is greater than the alpha (0.05) value at a 95% upper confidence limit. The combined 7196A and 7199 Cr(VI) data concludes there is not a significant difference between the sample means from the CSSLP Surface Water Impoundment Area unit-related samples (mean = 0.315 mg/kg) and the OU-specific background samples (mean = not calculated). All OU-specific background Cr(VI) results by both the 7196A and the 7199 methods were below detection, and the software did not calculate a mean.

The ProUCL Gehan statistic indicates the CSSLP Surface Water Impoundment Area Cr(VI) unit-related sediment concentrations are not significantly different than the OU-specific background sediment concentrations. Figure H-11 and Figure H-12 show the 7196A and 7199 Cr(VI) data for the CSSLP Surface Water Impoundment Area sediment samples. The Cr(VI) distribution between CSSLP Surface Water Impoundment Area unit-related sediment samples and OU-specific background sediment samples also indicates Cr(VI) sediment concentrations are at background concentrations.

H-2.2.4 Comparison Paired Samples (Soil & Sediment Media)

Seventy-seven soil samples with paired analyses for Cr(VI) by both 7196A and 7199 methods were compared using the ProUCL Tarone-Ware statistic. The Tarone-Ware test is a nonparametric test that handles datasets with non-detect values and multiple detection limits and assumes comparable shapes and variability. To determine if there is a significant difference in the sample mean produced by the two methods, ProUCL indicated Tarone-Ware is an appropriate statistic for this comparison.

The ProUCL Tarone-Ware statistic was first applied to the two datasets under the null hypothesis the sample means were equal for the two analytical methods. However, the Tarone-Ware statistic p-value (0.00478) is less than the alpha value (0.05), and indicated the null hypothesis should be

rejected. The ProUCL Tarone-Ware statistic concluded the sample means by the 7196A method (0.591 mg/kg) and the 7199 method (0.42 mg/kg) are significantly different (Table H-10).

The ProUCL Tarone-Ware statistic was then applied to the two datasets under the null hypothesis the 7196A sample mean is greater than the 7199 sample mean. The Tarone-Ware statistic P-value (0.998) is greater than the alpha value (0.05) and indicated the null hypothesis should be accepted. The ProUCL Tarone-Ware statistic concluded the sample mean by the 7196A method (0.591 mg/kg) is greater than the sample mean by the 7199 method (0.42 mg/kg) (Table H-11).

The overall percent difference between the individual results for the two methods indicated the 7196A method produces results about 15% higher than the 7199 method. This is also observed in the sample mean produced by the 7196A method (0.591 mg/kg) which has a relative percent difference of 33.8% greater than the sample mean produced by the 7199 method (0.42 mg/kg). Figure H-13 illustrates the difference between the results by the two methods for the same samples.

The difference between the two methods is important when comparing unit-related Cr(VI) results to background Cr(VI) results. The data should be generated by the same analytical method to avoid Type 1 and Type 2 errors:

- A Type 1 error is considering an OU comparable or below background concentrations (Cr(VI) soil) when in fact, OU concentrations are above background. A Type I error is therefore, not considering the need for remedial action, when it is indeed warranted,
- A Type 2 error is considering an OU above background concentrations (in terms of Cr(VI) soil) when in fact, the OU levels are comparable/below background. With this type of error, remedial action is mistakenly deemed warranted.

H-3. SUMMARY AND CONCLUSIONS

Various statistical analyses were performed comparing Cr(VI) data from unit-related soil (ECODS N-1, CSSLP Upland Area) and sediment samples (CSSLP Surface Water Impoundment Area), with background samples. The results of the various comparisons concluded that the OU data were comparable to background levels of Cr(VI). The Cr(VI) soil and sediment concentrations appear to be of natural origins and not unit related.

The results also indicated that the 7196A analytical method for Cr(VI) tends to produce higher concentration results for soil samples relative to the 7199 analytical method. This final evaluation revealed the importance of using data produced by the same analytical method when comparing unit-related samples to background samples, to prevent incorrect remedial decisions.

H-4. REFERENCES

Eary and Ral, 1987. "Kinetics of Chromium (III) Oxidation to Chromium(VI) by Reaction with Manganese Dioxide", L. Edmond Eary and Dhanpat Ral, *Environmental Science Technology*, Vol. 21, No. 12, p1187-1193.

USGS, 2008. *Release of Hexavalent Chromium by Ash and Soils in Wildfire-Impacted Areas, Open-File Report* 2008-1345, 2008, U.S. Department of the Interior, U.S. Geological Survey, Reston Virginia

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

WSRC, 2003a. *Site Evaluation Report for the Early Construction and Operation Disposal Site (ECODS) C-1 (NBN) (U),* WSRC-RP-2003-4010, Revision 0, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC

SRNS 2009. *Facility Decommissioning Evaluation Building 690-N, Process Heat Exchanger Repair Facility,* G-FDE-N-00013, Revision 1, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

This page is intentionally left blank.

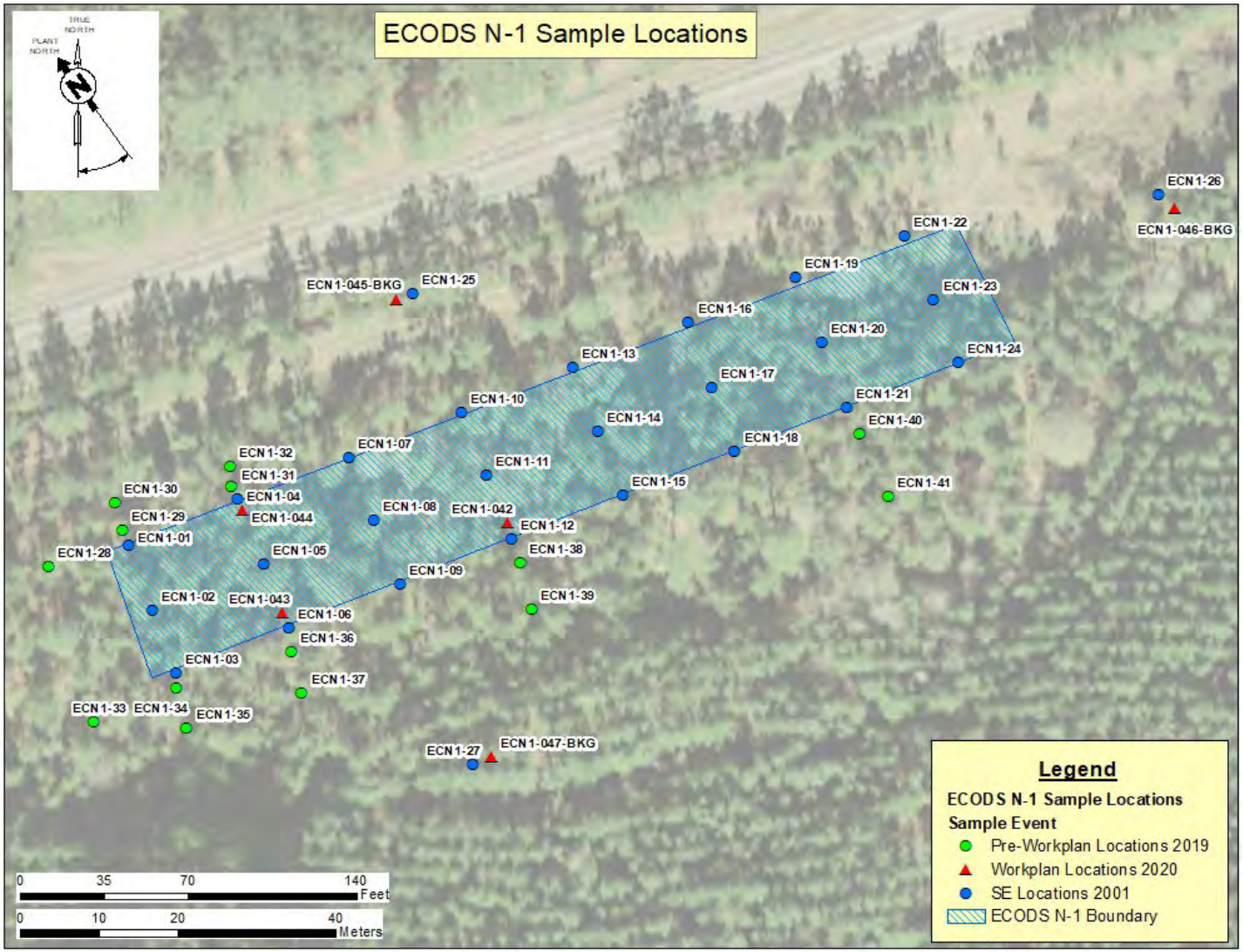


Figure H-1. ECODS N-1 Sample Location Map

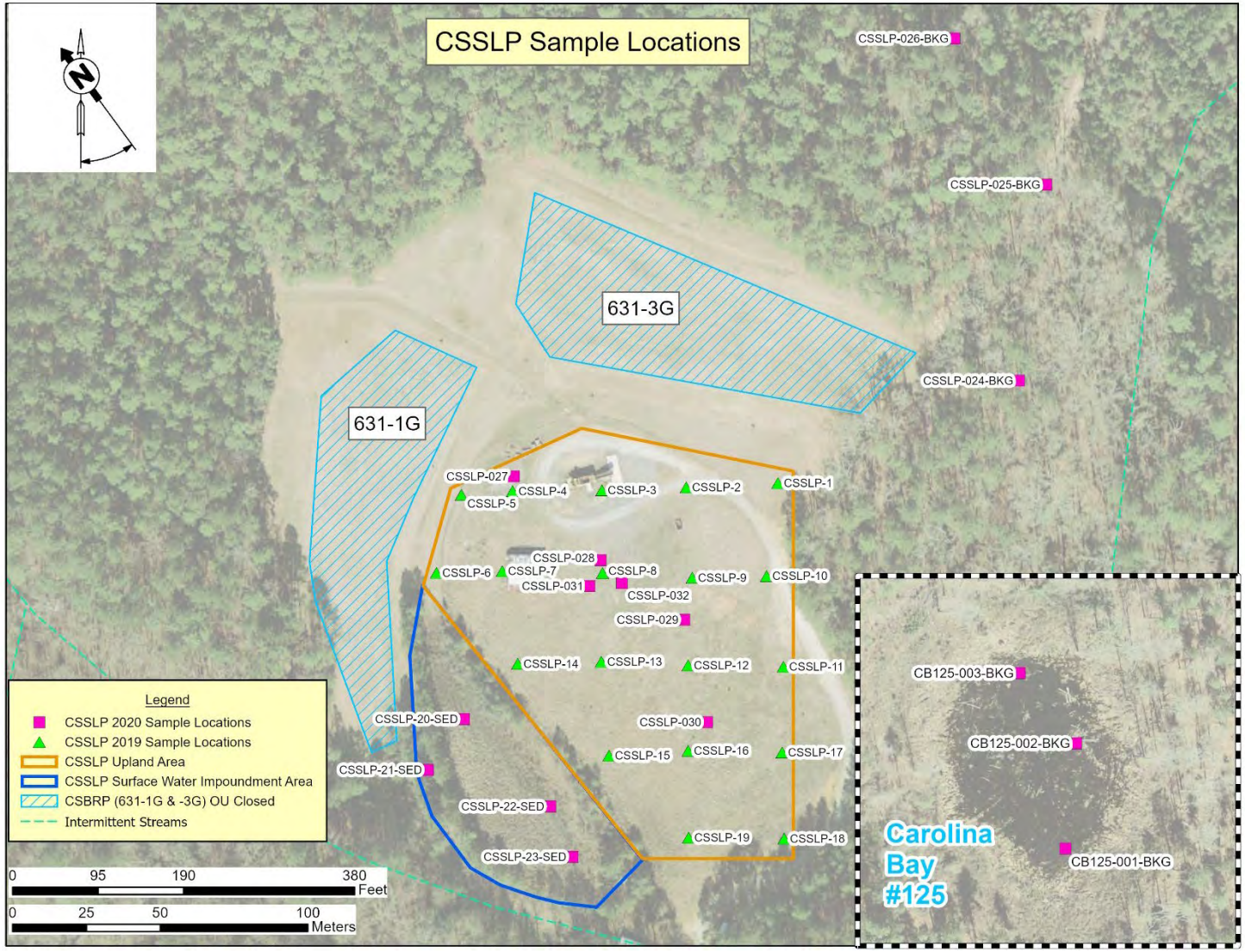


Figure H-2. Central Shops Scrap Lumber Pile (631-2G) Sample Location Map

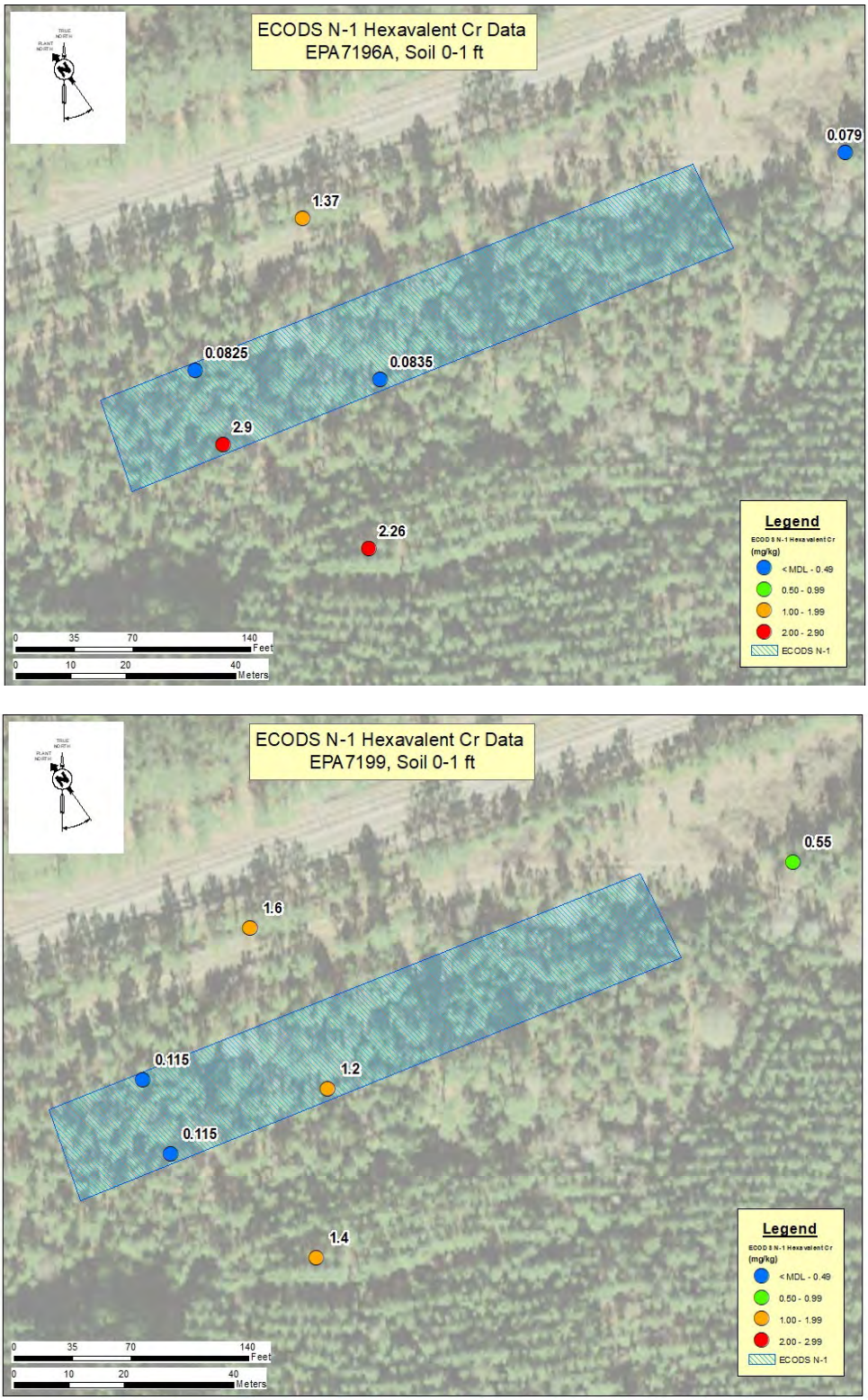


Figure H-3. ECODS N-1 and Background Cr(VI) Soil Data (0-1 ft)

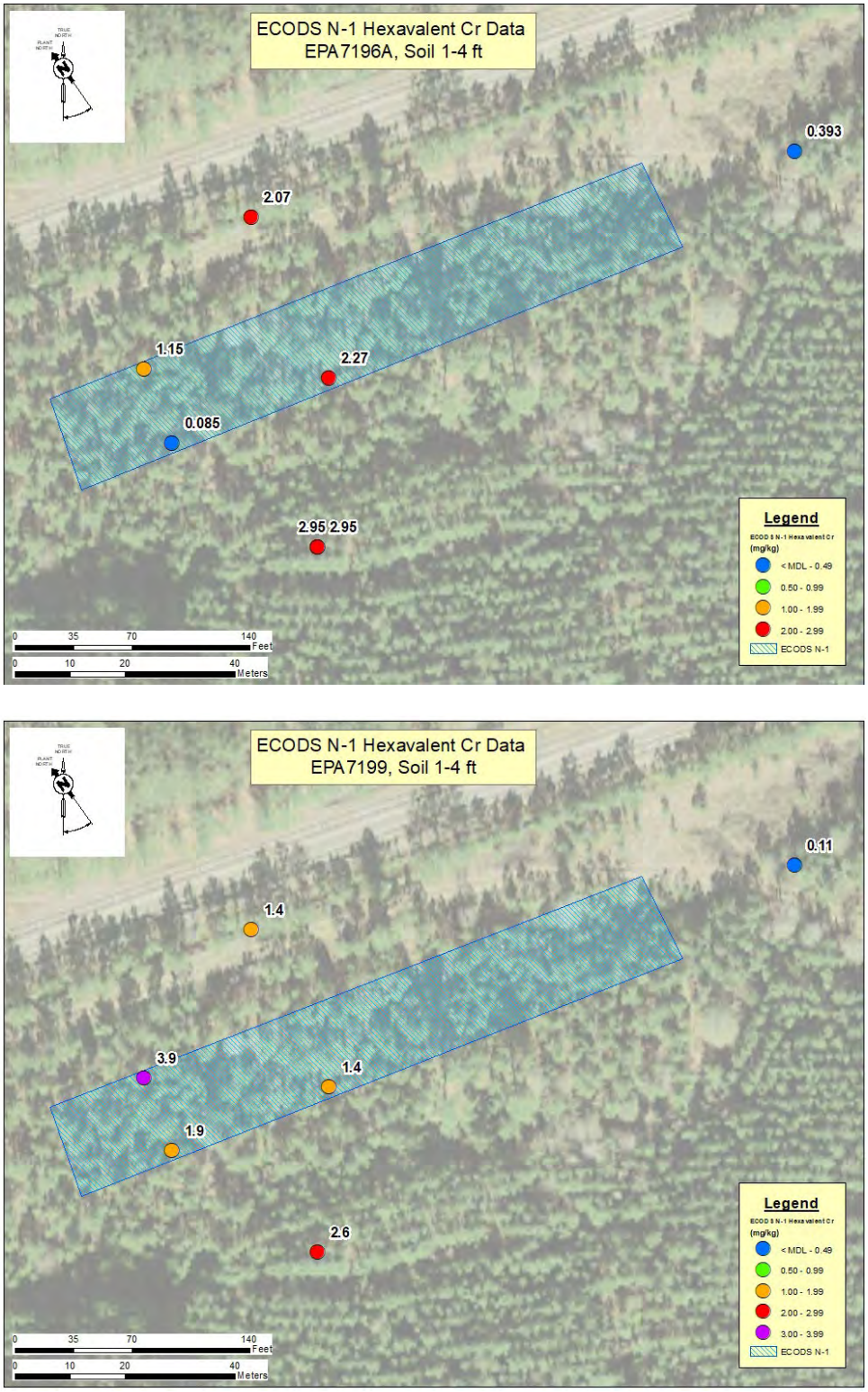


Figure H-4. ECODS N-1 and Background Cr(VI) Soil Data (1-4 ft)

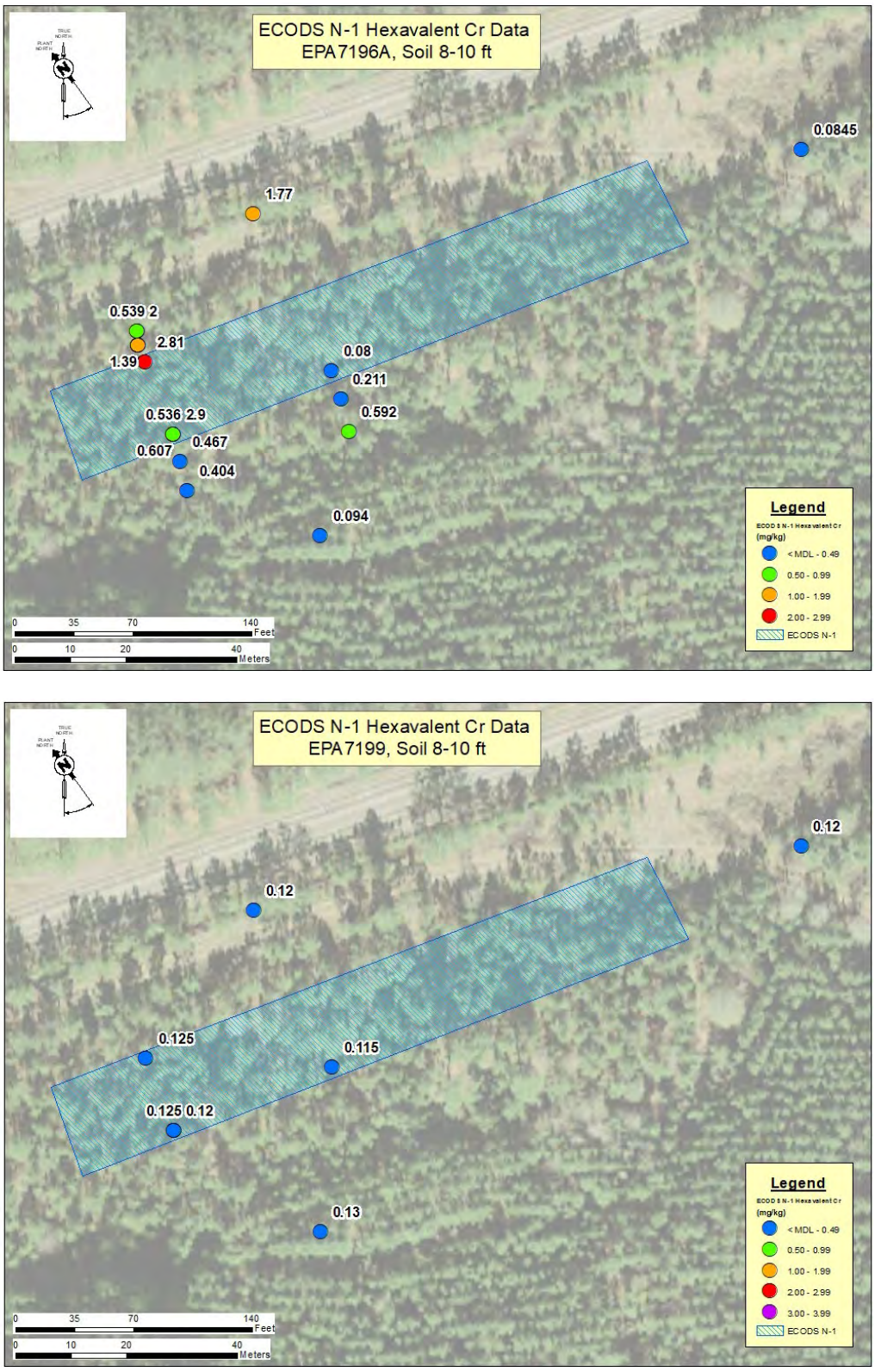


Figure H-5. ECODS N-1 and Background Cr(VI) Soil Data (8-10 ft)

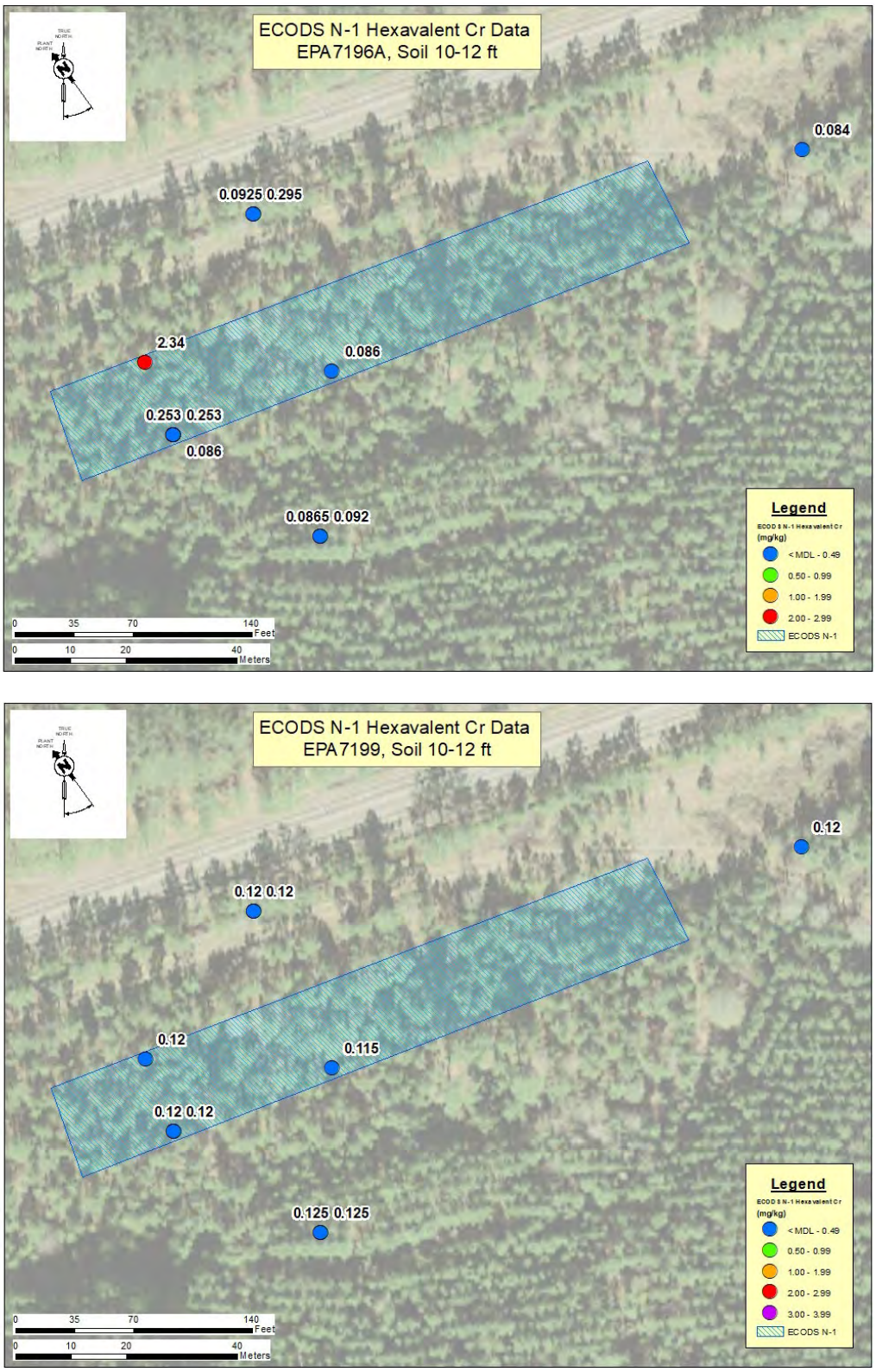
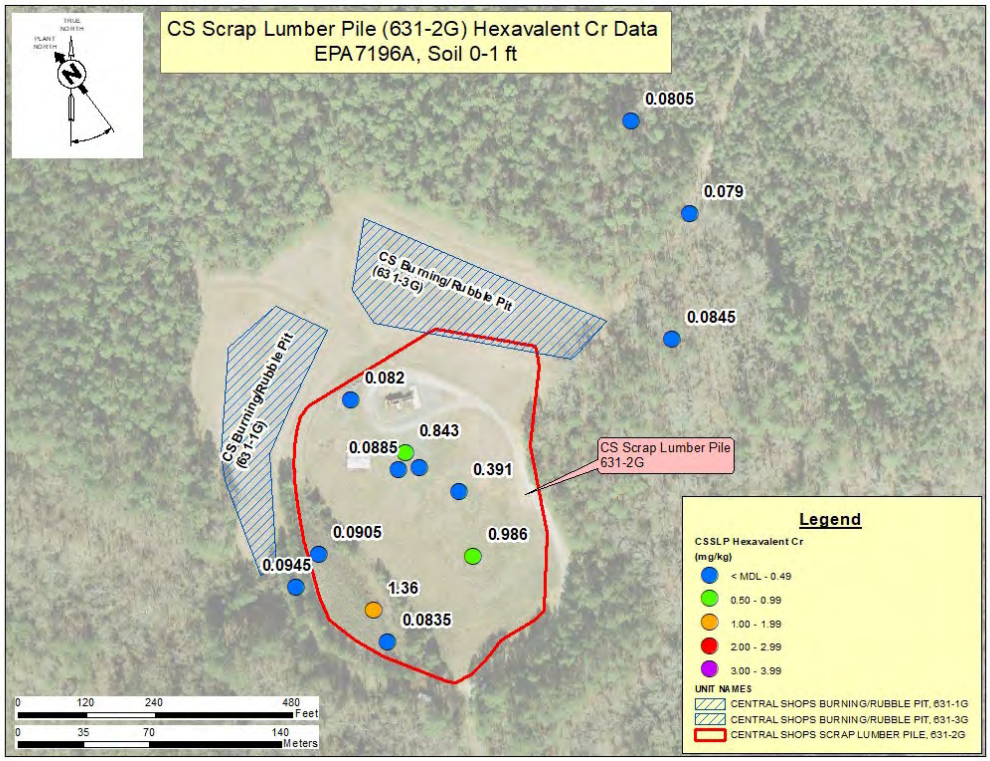


Figure H-6. ECODS N-1 and Background Cr(VI) Soil Data (10-12 ft)



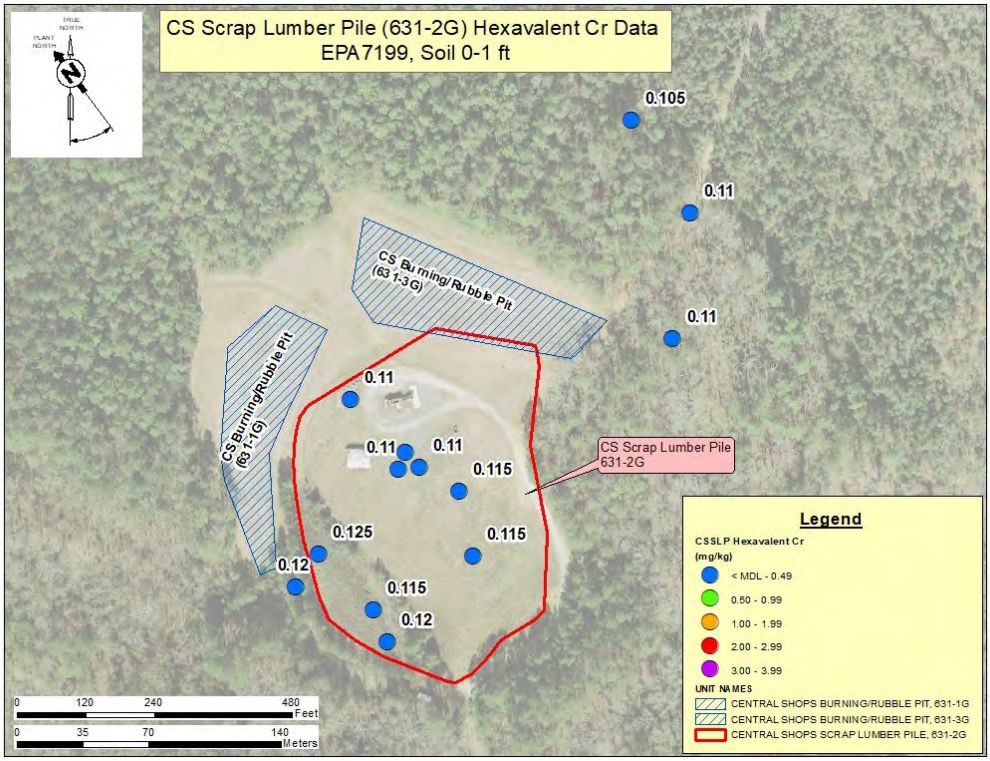


Figure H-7. CSSLP Upland Area and Background Cr(VI) Soil Data (0-1 ft)

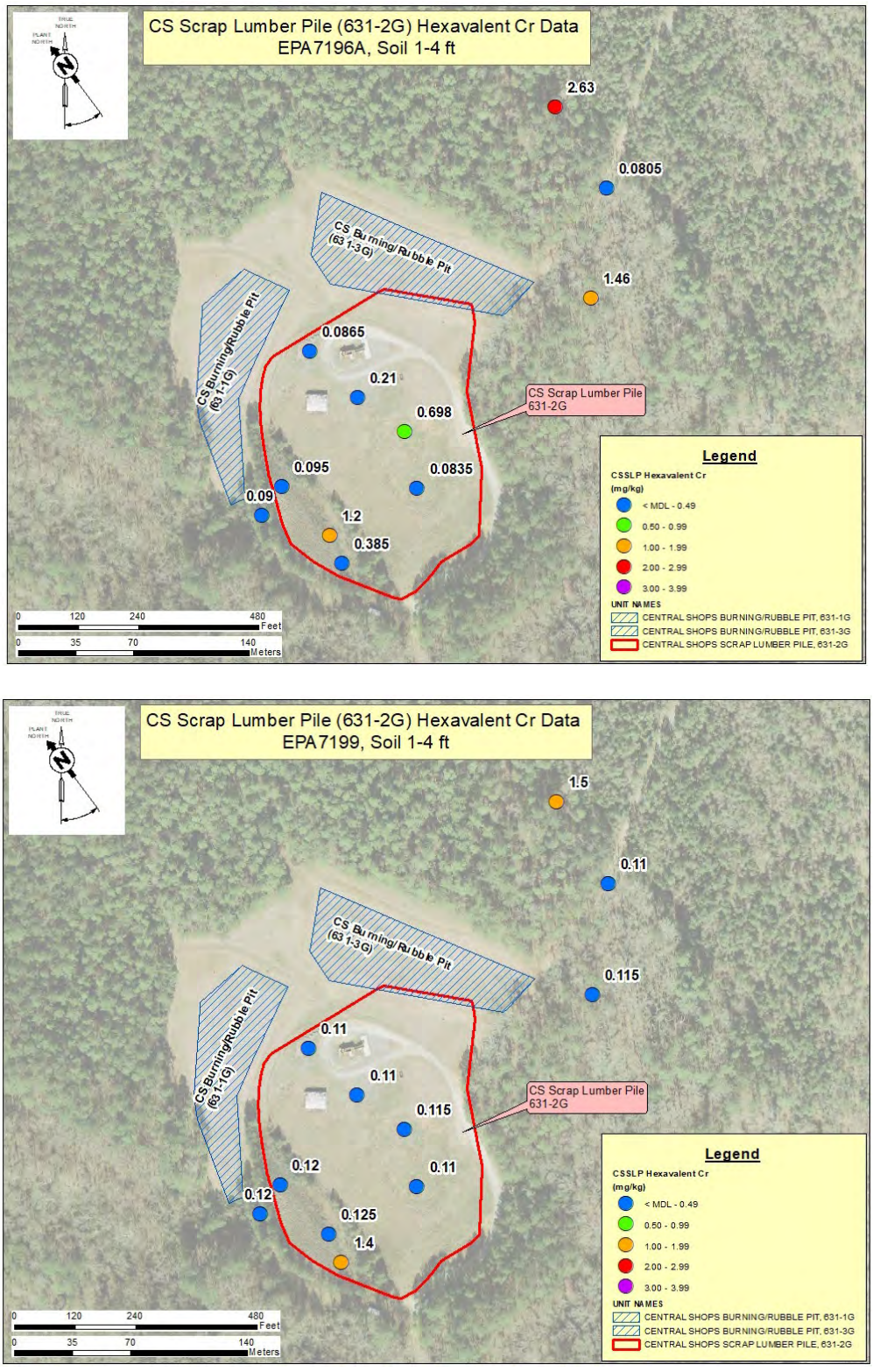


Figure H-8. CSSLP Upland Area and Background Cr(VI) Soil Data (1-4 ft)

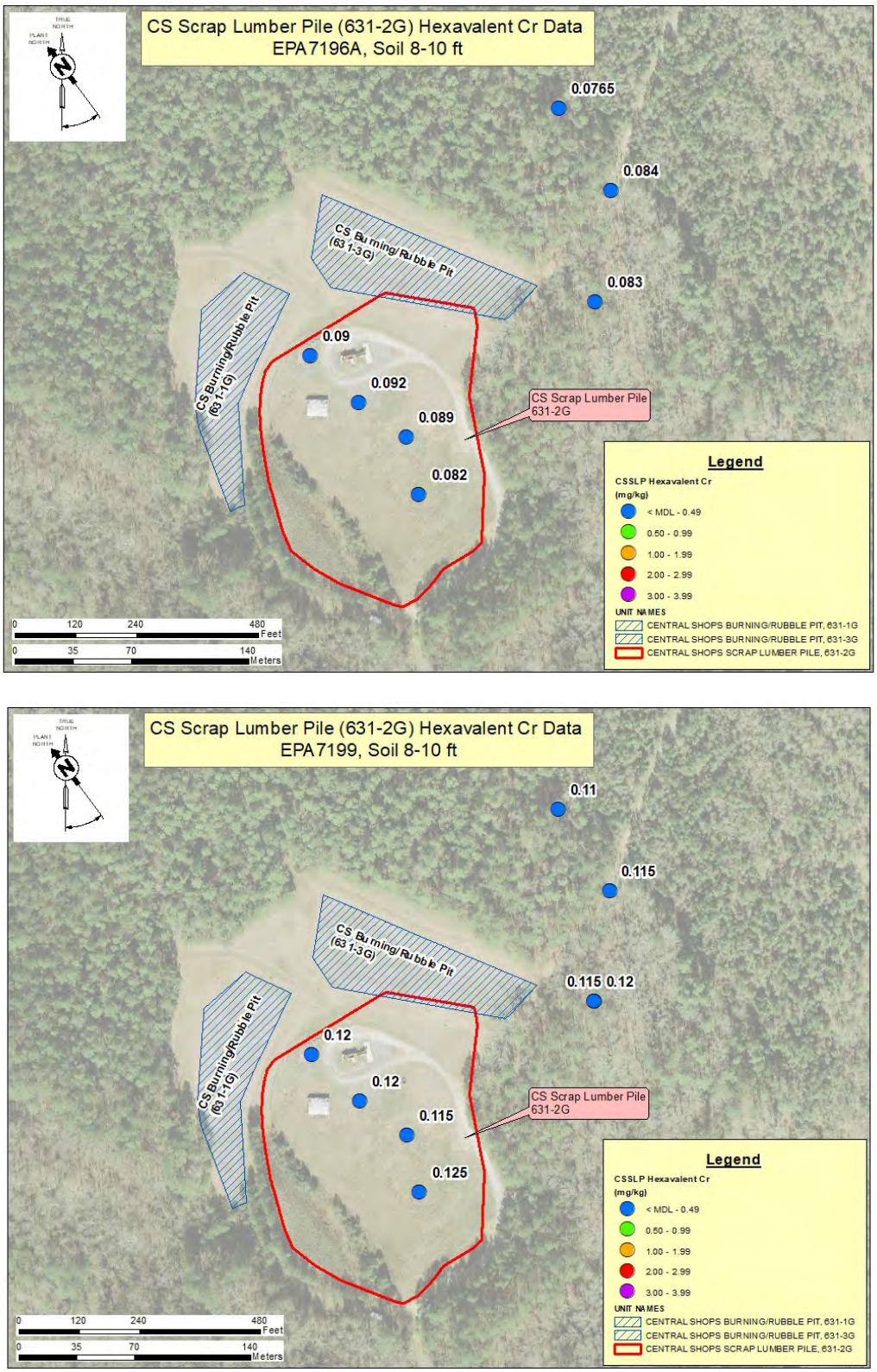


Figure H-9. CSSLP Upland Area and Background Cr(VI) Soil Data (8-10 ft)

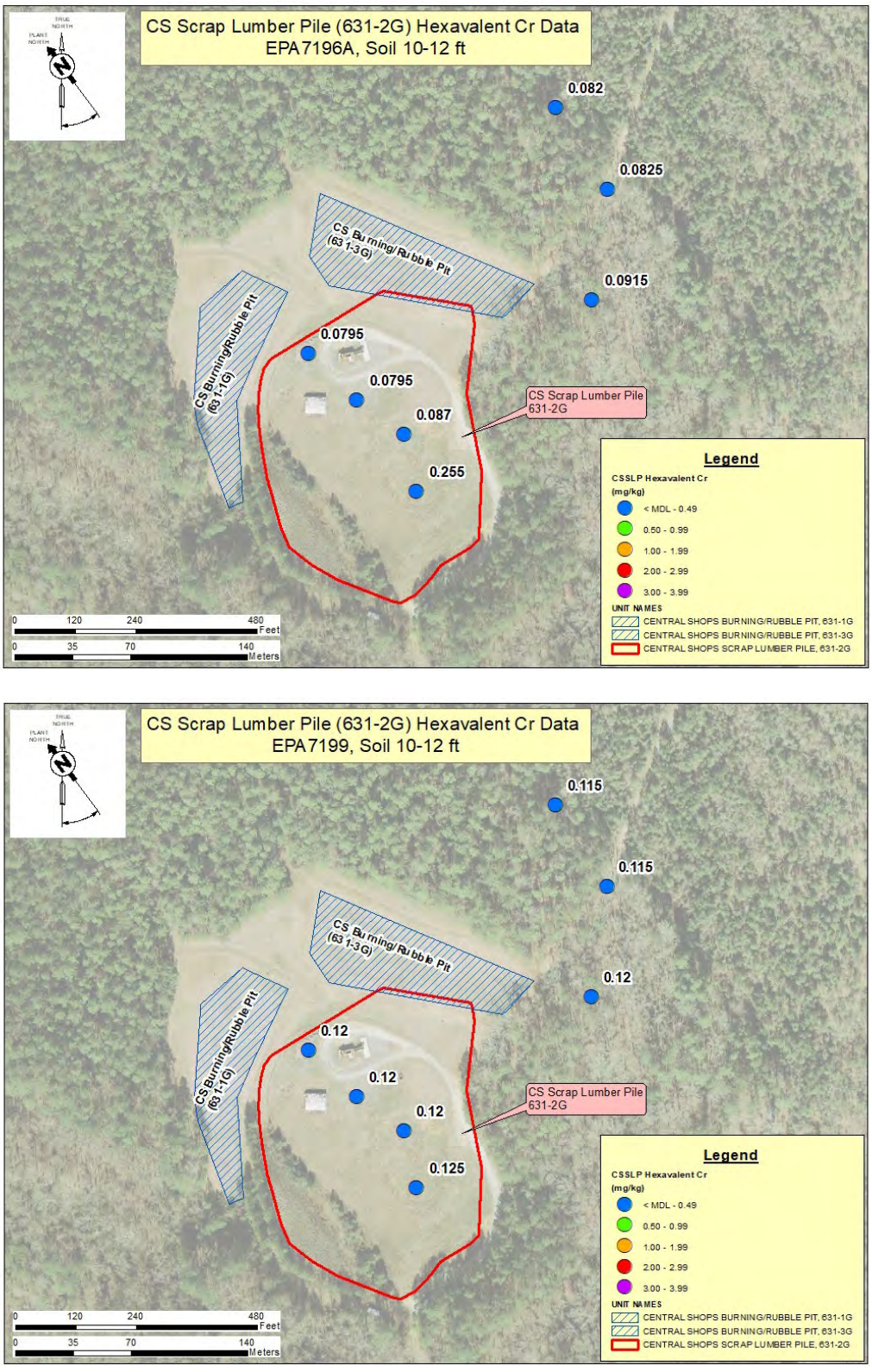


Figure H-10. CSSLP Upland Area and Background Cr(VI) Soil Data (10-12 ft)

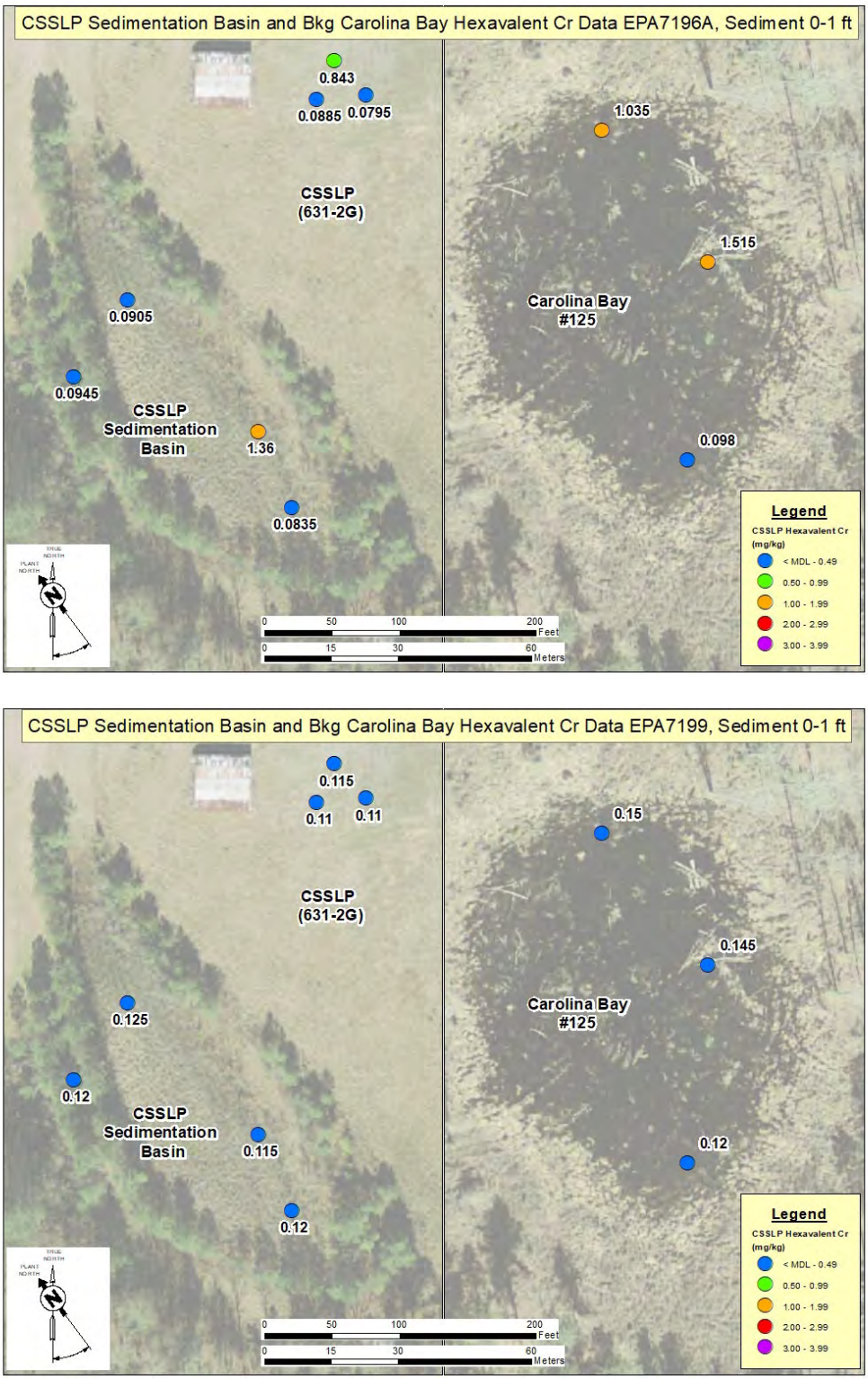


Figure H-11. CSSLP Surface Water Impoundment Area and Background Cr(VI) Sediment Data (0-1 ft)

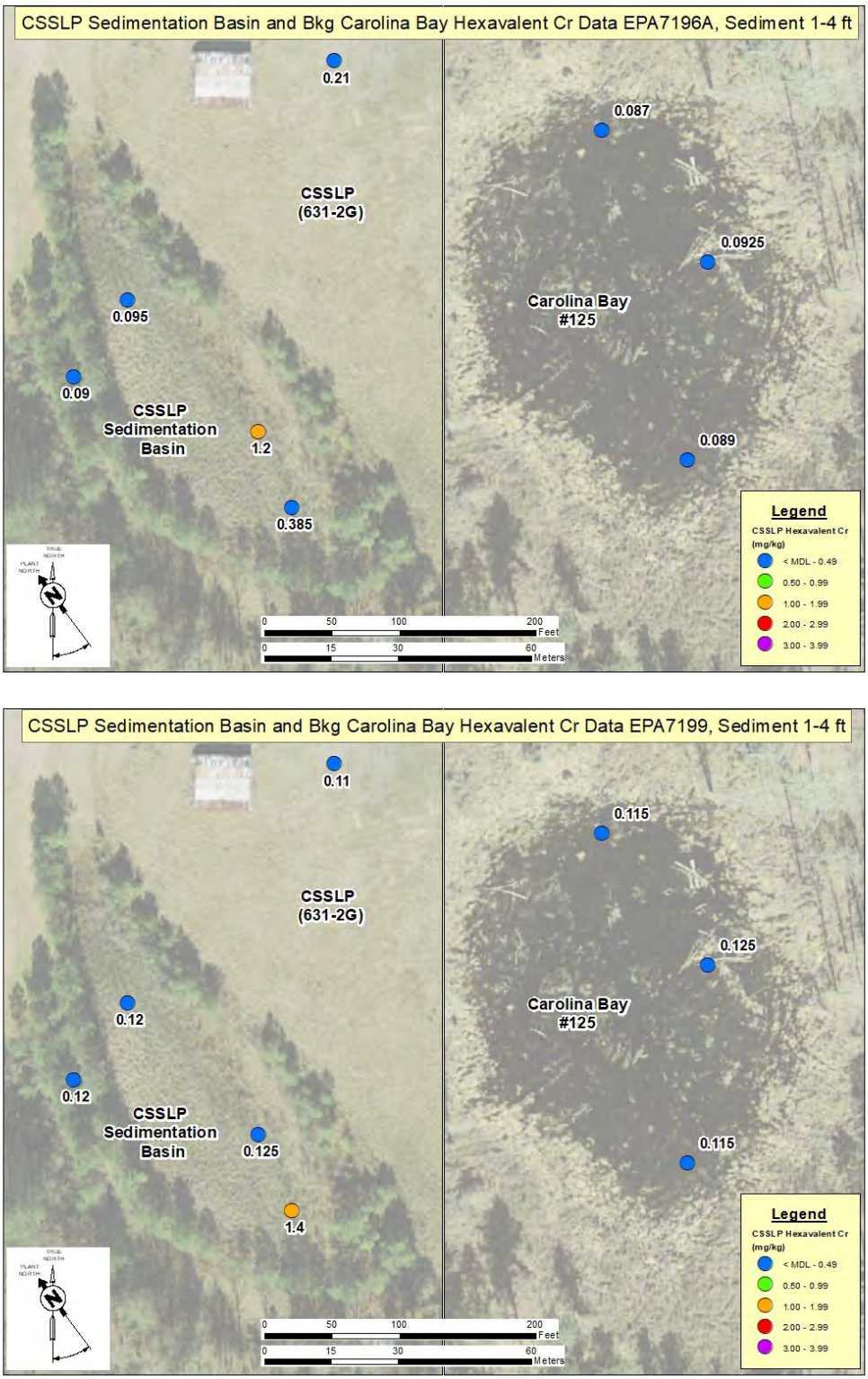


Figure H-12. CSSLP Surface Water Impoundment Area and Background Cr(VI) Sediment Data (1-4 ft)

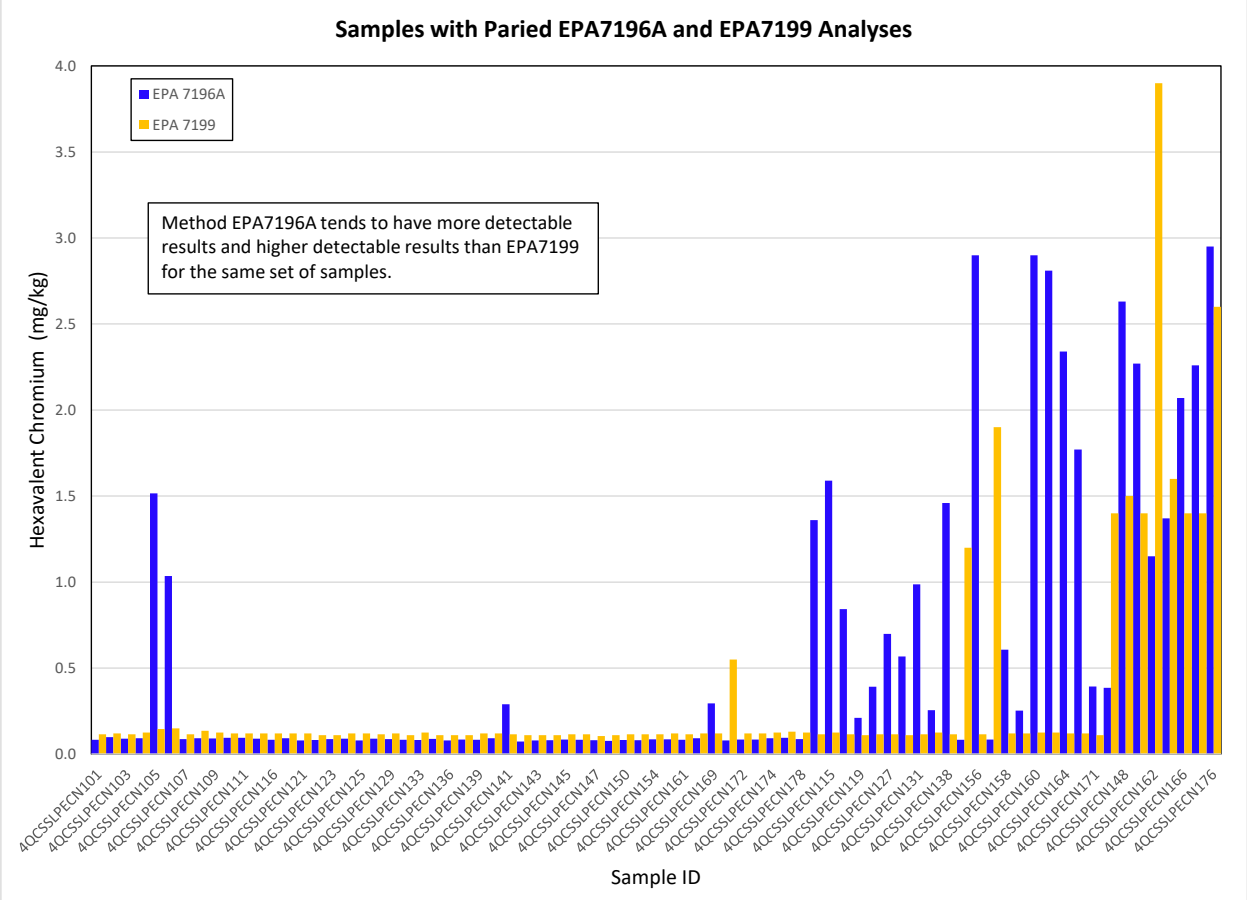


Figure H-13. Paired Sample Cr(VI) Data (EPA7196A and EPA7199)

This page is intentionally left blank.

Table H-1. ProUCL Output for ECODS N-1 and Background Cr(VI) Soil Data by SW-846 Method 7196A.

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Datasets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/20/2021 8:50:02 AM
From File:	NAOU CR6 ProUCL OU Bkg Data Input1.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median = Sample 2 Mean/Median (Two-Sided Alternative)**
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median
Sample 1 Data:	ECODS_7196A
Sample 2 Data:	ECODS_BKGD_7196A

Raw Statistics	**Sample 1**	**Sample 2**
Number of Valid Data	21	14
Number of Missing Observations	77	77
Number of Non-Detects	6	8
Number of Detect Data	15	6
Minimum Non-Detect	0.08	0.079
Maximum Non-Detect	0.086	0.295
Percent Non-detects	28.57%	57.14%
Minimum Detect	0.211	0.393
Maximum Detect	2.9	2.95
Mean of Detects	1.389	1.802
Median of Detects	1.15	1.92
SD of Detects	1.041	0.869
KM Mean	1.015	0.818
KM SD	1.035	0.998

Sample 1 vs. Sample 2 Gehan Test

H0: Mean of Sample 1 = Mean of background		
Gehan z Test Value	1.116	
Lower Critical z (0.025)	-1.96	
Upper Critical z (0.975)	1.96	
P-Value	0.264	
Conclusion with Alpha = 0.05		
Do Not Reject H0, Conclude Sample 1 = Sample 2		
P-Value ≥ alpha (0.05)		

Table H-2. ProUCL Output for ECODS N-1 and Background Cr(VI) Soil Data by SW-846 Method 7199

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Datasets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/20/2021 12:58:50 PM
From File:	NAOU CR6 ProUCL OU Bkg Data Input2.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median = Sample 2 Mean/Median (Two-Sided Alternative)**
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median
Sample 1 Data:	ECODS_7199
Sample 2 Data:	ECODS_BKGD_7199

Raw Statistics	**Sample 1**	**Sample 2**
Number of Valid Data	14	14
Number of Missing Observations	50	64
Number of Non-Detects	10	10
Number of Detect Data	4	4
Minimum Non-Detect	0.115	0.11
Maximum Non-Detect	0.125	0.55
Percent Non-detects	71.43%	71.43%
Minimum Detect	1.2	1.4
Maximum Detect	3.9	2.6
Mean of Detects	2.1	1.75
Median of Detects	1.65	1.5
SD of Detects	1.236	0.574
KM Mean	0.682	0.579
KM SD	1.064	0.787

Sample 1 vs. Sample 2 Gehan Test

H0: Mean of Sample 1 = Mean of background		
Gehan z Test Value	0.0576	
Lower Critical z (0.025)	-1.96	
Upper Critical z (0.975)	1.96	
P-Value	0.954	
Conclusion with Alpha = 0.05		
Do Not Reject H0, Conclude Sample 1 = Sample 2		
P-Value ≥ alpha (0.05)		

Table H-3. ProUCL Output ECODS N-1 and Background Cr(VI) Soil Data by SW-846 Methods 7196A and 7199

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Datasets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/20/2021 1:39:30 PM
From File:	NAOU CR6 ProUCL OU Bkg Data Input3.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median = Sample 2 Mean/Median (Two-Sided Alternative)**
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median
Sample 1 Data:	ECODS_7196A+7199
Sample 2 Data:	ECODS_Bkg_Soil_7196A+7199

Raw Statistics	**Sample 1**	**Sample 2**
Number of Valid Data	35	28
Number of Missing Observations	141	141
Number of Non-Detects	16	18
Number of Detect Data	19	10
Minimum Non-Detect	0.08	0.079
Maximum Non-Detect	0.125	0.55
Percent Non-detects	45.71%	64.29%
Minimum Detect	0.211	0.393
Maximum Detect	3.9	2.95
Mean of Detects	1.539	1.781
Median of Detects	1.39	1.685
SD of Detects	1.089	0.728
KM Mean	0.872	0.688
KM SD	1.067	0.914

Sample 1 vs. Sample 2 Gehan Test

H0: Mean of Sample 1 = Mean of background		
Gehan z Test Value	1.036	
Lower Critical z (0.025)	-1.96	
Upper Critical z (0.975)	1.96	
P-Value	0.3	
Conclusion with Alpha = 0.05		
Do Not Reject H0, Conclude Sample 1 = Sample 2		
P-Value ≥ alpha (0.05)		

Table H-4. ProUCL Output for CSSLP Upland Area and Background Cr(VI) Soil Data by SW-846 Method 7196A.

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Datasets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/20/2021 8:52:33 AM
From File:	NAOU CR6 ProUCL OU Bkg Data Input1.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median = Sample 2 Mean/Median (Two-Sided Alternative)**
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median
Sample 1 Data:	CSSLP_7196A
Sample 2 Data:	CSSLP_BKGD_7196A

Raw Statistics	Sample 1	Sample 2
Number of Valid Data	19	14
Number of Missing Observations	30	49
Number of Non-Detects	12	12
Number of Detect Data	7	2
Minimum Non-Detect	0.0795	0.0725
Maximum Non-Detect	0.092	0.29
Percent Non-detects	63.16%	85.71%
Minimum Detect	0.21	1.46
Maximum Detect	0.986	2.63
Mean of Detects	0.564	2.045
Median of Detects	0.568	2.045
SD of Detects	0.296	0.827
KM Mean	0.258	0.354
KM SD	0.287	0.725

Sample 1 vs. Sample 2 Gehan Test

H0: Mean of Sample 1 = Mean of background		
Gehan z Test Value	1.028	
Lower Critical z (0.025)	-1.96	
Upper Critical z (0.975)	1.96	
P-Value	0.304	
Conclusion with Alpha = 0.05		
Do Not Reject H0, Conclude Sample 1 = Sample 2		
P-Value ≥ alpha (0.05)		

Table H-5. ProUCL Output for CSSLP Upland Area and Background Cr(VI) Soil Data by SW-846 Method 7199.

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Datasets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/20/2021 12:57:31 PM
From File:	NAOU CR6 ProUCL OU Bkg Data Input2.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median = Sample 2 Mean/Median (Two-Sided Alternative)**
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median
Sample 1 Data:	CSSLP_Soil_7199
Sample 2 Data:	CSSLP_Bkg_Soil_7199

Raw Statistics	Sample 1	Sample 2
Number of Valid Data	19	14
Number of Missing Observations	17	36
Number of Non-Detects	19	13
Number of Detect Data	0	1
Minimum Non-Detect	0.11	0.105
Maximum Non-Detect	0.125	0.12
Percent Non-detects	100.00%	92.86%
Minimum Detect	N/A	1.5
Maximum Detect	N/A	1.5
Mean of Detects	N/A	1.5
Median of Detects	N/A	1.5
SD of Detects	N/A	N/A
KM Mean	N/A	0.205
KM SD	N/A	0.359

Sample 1 vs. Sample 2 Gehan Test

H0: Mean of Sample 1 = Mean of background		
Gehan z Test Value	-1.165	
Lower Critical z (0.025)	-1.96	
Upper Critical z (0.975)	1.96	
P-Value	0.244	
Conclusion with Alpha = 0.05		
Do Not Reject H0, Conclude Sample 1 = Sample 2		
P-Value ≥ alpha (0.05)		

Table H-6. ProUCL Output for CSSLP Upland Area and Background Cr(VI) Soil Data by SW-846 Methods 7196A and 7199.

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Datasets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/20/2021 1:36:49 PM
From File:	NAOU CR6 ProUCL OU Bkg Data Input3.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median = Sample 2 Mean/Median (Two-Sided Alternative)**
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median
Sample 1 Data:	CSSLP_Soil
Sample 2 Data:	CSSLP_Bkg_Soil

Raw Statistics	**Sample 1**	**Sample 2**
Number of Valid Data	38	28
Number of Missing Observations	89	113
Number of Non-Detects	31	25
Number of Detect Data	7	3
Minimum Non-Detect	0.0795	0.0725
Maximum Non-Detect	0.125	0.29
Percent Non-detects	81.58%	89.29%
Minimum Detect	0.21	1.46
Maximum Detect	0.986	2.63
Mean of Detects	0.564	1.863
Median of Detects	0.568	1.5
SD of Detects	0.296	0.664
KM Mean	0.169	0.264
KM SD	0.222	0.582

Sample 1 vs. Sample 2 Gehan Test

H0: Mean of Sample 1 = Mean of background		
Gehan z Test Value	0.615	
Lower Critical z (0.025)	-1.96	
Upper Critical z (0.975)	1.96	
P-Value	0.538	
Conclusion with Alpha = 0.05		
Do Not Reject H0, Conclude Sample 1 = Sample 2		
P-Value ≥ alpha (0.05)		

Table H-7. ProUCL Output for CSSLP Surface Water Impoundment Area and Background Cr(VI) Sediment Data by SW-846 Method 7196A

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Datasets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/20/2021 8:55:51 AM
From File:	NAOU CR6 ProUCL OU Bkg Data Input1.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median = Sample 2 Mean/Median (Two-Sided Alternative)**
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median
Sample 1 Data:	CSSLP_Soil
Sample 2 Data:	CSSLP_Bkg_Soil

Raw Statistics	**Sample 1**	**Sample 2**
Number of Valid Data	9	7
Number of Missing Observations	21	14
Number of Non-Detects	6	7
Number of Detect Data	3	0
Minimum Non-Detect	0.0835	0.083
Maximum Non-Detect	0.095	1.515
Percent Non-detects	66.67%	100.00%
Minimum Detect	0.385	N/A
Maximum Detect	1.59	N/A
Mean of Detects	1.112	N/A
Median of Detects	1.36	N/A
SD of Detects	0.64	N/A
KM Mean	0.426	N/A
KM SD	0.571	N/A

Sample 1 vs. Sample 2 Gehan Test

H0: Mean of Sample 1 = Mean of background		
Gehan z Test Value	1.493	
Lower Critical z (0.025)	-1.96	
Upper Critical z (0.975)	1.96	
P-Value	0.136	
Conclusion with Alpha = 0.05		
Do Not Reject H0, Conclude Sample 1 = Sample 2		
P-Value ≥ alpha (0.05)		

Table H-8. ProUCL Output for CSSLP Surface Water Impoundment Area and Background Cr(VI) Sediment Data by SW-846 Method 7199.

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Datasets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/20/2021 12:56:06 PM
From File:	NAOU CR6 ProUCL OU Bkg Data Input2.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median = Sample 2 Mean/Median (Two-Sided Alternative)**
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median
Sample 1 Data:	CSSLP_Sed_7199
Sample 2 Data:	CSSLP_Bkg_Sed_7199

Raw Statistics	Sample 1	Sample 2
Number of Valid Data	10	7
Number of Missing Observations	7	0
Number of Non-Detects	9	7
Number of Detect Data	1	0
Minimum Non-Detect	0.115	0.115
Maximum Non-Detect	0.135	0.15
Percent Non-detects	90.00%	100.00%
Minimum Detect	1.4	N/A
Maximum Detect	1.4	N/A
Mean of Detects	1.4	N/A
Median of Detects	1.4	N/A
SD of Detects	N/A	N/A
KM Mean	0.244	N/A
KM SD	0.386	N/A

Sample 1 vs. Sample 2 Gehan Test

H0: Mean of Sample 1 = Mean of background		
Gehan z Test Value	0.837	
Lower Critical z (0.025)	-1.96	
Upper Critical z (0.975)	1.96	
P-Value	0.403	
Conclusion with Alpha = 0.05		
Do Not Reject H0, Conclude Sample 1 = Sample 2		
P-Value ≥ alpha (0.05)		

Table H-9. ProUCL Output CSSLP Surface Water Impoundment Area and Background Cr(VI) Sediment Data by SW-846 Methods 7196A and 7199

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Datasets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/20/2021 1:36:13 PM
From File:	NAOU CR6 ProUCL OU Bkg Data Input3.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median = Sample 2 Mean/Median (Two-Sided Alternative)**
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median
Sample 1 Data:	EPA7196A+EPA7199
Sample 2 Data:	EPA7196A+EPA7199

Raw Statistics	Sample 1	Sample 2
Number of Valid Data	19	14
Number of Missing Observations	89	85
Number of Non-Detects	15	14
Number of Detect Data	4	0
Minimum Non-Detect	0.0835	0.083
Maximum Non-Detect	0.135	1.515
Percent Non-detects	78.95%	100.00%
Minimum Detect	0.385	N/A
Maximum Detect	1.59	N/A
Mean of Detects	1.184	N/A
Median of Detects	1.38	N/A
SD of Detects	0.542	N/A
KM Mean	0.315	N/A
KM SD	0.498	N/A

Sample 1 vs. Sample 2 Gehan Test

H0: Mean of Sample 1 = Mean of background		
Gehan z Test Value	1.724	
Lower Critical z (0.025)	-1.96	
Upper Critical z (0.975)	1.96	
P-Value	0.0847	
Conclusion with Alpha = 0.05		
Do Not Reject H0, Conclude Sample 1 = Sample 2		
P-Value ≥ alpha (0.05)		

Table H-10. ProUCL Output for Paired Sample Data by SW-846 Methods 7196A and 7199

Tarone-Ware Sample 1 vs Sample 2 Comparison Hypothesis Test for Datas Sets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/19/2021 3:20:55 PM
From File:	NAOU CR6 ProUCL Paired Data Input.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median = Sample 2 Mean/Median (Two-Sided Alternative)**
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median
Sample 1 Data:	EPA7196A
Sample 2 Data:	EPA7199

Raw Statistics	**Sample 1**	**Sample 2**
Number of Valid Data	77	77
Number of Non-Detects	51	67
Number of Detect Data	26	10
Minimum Non-Detect	0.145	0.21
Maximum Non-Detect	3.03	1.1
Percent Non-detects	66.23%	87.01%
Minimum Detect	0.21	1.2
Maximum Detect	2.95	3.9
Mean of Detects	1.439	1.83
Median of Detects	1.365	1.45
SD of Detects	0.956	0.829
KM Mean	0.591	0.42
KM SD	0.823	0.614

Sample 1 vs. Sample 2 Tarone Ware Test

H0: Mean/Median of Sample 1 = Mean/Median of Sample 2		
TW Statistic	2.822	
Lower TW Critical Value (0.025)	-1.96	
Upper TW Critical Value (0.975)	1.96	
P-Value	0.00478	
Conclusion with Alpha = 0.05		
Reject H0, Conclude Sample 1 <> Sample 2		
P-Value < alpha (0.05)		

Table H-11. ProUCL Output for Paired Sample Data by SW-846 Methods 7196A and 7199

Tarone-Ware Sample 1 vs Sample 2 Comparison Hypothesis Test for Datas Sets with Non-Detects	
User Selected Options:	
Date/Time of Computation:	ProUCL 5.14/19/2021 3:35:01 PM
From File:	NAOU CR6 ProUCL Paired Data Input.xls
Full Precision:	Off
Confidence Coefficient	95%
Selected Null Hypothesis	**Sample 1 Mean/Median ≥ Sample 2 Mean/Median (Form 2)**
Alternative Hypothesis	Sample 1 Mean/Median < Sample 2 Mean/Median
Sample 1 Data:	EPA7196A
Sample 2 Data:	EPA7199

Raw Statistics	**Sample 1**	**Sample 2**
Number of Valid Data	77	77
Number of Non-Detects	51	67
Number of Detect Data	26	10
Minimum Non-Detect	0.145	0.21
Maximum Non-Detect	3.03	1.1
Percent Non-detects	66.23%	87.01%
Minimum Detect	0.21	1.2
Maximum Detect	2.95	3.9
Mean of Detects	1.439	1.83
Median of Detects	1.365	1.45
SD of Detects	0.956	0.829
KM Mean	0.591	0.42
KM SD	0.823	0.614

Sample 1 vs. Sample 2 Tarone Ware Test

H0: Mean/Median of Sample 1 = Mean/Median of Sample 2		
TW Statistics	2.822	
TW Critical (0.05)	-1.645	
P-Value	0.998	
Conclusion with Alpha = 0.05		
Do Not Reject H0, Conclude Sample 1 ≥ Sample 2		
P-Value ≥ alpha (0.05)		

This page is intentionally left blank.

Attachment H-1

Hexavalent Chromium Data

This page was intentionally left blank.

Appendix H-1: Hexavalent Chromium Data											
Location	Date Sampled	Top (ft-bgs)	Bottom (ft-bgs)	SW-846 Method	Analyte	Matrix	MDL	SQL	Lab Qual	Review Qual	Result (mg/kg)
ECN1-042	9/23/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.220	1.100			1.200
ECN1-042	9/23/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.167	0.419	U	U	0.419
ECN1-042	9/23/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.230	1.100			1.400
ECN1-042	9/23/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.174	0.434			2.270
ECN1-042	9/28/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.230	1.200	U	U	1.200
ECN1-042	9/28/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.160	0.400	U	U	0.400
ECN1-042	9/28/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.230	1.200	U	U	1.200
ECN1-042	9/28/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.172	0.431	U	U	0.431
ECN1-043	9/23/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.230	1.100	U	U	1.100
ECN1-043	9/23/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.172	0.429			2.900
ECN1-043	9/23/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.230	1.100			1.900
ECN1-043	9/23/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.170	0.426	U	U	0.426
ECN1-043	9/29/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
ECN1-043	9/29/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.180	0.449			0.607
ECN1-043	9/29/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
ECN1-043	9/29/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.179	0.447	J	J	0.253
ECN1-044	9/29/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.230	1.100	U	U	1.100
ECN1-044	9/29/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.165	0.414	U	U	0.414
ECN1-044	9/29/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.230	1.200			3.900
ECN1-044	9/29/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.166	0.416			1.150
ECN1-044	9/30/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.250	1.200	U	U	1.200
ECN1-044	9/30/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.195	0.487			2.810
ECN1-044	9/30/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
ECN1-044	9/30/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.188	0.470			2.340
ECN1-045-BKG	9/30/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.220	1.100			1.600

Appendix H-1: Hexavalent Chromium Data											
Location	Date Sampled	Top (ft-bgs)	Bottom (ft-bgs)	SW-846 Method	Analyte	Matrix	MDL	SQL	Lab Qual	Review Qual	Result (mg/kg)
ECN1-045-BKG	9/30/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.169	0.423			1.370
ECN1-045-BKG	9/30/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.230	1.100			1.400
ECN1-045-BKG	9/30/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.166	0.416			2.070
ECN1-045-BKG	10/1/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
ECN1-045-BKG	10/1/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.175	0.439			1.770
ECN1-045-BKG	10/1/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
ECN1-045-BKG	10/1/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.185	0.463	U	U	0.463
ECN1-046-BKG	9/30/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	1.100	5.700	U	U	5.700
ECN1-046-BKG	9/30/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.158	0.395	U	U	0.395
ECN1-046-BKG	9/30/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	U	1.100
ECN1-046-BKG	9/30/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.151	0.378			0.393
ECN1-046-BKG	10/1/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
ECN1-046-BKG	10/1/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.169	0.422	U	U	0.422
ECN1-046-BKG	10/1/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
ECN1-046-BKG	10/1/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.168	0.421	U	U	0.421
ECN1-047-BKG	9/23/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.240	1.200			1.400
ECN1-047-BKG	9/23/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.172	0.431			2.260
ECN1-047-BKG	9/23/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.270	1.300			2.600
ECN1-047-BKG	9/23/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.187	0.468			2.950
ECN1-047-BKG	9/24/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.260	1.300	U	U	1.300
ECN1-047-BKG	9/24/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.188	0.470	U	U	0.470
ECN1-047-BKG	9/24/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.250	1.300	U	U	1.300
ECN1-047-BKG	9/24/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.173	0.433	U	U	0.433
ECN1-31	8/7/19	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.162	0.405			1.340
ECN1-32	8/7/19	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.143	0.358		J	2.000

Appendix H-1: Hexavalent Chromium Data											
Location	Date Sampled	Top (ft-bgs)	Bottom (ft-bgs)	SW-846 Method	Analyte	Matrix	MDL	SQL	Lab Qual	Review Qual	Result (mg/kg)
ECN1-36	8/7/19	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.109	0.271			0.467
ECN1-37	8/7/19	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.108	0.270			0.404
ECN1-38	8/8/19	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.121	0.302	J	J	0.211
ECN1-39	8/8/19	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.109	0.272			0.592
CB125-001-BKG	10/8/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
CB125-001-BKG	10/8/20	0.0	1.0	7196A	Chromium, Hexavalent	Sediment	0.196	0.491	U	U	0.491
CB125-001-BKG	10/8/20	1.0	4.0	7199	Chromium, Hexavalent	Sediment	0.230	1.100	U	U	1.100
CB125-001-BKG	10/8/20	1.0	4.0	7196A	Chromium, Hexavalent	Sediment	0.178	0.446	U	U	0.446
CB125-002-BKG	10/8/20	1.0	4.0	7199	Chromium, Hexavalent	Sediment	0.250	1.300	U	U	1.300
CB125-002-BKG	10/8/20	1.0	4.0	7196A	Chromium, Hexavalent	Sediment	0.185	0.463	U	U	0.463
CB125-002-BKG	10/8/20	0.0	1.0	7199	Chromium, Hexavalent	Sediment	0.290	1.500	U	U	1.500
CB125-002-BKG	10/8/20	0.0	1.0	7196A	Chromium, Hexavalent	Sediment	3.030	7.580	U	U	7.580
CB125-003-BKG	10/8/20	0.0	1.0	7199	Chromium, Hexavalent	Sediment	0.300	1.500	U	U	1.500
CB125-003-BKG	10/8/20	0.0	1.0	7196A	Chromium, Hexavalent	Sediment	2.070	5.170	U	U	5.170
CB125-003-BKG	10/8/20	1.0	4.0	7199	Chromium, Hexavalent	Sediment	0.230	1.100	U	U	1.100
CB125-003-BKG	10/8/20	1.0	4.0	7196A	Chromium, Hexavalent	Sed.	0.174	0.436	U	U	0.436
CSSLP-024-BKG	10/5/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	UJ	1.100
CSSLP-024-BKG	10/5/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.169	0.422	U	U	0.422
CSSLP-024-BKG	10/5/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.230	1.100	U	U	1.100
CSSLP-024-BKG	10/5/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.165	0.411			1.460
CSSLP-024-BKG	10/5/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
CSSLP-024-BKG	10/5/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.166	0.416	U	U	0.416
CSSLP-024-BKG	10/5/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
CSSLP-024-BKG	10/5/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.183	0.459	U	U	0.459
CSSLP-025-BKG	10/5/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	U	1.100

Appendix H-1: Hexavalent Chromium Data											
Location	Date Sampled	Top (ft-bgs)	Bottom (ft-bgs)	SW-846 Method	Analyte	Matrix	MDL	SQL	Lab Qual	Review Qual	Result (mg/kg)
CSSLP-025-BKG	10/5/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.158	0.395	U	U	0.395
CSSLP-025-BKG	10/5/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	U	1.100
CSSLP-025-BKG	10/5/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.161	0.402	U	U	0.402
CSSLP-025-BKG	10/5/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.230	1.200	U	U	1.200
CSSLP-025-BKG	10/5/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.168	0.421	U	U	0.421
CSSLP-025-BKG	10/5/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.230	1.200	U	U	1.200
CSSLP-025-BKG	10/5/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.165	0.413	U	U	0.413
CSSLP-026-BKG	10/5/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.210	1.100	U	U	1.100
CSSLP-026-BKG	10/5/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.161	0.403	U	U	0.403
CSSLP-026-BKG	10/5/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.230	1.200			1.500
CSSLP-026-BKG	10/5/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.176	0.440			2.630
CSSLP-026-BKG	10/6/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	U	1.100
CSSLP-026-BKG	10/6/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.153	0.382	U	U	0.382
CSSLP-026-BKG	10/6/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.230	1.200	U	U	1.200
CSSLP-026-BKG	10/6/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.164	0.409	U	U	0.409
CSSLP-027	10/6/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	U	1.100
CSSLP-027	10/6/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.164	0.410	U	U	0.410
CSSLP-027	10/6/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	U	1.100
CSSLP-027	10/6/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.173	0.434	U	U	0.434
CSSLP-027	10/6/20	4.0	10.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
CSSLP-027	10/6/20	4.0	10.0	7196A	Chromium, Hexavalent	Soil	0.180	0.450	U	U	0.450
CSSLP-027	10/6/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
CSSLP-027	10/6/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.159	0.398	U	U	0.398
CSSLP-028	10/7/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.230	1.200	U	U	1.200
CSSLP-028	10/7/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.161	0.402			0.843

Appendix H-1: Hexavalent Chromium Data											
Location	Date Sampled	Top (ft-bgs)	Bottom (ft-bgs)	SW-846 Method	Analyte	Matrix	MDL	SQL	Lab Qual	Review Qual	Result (mg/kg)
CSSLP-028	10/7/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	U	1.100
CSSLP-028	10/7/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.155	0.387	J	J	0.210
CSSLP-028	10/7/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	UJ	1.200
CSSLP-028	10/7/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.184	0.459	U	U	0.459
CSSLP-028	10/7/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
CSSLP-028	10/7/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.159	0.398	U	U	0.398
CSSLP-029	10/7/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.230	1.200	U	U	1.200
CSSLP-029	10/7/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.155	0.388			0.391
CSSLP-029	10/7/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.230	1.200	U	U	1.200
CSSLP-029	10/7/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.171	0.429			0.698
CSSLP-029	10/7/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.230	1.200	U	U	1.200
CSSLP-029	10/7/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.178	0.445	U	U	0.445
CSSLP-029	10/7/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.240	1.200	U	U	1.200
CSSLP-029	10/7/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.174	0.435	U	U	0.435
CSSLP-030	10/7/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.230	1.200	U	U	1.200
CSSLP-030	10/7/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.154	0.385			0.986
CSSLP-030	10/7/20	1.0	4.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	U	1.100
CSSLP-030	10/7/20	1.0	4.0	7196A	Chromium, Hexavalent	Soil	0.167	0.417	U	U	0.417
CSSLP-030	10/7/20	8.0	10.0	7199	Chromium, Hexavalent	Soil	0.250	1.200	U	U	1.200
CSSLP-030	10/7/20	8.0	10.0	7196A	Chromium, Hexavalent	Soil	0.164	0.410	U	U	0.410
CSSLP-030	10/7/20	10.0	12.0	7199	Chromium, Hexavalent	Soil	0.250	1.300	U	U	1.300
CSSLP-030	10/7/20	10.0	12.0	7196A	Chromium, Hexavalent	Soil	0.188	0.469	J	J	0.255
CSSLP-031	10/6/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	U	1.100
CSSLP-031	10/6/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.177	0.443	U	U	0.443
CSSLP-032	10/6/20	0.0	1.0	7199	Chromium, Hexavalent	Soil	0.220	1.100	U	U	1.100

Appendix H-1: Hexavalent Chromium Data											
Location	Date Sampled	Top (ft-bgs)	Bottom (ft-bgs)	SW-846 Method	Analyte	Matrix	MDL	SQL	Lab Qual	Review Qual	Result (mg/kg)
CSSLP-032	10/6/20	0.0	1.0	7196A	Chromium, Hexavalent	Soil	0.159	0.397	U	U	0.397
CSSLP-20-SED	10/12/20	0.0	1.0	7199	Chromium, Hexavalent	Sediment	0.250	1.200	U	U	1.200
CSSLP-20-SED	10/12/20	0.0	1.0	7196A	Chromium, Hexavalent	Sediment	0.181	0.452	U	U	0.452
CSSLP-20-SED	10/12/20	1.0	4.0	7199	Chromium, Hexavalent	Sediment	0.240	1.200	U	U	1.200
CSSLP-20-SED	10/12/20	1.0	4.0	7196A	Chromium, Hexavalent	Sediment	0.190	0.475	U	U	0.475
CSSLP-21-SED	10/12/20	0.0	1.0	7199	Chromium, Hexavalent	Sediment	0.240	1.200	U	U	1.200
CSSLP-21-SED	10/12/20	0.0	1.0	7196A	Chromium, Hexavalent	Sediment	0.189	0.473	U	U	0.473
CSSLP-21-SED	10/12/20	1.0	4.0	7199	Chromium, Hexavalent	Sediment	0.240	1.200	U	U	1.200
CSSLP-21-SED	10/12/20	1.0	4.0	7196A	Chromium, Hexavalent	Sediment	0.180	0.451	U	U	0.451
CSSLP-22-SED	10/13/20	0.0	1.0	7199	Chromium, Hexavalent	Sediment	0.230	1.100	U	U	1.100
CSSLP-22-SED	10/13/20	0.0	1.0	7196A	Chromium, Hexavalent	Sediment	0.180	0.451	J	J	1.360
CSSLP-22-SED	10/13/20	1.0	4.0	7199	Chromium, Hexavalent	Sediment	0.250	1.200	U	U	1.200
CSSLP-22-SED	10/13/20	1.0	4.0	7196A	Chromium, Hexavalent	Sediment	0.183	0.458	J	J	1.200
CSSLP-23-SED	10/12/20	0.0	1.0	7199	Chromium, Hexavalent	Sediment	0.240	1.200	U	U	1.200
CSSLP-23-SED	10/12/20	0.0	1.0	7196A	Chromium, Hexavalent	Sediment	0.167	0.418	U	U	0.418
CSSLP-23-SED	10/12/20	1.0	4.0	7199	Chromium, Hexavalent	Sediment	0.240	1.200			1.400
CSSLP-23-SED	10/12/20	1.0	4.0	7196A	Chromium, Hexavalent	Sediment	0.180	0.450	J	J	0.385

APPENDIX I

COST ESTIMATES

LIST OF TABLES

Table		Page
Table I-1.	ECODS N-1 – Alternative A-2 - Land Use Controls	I-3
Table I-2.	CSSLP – Alternative B-2 - Land Use Controls	I-5
Table I-3.	CSSLP – Alternative B-3 – Class II Soil Cover over Upland and Surface Water Impoundment Area	I-7
Table I-4.	CSSLP – Alternative B-4 – Excavate Hot Spot and Remove for Off-Unit Disposal	I-9
Table I-5.	Ford Building – Alternative C-2 – Concrete Cover, Land Use Controls	I-11
Table I-6.	Ford Building – Alternative C-3 – Hot Spot Excavate and Remove for Off-Unit Disposal, Concrete Cover, Land Use Controls	I-13

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

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

0.45 acres *Early Construction and Oper*

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**

Table I-1. ECODS N-1 – Alternative A-2 - Land Use Controls *(continued/end)*

Total Present Value Direct O&M Cost		**$126,336**
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-2017-0

Table I-2. CSSLP – Alternative B-2 - Land Use Controls

Institutional Controls Estimate
Alternative B-2
CCSLP Land Use Controls

3.34	*acres*	*Central Shops Scrap Lumber*	
1.02	*acres*	*Central Shops Scrap Lumber*	
4.36	***total acres***		

Item	Quantity	Units	Unit Cost	Total Cost
Direct Capital Costs				
CSSLP				
Institutional Controls				
Posting of Warning Signs	8	ea	$50	$400
Land Use Control Implementation Plan	1	ea	$5,000	$5,000
Deed Restrictions	1	ea	$5,000	$5,000
Subtotal - Direct Capital Cost				$10,400
Mobilization/Demobilization	9%	of subtotal direct capital		$936
Site Preparation/Site Restoration	9%	of subtotal direct capital		$936
Total Direct Capital Cost				**$12,272**
Indirect Capital Costs				
Engineering & Design	14%	of direct capital		$1,718
Project/Construction Management	25%	of direct capital		$3,068
Health & Safety	6%	of direct capital		$736
Overhead	30%	of O&M (direct + indirect)		$5,338
Contingency	26%	of O&M (direct + indirect)		$4,627
Total Indirect Capital Cost				**$15,487**
Total Estimated Capital Cost				**$27,759**
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
CSSLP Maintenance	1	ea	$1,743	$1,743
Subtotal - Annual Costs				$2,243
Present Value Cost				**$4,611**
	-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	$1,743	$1,743
Subtotal - 30 Year Annual Costs				$2,243
Present Value Cost				**$70,533**
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**

Table I-2. CSSLP – Alternative B-2 - Land Use Controls *(continued/end)*

Total Present Value Direct O&M Cost		**$170,034**
Indirect O&M Costs		
Project/Admin Management	18% of direct O&M	$31,294
Health & Safety	19% of direct O&M	$32,307
Overhead	30% of O&M (direct + indirect)	$51,010
Contingency	20% of O&M (direct + indirect)	$33,157
Total Present Worth Indirect O&M Cost		$147,767
Total Estimated Present Worth O&M Cost		**$317,802**
TOTAL ESTIMATED COST		**$345,561**

Interest rates for costs with 3-year and 30-year durations are based on 2020 SRNS Technical Memorandum ERTEC-2017-0

Table I-3. CSSLP – Alternative B-3 – Class II Soil Cover over Upland and Surface Water Impoundment Areas

Soil Cover Estimate
Alternative B-3
CCSLP Class II Soil Cover over Upland and Surface Water Impoundment Area, LUCs
Ref.: None.

3.34 acres Central Shops Scrap Lumber Pil
1.02 acres Central Shops Scrap Lumber Pil
4.36 total acres

Item	Quantity	Units	Unit Cost	Total Cost
Direct Capital Costs				
CSSLP				
Clearing and Grubbing				
Clear Vegetation and Debris, Stockpile at Site Perimeter	5.8	ac	$2,600	$15,077
Clear Trees and Grub Stumps, Stockpile at Site Perimeter	5.8	ac	$4,500	$26,095
Close In-Situ w/ SCDHEC Class II Cover system				
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
Construct SCDHEC Class II Cover system				
Design	1	ea	$233,000	$233,000
Site Layout and Surveys w/ As-Builts	6	ac	$3,000	$17,396
Contour for slope	37,984	yd3	$3.59	$136,364
Common Backfill (20 Inches)	14,068	yd3	$13	$182,887
Topsoil (4 Inches)	2,814	yd3	$35	$98,478
Sod	25,323	yd2	$5	$126,614
Backfill Sampling / Analysis	16	ea	$1,200	$19,200
Stormwater Management	3,649	lf	$25	$91,233
Institutional Controls				
Posting of Warning Signs	8	ea	$50	$400
Land Use Control Implementation Plan	1	ea	$5,000	$5,000
Deed Restrictions	1	ea	$5,000	$5,000
Subtotal - Direct Capital Cost				$979,013
Mobilization/Demobilization	9%	of subtotal direct capital		$88,111
Site Preparation/Site Restoration	9%	of subtotal direct capital		$88,111
Total Direct Capital Cost				**$1,155,236**
Indirect Capital Costs				
Engineering & Design	14%	of direct capital		$161,733
Project/Construction Management	25%	of direct capital		$288,809
Health & Safety	6%	of direct capital		$69,314
Overhead	30%	of O&M (direct + indirect)		$502,528
Contingency	26%	of O&M (direct + indirect)		$435,524
Total Indirect Capital Cost				**$1,457,907**
Total Estimated Capital Cost				**$2,613,143**
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
CSSLP Maintenance	1	ea	$3,175	$3,175
Subtotal - Annual Costs				$3,675
Present Value Cost				**$7,553**
	-0.3%	30 Year Discount Rate3		
Annual Costs	30	years O&M		*Years 2021-2051*

Table I-3. CSSLP – Alternative B-3 – Class II Soil Cover over Upland and Surface Water Impoundment Area *(continued/end)*

Access Controls		1	ea	$500	$500
Annual Inspection/Maintenance		1	ea	$3,175	$3,175
	Subtotal - 30 Year Annual Costs				$3,675
	Present Value Cost				**$115,543**
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				**$217,986**
Indirect O&M Costs					
Project/Admin Management		29%	of direct O&M		$62,588
Health & Safety		19%	of direct O&M		$23,388
Overhead		30%	of O&M (direct + indirect)		$72,694
Contingency		20%	of O&M (direct + indirect)		$47,251
	Total Present Worth Indirect O&M Cost				**$205,922**
	Total Estimated Present Worth O&M Cost				**$423,908**
	TOTAL ESTIMATED COST				**$3,037,051**

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

Table I-4. CSSLP – Alternative B-4 – Excavate Hot Spot and Remove for Off-Unit Disposal

Haul to Three Rivers Landfill Estimate
Alternative B-4
CSSLP Excavate 1' Hot Spot and Remove For Off-Unit Disposal

3.34 acres Central Shops Scrap Lumber
1.02 acres Central Shops Scrap Lumber
4.36 total acres

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 I-4. CSSLP – Alternative B-4 – Excavate Hot Spot and Remove for Off-Unit 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-2017-00

Table I-5. Ford Building – Alternative C-2 – Concrete Cover, Land Use Controls

Institutional Controls Estimate
Alternative C-2
Ford Building Concrete Cover, LUCs
Ref.: None

0.35	*acres*	*Ford Building (690-N)*	
0.70	*acres*	*745-N Excess Equipment Yar*	
0.03	*acres*	*13.8 kV Substation (652-44N*	
0.02	*acres*	*Fuel Oil Tank Containment D*	
0.07	*acres*	*Shielding Remnants*	

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 I-5. Ford Building – Alternative C-2 – Concrete Cover, 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-2017-00

Table I-6. Ford Building – Alternative C-3 – Hot Spot Excavate and Remove for Off-Unit Disposal, Concrete Cover, Land Use Controls

Haul to Three Rivers Landfill Estimate
Alternative C-3
Hot Spot Excavate and Remove For Off-Unit Disposal, Concrete C
Ref.: None

0.35	*acres*	*Ford Building (690-N)*
0.70	*acres*	*745-N Excess Equipment Yar*
0.03	*acres*	*13.8 kV Substation (652-44N*
0.02	*acres*	*Fuel Oil Tank Containment Di*
0.07	*acres*	*Shielding Remnants*

Item	Quantity	Units	Unit Cost	Total Cost
Direct Capital Costs				
3RLF				
Landfill Disposal Fees				
FB	0.40	yd3	$65.00	$500
Ford Building Hot Spot				
Excavate, Truck Haul and Dump for Off-Unit Disposal				
Excavate & Load Sediment for Hauling	0.33	yd3	$6,435	$2,145
Truck Haul Sediment to Disposal Site	0.40	yd3	$5,363	$2,145
Backfill / Compact at Disposal Site	0.40	yd3	$5,363	$2,145
Confirmation Sampling / Analysis	1	ea	$1,000	$1,000
Site Restoration				
Common Backfill (8 Inches)	0.27	yd3	$8,044	$2,145
Topsoil (4 Inches)	0.13	yd3	$16,088	$2,145
Backfill Sampling / Analysis	1	ea	$1,200	$1,200
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				$23,126
Mobilization/Demobilization	9%	of subtotal direct capital		$2,081
Site Preparation/Site Restoration	9%	of subtotal direct capital		$2,081
Total Direct Capital Cost				**$27,789**
Indirect Capital Costs				
Engineering & Design	14%	of direct capital		$3,890
Project/Construction Management	25%	of direct capital		$6,947
Health & Safety	6%	of direct capital		$1,667
Overhead	30%	of O&M (direct + indirect)		$12,088
Contingency	26%	of O&M (direct + indirect)		$10,476
Total Indirect Capital Cost				**$35,069**
Total Estimated Capital Cost				**$63,358**

Table I-6. Ford Building – Alternative C-3 – Hot Spot Excavate and Remove for Off-Unit Disposal, Concrete Cover, Land Use Controls*(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
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**
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				**$713,746**

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

APPENDIX J

DATA USABILITY REPORTS (DUR)	
Appendix J.1	Data Usability Report for 2019 Pre-Workplan Characterization Samples
Appendix J.2	Data Usability Report for 2020 Workplan Characterization Samples

This page was intentionally left blank.

APPENDIX J.1

Data Usability Report for 2019 Pre-Workplan Characterization Samples

This page was intentionally left blank.

TABLE OF CONTENTS (APPENDIX J.1)

Section **Page**

J.1.1 Project Summary J-9

J.1.2 Assessment of Precision, Accuracy, Representativeness, Comparability, and Completeness Data Quality Indicators and Measurement Perfomance Criteria .. J-16

J.1.2.1 Precision J-16
J.1.2.2 Accuracy J-17
J.1.2.3 Representativeness J-17
J.1.2.4 Comparability J-18
J.1.2.5 Completeness J-18

J.1.3 Validation Findings J-19

J.1.3.1 Holding Times J-19
J.1.3.2 Preservation J-21
J.1.3.3 Calibration, Identification, and Quantitation J-21
J.1.3.4 Trip Blanks and Rinsate Blanks J-22
J.1.3.5 Method Blanks J-24
J.1.3.6 Laboratory Duplicate RPD J-27
J.1.3.7 Field Duplicate RPD J-29
J.1.3.8 Matrix Spike Recovery J-31
J.1.3.9 LCS Recovery J-37
J.1.3.10 Surrogate/Tracer Recovery J-38
J.1.3.11 Split Samples Comparability J-49

J.1.4 Data Usability J-51

J.1.5 References J-51

LIST OF TABLES
(APPENDIX J.1)

Table		Page
Table J.1-1.	Sample Identification (ID) Summary	J-9
Table J.1-2.	Total Number of Records	J-14
Table J.1-3.	Environmental Record Review Qualifier Summary	J-15
Table J.1-4.	Holding Time Review Qualifier Summary	J-20
Table J.1-5.	Preservation Review Qualifier Summary	J-21
Table J.1-6.	Calibration, Identification, and Quantitation Review Summary	J-22
Table J.1-7A.	Trip Blank Review Qualifier Summary	J-23
Table J.1-7B.	Rinsate Blank Review Qualifier Summary	J-23
Table J.1-7C.	Field Blank Review Qualifier Summary	J-23
Table J.1-8.	Method Blank Review Qualifier Summary	J-26
Table J.1-9.	Laboratory Duplicate Qualifier Summary	J-29
Table J.1-10.	Field Duplicate Qualifier Summary	J-31
Table J.1-11.	Matrix Spike Recovery Qualifier Summary	J-36
Table J.1-12.	Laboratory Control Samples Qualifier Summary	J-37
Table J.1-13.	Surrogate/Tracer Recovery Qualifier Summary	J-49
Table J.1-14.	Split Samples	J-49

LIST OF ABBREVIATION AND ACRONYMS (APPENDIX J.1)

%	percent
BRA	Baseline Risk Assessment
CAL	Calibration
ECODS	Early Construction and Operational Disposal Sites
ID	Identification
ft	feet
GEL	General Engineering Labs
LCS	laboratory control samples
µ/kg	microgram per kilogram
MDL	Minimum Detectable Limit
MB	method blank
MS	matrix spike
OU	Operable Unit
PCB	polychlorinated biphenyl
QC	Quality Control
RB	rinsate blank
RFI/RI	Resource Conservation and Recovery Act Facility Investigation / Remedial Investigation
RPD	relative percent differences
SHE	Shealy Labs
ssEQL	sample specific estimated quantification limit
TAL	Test America Labs
TB	trip blank
TPH	Total Petroleum Hydrocarbons

This page was intentionally left blank.

J.1.0 DATA USABILITY REPORT FOR 2019 PRE-WORKPLAN CHARACTERIZATION SAMPLES

J.1.1 Project Summary

This report presents analytical data verification and validation results for the 2019 sampling events associated with three waste units that are located in N-Area. The sampling was conducted in accordance with the *Sampling and Analysis Plan for Pre-Work Plan Characterization of the ECODS N-1 (NBN), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (Ford Building) Operable Unit (U)* (SRNS 2019). The project generated 226 regular field samples, 12 field duplicate samples, and 11 split samples. The samples, along with the requested analytical analyses, are listed in Table 1.

Table J.1-1. Sample Identification (ID) Summary

Sample ID	Station ID	Sample Type	Sample Date	Sample Time	Matrix	Interval *(ft)*	Analysis Requested
NAOU-00000001	CSR 1	REG	6/12/19	1104	GRWATER	5-35	1, 2, 3, 4, 5, 6, 7, 8, 9
NAOU-00000002	CSR 4	REG	6/12/19	0859	GRWATER	15-45	1, 2, 3, 4, 5, 6, 7, 8, 9
NAOU-00000003	CSR 5D	FD	6/12/19	0943	GRWATER	18-38	1, 2, 3, 4, 5, 6, 7, 8, 9
NAOU-00000004	CSR 5D	REG	6/12/19	0943	GRWATER	18-38	1, 2, 3, 4, 5, 6, 7, 8, 9
NAOU-00000005	CSSLP-1	REG	6/26/19	1305	SOIL	0-1	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000006	CSSLP-1	REG	6/26/19	1335	SOIL	1-4	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000007	CSSLP-1	REG	9/3/19	1030	SOIL	8-10	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000008	CSSLP-1	SPL	6/26/19	1305	SOIL	0-1	1, 2, 3, 4, 7, 8
NAOU-00000009	CSSLP-2	REG	6/24/19	0830	SOIL	0-1	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000010	CSSLP-2	REG	6/24/19	0915	SOIL	1-2.5	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000011	CSSLP-2	REG	9/3/19	1100	SOIL	8-10	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000012	CSSLP-3	FD	6/19/19	1408	SOIL	0-1	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000013	CSSLP-3	REG	6/19/19	1408	SOIL	0-1	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000014	CSSLP-3	REG	6/19/19	1450	SOIL	1-4	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000015	CSSLP-3	REG	9/3/19	1140	SOIL	8-10	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000016	CSSLP-4	REG	6/19/19	1215	SOIL	0-1	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000017	CSSLP-4	REG	6/19/19	1225	SOIL	1-4	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000018	CSSLP-4	REG	9/3/19	1240	SOIL	8-10	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000019	CSSLP-5	REG	6/19/19	1042	SOIL	0-1	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000020	CSSLP-5	REG	6/19/19	1115	SOIL	1-4	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000021	CSSLP-5	REG	9/3/19	1310	SOIL	8-10	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000022	CSSLP-6	REG	6/26/19	0735	SOIL	0-1	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000023	CSSLP-6	REG	6/26/19	0755	SOIL	1-3	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000024	CSSLP-6	REG	9/4/19	0840	SOIL	8-10	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000025	CSSLP-7	REG	6/26/19	0820	SOIL	0-1	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000026	CSSLP-7	REG	6/26/19	0840	SOIL	1-2	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000027	CSSLP-7	REG	9/4/19	0930	SOIL	8-10	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000028	CSSLP-8	REG	6/26/19	1200	SOIL	0-1	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000029	CSSLP-8	REG	6/26/19	1220	SOIL	1-2.5	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000030	CSSLP-8	REG	9/4/19	0950	SOIL	8-10	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000031	CSSLP-8	SPL	6/26/19	1220	SOIL	1-2.5	1, 2, 3, 4, 7, 8
NAOU-00000032	CSSLP-9	REG	6/24/19	1100	SOIL	0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000033	CSSLP-9	REG	6/24/19	1140	SOIL	1-2.5	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000034	CSSLP-9	REG	9/4/19	0950	SOIL	8.0-10.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000035	CSSLP-10	REG	6/24/19	1000	SOIL	0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000036	CSSLP-10	REG	6/24/19	1015	SOIL	1.0 - 4.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000037	CSSLP-10	REG	9/4/19	1100	SOIL	8.0 - 10.0	1, 2, 3, 4, 5, 6, 7, 8

Table J.1-1. Sample Identification (ID) Summary *(Continued)*

Sample ID	Station ID	Sample Type	Sample Date	Sample Time	Matrix	Interval *(ft)*	Analysis Requested
NAOU-00000038	CSSLP-11	REG	6/25/19	1055	SOIL	0-1	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000039	CSSLP-11	REG	6/25/19	1110	SOIL	1.0- 4.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000040	CSSLP-11	REG	9/4/19	1120	SOIL	8.0-10	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000041	CSSLP-12	REG	6/25/19	945	SOIL	0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000042	CSSLP-12	REG	6/25/19	1010	SOIL	1.0 -2.5	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000043	CSSLP-12	REG	9/5/19	0930	SOIL	8.0-10.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000044	CSSLP-13	REG	6/24/19	1320	SOIL	0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000045	CSSLP-13	REG	6/24/19	1400	SOIL	1.0 -2.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000046	CSSLP-13	REG	9/5/19	0830	SOIL	8.0-10.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000047	CSSLP-14	FD	6/25/19	900	SOIL	1.0-2.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000048	CSSLP-14	REG	6/25/19	805	SOIL	0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000049	CSSLP-14	REG	6/25/19	900	SOIL	1.0- 2.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000050	CSSLP-14	REG	9/4/19	1230	SOIL	8.0-10.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000051	CSSLP-15	REG	7/1/19	850	SOIL	0.0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000052	CSSLP-15	REG	7/1/19	930	SOIL	1.0-1.5	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000053	CSSLP-15	REG	9/4/19	1300	SOIL	8.0-10.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000054	CSSLP-15	SPL	9/4/19	1300	SOIL	8.0-10.0	1, 2, 3, 4, 7, 8, 10, 11, 12, 13, 14,15, 16, 17, 18, 19, 20
NAOU-00000055	CSSLP-16	REG	7/1/19	1005	SOIL	0.0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000056	CSSLP-16	REG	7/1/19	1035	SOIL	1.0-2.5	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000057	CSSLP-16	REG	9/5/19	0900	SOIL	8.0-10.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000058	CSSLP-17	REG	6/25/19	1230	SOIL	0.0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000059	CSSLP-17	REG	6/25/19	1250	SOIL	1.0-3.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000060	CSSLP-17	REG	9/5/19	1045	SOIL	8.0-10.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000061	CSSLP-18	FD	9/5/19	1115	SOIL	8.0-10.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000062	CSSLP-18	REG	6/26/19	1030	SOIL	0.0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000063	CSSLP-18	REG	6/26/19	1045	SOIL	1.0-4.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000064	CSSLP-18	REG	9/5/19	1115	SOIL	8.0-10.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000065	CSSLP-19	REG	7/1/19	1110	SOIL	0.0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000066	CSSLP-19	REG	7/1/19	1135	SOIL	1.0-2.0	1, 2, 3, 4, 5, 6, 7, 8, 10
NAOU-00000067	CSSLP-19	REG	9/5/19	1200	SOIL	8.0-10.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000068	FBFA-26	REG	8/22/19	0920	SOIL	0.0-1.0	1, 2, 3, 4, 5, 6, 7, 8
NAOU-00000069	FBFA-26	REG	8/22/19	0940	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000070	FBFA-1	REG	7/9/19	900	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000071	FBFA-1	REG	7/9/19	930	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8, 11
NAOU-00000072	FBFA-2	REG	7/11/19	1055	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8, 11
NAOU-00000073	FBFA-2	REG	7/11/19	1120	SOIL	1.0-3.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000074	FBFA-3	FD	7/11/19	825	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000075	FBFA-3	REG	7/11/19	825	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8, 11
NAOU-00000076	FBFA-3	REG	7/11/19	900	SOIL	1.0-2.5	1, 2, 3, 4, 5, 7, 8
NAOU-00000077	FBFA-4	REG	7/10/19	1255	SOIL	0.1-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000078	FBFA-4	REG	7/10/19	1325	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000079	FBFA-4	SPL	7/10/19	1325	SOIL	1.0-4.0	1, 2, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
NAOU-00000080	FBFA-5	REG	7/11/19	1150	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8, 9 10, 11
NAOU-00000081	FBFA-5	REG	7/11/19	1215	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000082	FBFA-6	REG	7/9/19	1005	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000083	FBFA-6	REG	7/9/19	1030	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000084	FBFA-7	REG	7/9/19	1105	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000085	FBFA-7	REG	7/9/19	1115	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000086	FBFA-7	REG	8/19/19	1030	SOIL	8.0-10.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000087	FBFA-7	REG	8/19/19	1115	SOIL	18.0-20.0	1, 2, 3, 4, 5, 7, 8, 10
NAOU-00000088	FBFA-7	REG	8/19/19	1140	SOIL	28.0-30.0	1, 2, 3, 4, 5, 7, 8, 10, 11
NAOU-00000089	FBFA-7	REG	8/21/19	920	GRWATER	46.0-56.0	3, 7, 8, 9
NAOU-00000090	FBFA-8	REG	7/15/19	825	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000091	FBFA-8	REG	7/15/19	840	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8

Table J.1-1. Sample Identification (ID) Summary *(Continued)*

Sample ID	Station ID	Sample Type	Sample Date	Sample Time	Matrix	Interval *(ft)*	Analysis Requested
NAOU-00000092	FBFA-9	REG	7/11/19	935	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000093	FBFA-9	REG	7/11/19	950	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000094	FBFA-10	REG	7/11/19	1020	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000095	FBFA-10	REG	7/11/19	1035	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000096	FBFA-11	REG	7/15/19	905	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000097	FBFA-11	REG	7/15/19	925	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8, 10, 11
NAOU-00000098	FBFA-12	REG	-	-	SOIL	0.0-1.0	Unused COC
NAOU-00000099	FBFA-12	REG	-	-	SOIL	1.0-4.0	Unused COC
NAOU-00000100	FBFA-13	REG	7/15/19	1030	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8, 10, 11
NAOU-00000101	FBFA-13	REG	7/15/19	1050	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8, 10
NAOU-00000102	FBFA-14	REG	7/16/19	835	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000103	FBFA-14	REG	7/9/19	850	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000104	FBFA-15	REG	7/16/19	920	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000105	FBFA-15	REG	7/16/19	945	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000106	FBFA-16	REG	7/16/19	1010	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000107	FBFA-16	REG	7/16/19	1025	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8, 10
NAOU-00000108	FBFA-17	REG	7/17/19	850	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8, 11
NAOU-00000109	FBFA-17	REG	7/17/19	905	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8, 10
NAOU-00000110	FBFA-17	REG	8/21/19	1120	SOIL	8.0-10.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000111	FBFA-17	REG	8/21/19	1150	SOIL	18.0-20.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000112	FBFA-17	REG	8/21/19	1250	SOIL	28.0-30.0	1, 2, 3, 4, 5, 7, 8, 10
NAOU-00000113	FBFA-17	REG	8/27/19	0910	GRWATER	46.0-56.0	1, 2, 3, 4, 5, 7, 8, 9
NAOU-00000114	FBFA-17	SPL	8/21/19	1120	SOIL	8.0-10.0	1, 2, 7, 8
NAOU-00000115	FBFA-18	FD	7/16/19	1215	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8, 10
NAOU-00000116	FBFA-18	REG	7/16/19	1155	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000117	FBFA-18	REG	7/16/19	1215	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000118	FBFA-19	REG	7/17/19	935	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8, 10, 11
NAOU-00000119	FBFA-19	REG	7/17/19	950	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000120	FBFA-20	REG	7/17/19	1050	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000121	FBFA-20	REG	7/17/19	1130	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000122	FBFA-21	REG	7/17/19	1200	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8, 10, 11
NAOU-00000123	FBFA-21	REG	-	-	SOIL	1.0-4.0	Unused COC
NAOU-00000124	FBFA-22	REG	7/18/19	805	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000125	FBFA-22	REG	7/18/19	830	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000126	FBFA-23	REG	7/18/19	850	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000127	FBFA-23	REG	7/18/19	920	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000128	FBFA-24	REG	7/18/19	950	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000129	FBFA-24	REG	7/18/19	1025	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000130	FBFA-25	REG	8/22/19	1210	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000131	FBFA-25	REG	8/22/19	1240	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000132	FBFA-25	SPL	8/22/19	1240	SOIL	1.0-4.0	1, 2, 7, 8
NAOU-00000133	FBFA-27	REG	7/22/19	955	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000134	FBFA-27	REG	7/22/19	1020	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8, 10
NAOU-00000135	FBFA-28	REG	8/22/19	1030	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000136	FBFA-28	REG	8/22/19	1100	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8, 10
NAOU-00000137	FBFA-29	REG	7/23/19	1100	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000138	FBFA-29	REG	7/23/19	1125	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000139	FBFA-30	REG	7/23/19	1010	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000140	FBFA-30	REG	7/23/19	1035	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000141	FBFA-31	REG	7/23/19	900	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000142	FBFA-31	REG	7/23/19	920	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000143	FBFA-32	REG	7/22/19	1135	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000144	FBFA-32	REG	7/22/19	1300	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000145	FBFA-32	SPL	7/22/19	1300	SOIL	1.0-4.0	1, 2, 7, 8
NAOU-00000146	FBFA-33	REG	7/23/19	805	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000147	FBFA-33	REG	7/23/19	825	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8

Table J.1-1. Sample Identification (ID) Summary *(Continued)*

Sample ID	Station ID	Sample Type	Sample Date	Sample Time	Matrix	Interval *(ft)*	Analysis Requested
NAOU-00000148	FBFA-34	REG	7/24/19	845	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000149	FBFA-34	REG	7/24/19	910	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000150	FBFA-35	REG	7/24/19	930	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000151	FBFA-35	REG	7/24/19	1000	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000152	FBFA-36	FD	8/26/19	1240	SOIL	18.0-20.0	1, 2, 3, 4, 5, 7, 8, 21
NAOU-00000153	FBFA-36	REG	7/18/19	1125	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000154	FBFA-36	REG	7/18/19	1140	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000155	FBFA-36	REG	8/26/19	1220	SOIL	8.0-10.0	1, 2, 3, 4, 5, 7, 8, 21
NAOU-00000156	FBFA-36	REG	8/26/19	1240	SOIL	18.0-20.0	1, 2, 3, 4, 5, 7, 8, 21
NAOU-00000157	FBFA-36	REG	8/26/19	1310	SOIL	28.0-30.0	1, 2, 3, 4, 5, 7, 8, 21
NAOU-00000158	FBFA-36	REG	8/29/19	1210	GRWATER	46.0-56.0	1, 2, 5, 7, 9, 21
NAOU-00000159	FBFA-38	FD	8/28/19	0940	SOIL	28.0-30.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000160	FBFA-38	REG	7/24/19	805	SOIL	0.0-1.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000161	FBFA-38	REG	7/24/19	820	SOIL	1.0-4.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000162	FBFA-38	REG	8/28/19	0850	SOIL	8.0-10.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000163	FBFA-38	REG	8/28/19	0910	SOIL	18.0-20.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000164	FBFA-38	REG	8/28/19	0940	SOIL	28.0-30.0	1, 2, 3, 4, 5, 7, 8
NAOU-00000165	FBFA-38	REG	8/29/19	0940	GRWATER	46.0-56.0	1, 2, 4, 5, 7, 8, 9
NAOU-00000166	FBFA-37	REG	7/22/19	0810	SOIL	0-1	1, 2, 3, 4, 5, 7, 8
NAOU-00000167	FBFA-37	REG	8/26/19	0810	SOIL	1-4	1, 2, 3, 4, 5, 7, 8
NAOU-00000168	FBFA-37	REG	8/26/19	1010	SOIL	8-10	1, 2, 3, 4, 5, 7, 8, 21
NAOU-00000169	FBFA-37	REG	8/26/19	1030	SOIL	18-20	1, 2, 3, 4, 5, 7, 8, 21
NAOU-00000170	FBFA-37	REG	8/26/19	1050	SOIL	28-30	1, 2, 3, 4, 5, 7, 8, 21
NAOU-00000171	FBFA-37	REG	8/26/19	1100	GRWATER	46-56	1, 2, 3, 4, 5, 7, 8, 9 21
NAOU-00000172	CBR_3D	REG	6/12/19	1403	GRWATER	45-65	1, 2
NAOU-00000173	CBR_3D	SPL	6/12/19	1403	GRWATER	45-65	1, 2
NAOU-00000174	ECNI-28	REG	6/20/19	0810	SOIL	0-1	1, 2
NAOU-00000175	ECNI-28	REG	6/20/19	0815	SOIL	1-4	1, 2
NAOU-00000176	ECNI-28	REG	8/5/19	1245	SOIL	8-10	1, 2
NAOU-00000177	ECNI-28	REG	8/5/19	1330	SOIL	10-12	1, 2
NAOU-00000178	ECNI-28	REG	8/5/19	1420	SOIL	18-20	1, 2
NAOU-00000179	ECNI-29	REG	6/20/19	0835	SOIL	0-1	1, 2
NAOU-00000180	ECNI-29	REG	6/20/19	0840	SOIL	1-4	1, 2
NAOU-00000181	ECNI-29	REG	8/5/19	1105	SOIL	8-10	1, 2
NAOU-00000182	ECNI-29	REG	8/5/19	1115	SOIL	10-12	1, 2
NAOU-00000183	ECNI-29	REG	8/5//19	1130	SOIL	18-20	1, 2
NAOU-00000184	ECNI-29	SPL	6/20/19	0840	SOIL	1-4	1, 2
NAOU-00000185	ECNI-30	FD	6/20/19	0920	SOIL	1-4	1, 2
NAOU-00000186	ECNI-30	REG	6/20/19	0915	SOIL	0-1	1, 2
NAOU-00000187	ECNI-30	REG	6/20/19	0920	SOIL	1-4	1, 2
NAOU-00000188	ECNI-30	REG	8/5/19	0930	SOIL	8-10	1, 2
NAOU-00000189	ECNI-30	REG	8/5/19	0945	SOIL	10-12	1, 2
NAOU-00000190	ECNI-30	REG	8/5/19	1000	SOIL	18-20	1, 2
NAOU-00000191	ECNI-31	REG	8/7/19	0820	SOIL	8-10	1, 2, 22
NAOU-00000192	ECNI-31	REG	6/20/19	0940	SOIL	0-1	1, 2
NAOU-00000193	ECNI-31	REG	6/20/19	0945	SOIL	1-4	1, 2
NAOU-00000194	ECNI-31	REG	8/7/19	0825	SOIL	10-12	1, 2
NAOU-00000195	ECNI-31	REG	8/7/19	0835	SOIL	18-20	1, 2
NAOU-00000196	ECNI-32	FD	8/7/19	0910	SOIL	8-10	1, 2, 22
NAOU-00000197	ECNI-32	REG	8/7/19	0910	SOIL	8-10	1, 2, 22
NAOU-00000198	ECNI-32	REG	6/20/19	1050	SOIL	0-1	1, 2
NAOU-00000199	ECNI-32	REG	6/20/19	1055	SOIL	1-4	1, 2
NAOU-00000200	ECNI-32	REG	8/7/19	0915	SOIL	10-12	1, 2
NAOU-00000201	ECNI-32	REG	8/7/19	0925	SOIL	18-20	1, 2
NAOU-00000202	ECNI-33	REG	6/20/19	1130	SOIL	0-1	1, 2
NAOU-00000203	ECNI-33	REG	6/20/19	1140	SOIL	1-4	1, 2

Table J.1-1. Sample Identification (ID) Summary *(Continued)*

Sample ID	Station ID	Sample Type	Sample Date	Sample Time	Matrix	Interval *(ft)*	Analysis Requested
NAOU-00000204	ECNI-33	REG	8/6/19	0840	SOIL	8-10	1, 2
NAOU-00000205	ECNI-33	REG	-	-	SOIL	10-12	Unused COC
NAOU-00000206	ECNI-33	REG	8/6/19	1000	SOIL	18-20	1, 2
NAOU-00000207	ECNI-33	SPL	-	-	SOIL	10-12	Unused COC
NAOU-00000208	ECNI-34	REG	6/20/19	1205	SOIL	0-1	1, 2
NAOU-00000209	ECNI-34	REG	6/20/19	1210	SOIL	1-4	1, 2
NAOU-00000210	ECNI-34	REG	8/6/19	1030	SOIL	8-10	1, 2
NAOU-00000211	ECNI-34	REG	8/6/19	1035	SOIL	10-12	1, 2
NAOU-00000212	ECNI-34	REG	8/6/19	1105	SOIL	18-20	1, 2
NAOU-00000213	ECNI-35	FD	8/6/19	1250	SOIL	18-20	1, 2
NAOU-00000214	ECNI-35	REG	6/20/19	1235	SOIL	0-1	1, 2
NAOU-00000215	ECNI-35	REG	6/20/19	1240	SOIL	1-4	1, 2
NAOU-00000216	ECNI-35	REG	6/20/19	1230	SOIL	8-10	1, 2
NAOU-00000217	ECNI-35	REG	8/6/19	1235	SOIL	10-12	1, 2
NAOU-00000218	ECNI-35	REG	8/6/19	1250	SOIL	18-20	1, 2
NAOU-00000219	ECNI-35	REG	8/14/19	1320	GRWATER	45-55	1, 2
NAOU-00000220	ECNI-36	REG	8/7/19	1340	SOIL	8-10	1, 2, 22
NAOU-00000221	ECNI-36	REG	6/20/19	1330	SOIL	0-1	1, 2
NAOU-00000222	ECNI-36	REG	6/20/19	1335	SOIL	1-4	1, 2
NAOU-00000223	ECNI-36	REG	8/7/19	1350	SOIL	10-12	1, 2
NAOU-00000224	ECNI-36	REG	8/7/19	1400	SOIL	18-20	1, 2
NAOU-00000225	ECNI-36	SPL	8/7/19	1340	SOIL	8-10	1, 2
NAOU-00000226	ECNI-37	REG	8/7/19	1120	SOIL	8-10	1, 2, 22
NAOU-00000227	ECNI-37	REG	6/27/19	0820	SOIL	0-1	1, 2
NAOU-00000228	ECNI-37	REG	6/27/19	0835	SOIL	1-4	1, 2
NAOU-00000229	ECNI-37	REG	8/7/19	1130	SOIL	10-12	1, 2
NAOU-00000230	ECNI-37	REG	8/7/19	1300	SOIL	18-20	1, 2
NAOU-00000231	ECNI-38	REG	8/8/19	0930	SOIL	8-10	1, 2, 22
NAOU-00000232	ECNI-38	REG	6/27/19	0910	SOIL	0-1	1, 2
NAOU-00000233	ECNI-38	REG	6/27/19	0915	SOIL	1-4	1, 2
NAOU-00000234	ECNI-38	REG	8/8/19	0935	SOIL	10-12	1, 2
NAOU-00000235	ECNI-38	REG	8/8/19	0950	SOIL	18-20	1, 2
NAOU-00000236	ECNI-39	REG	8/8/19	0830	SOIL	8-10	1, 2, 22
NAOU-00000237	ECNI-39	REG	6/27/19	0845	SOIL	0-1	1, 2
NAOU-00000238	ECNI-39	REG	6/27/19	0855	SOIL	1-4	1, 2
NAOU-00000239	ECNI-38	REG	8/8/19	0835	SOIL	10-12	1, 2
NAOU-00000240	ECNI-39	REG	8/8/19	0850	SOIL	18-20	1, 2
NAOU-00000241	ECNI-39	REG	8/14/19	1120	GRWATER	45-55	1, 2
NAOU-00000242	ECNI-40	REG	6/27/19	0950	SOIL	0-1	1, 2
NAOU-00000243	ECNI-40	REG	6/27/19	0955	SOIL	1-4	1, 2
NAOU-00000244	ECNI-40	REG	8/8/19	1100	SOIL	8-10	1, 2
NAOU-00000245	ECNI-40	REG	8/8/19	1105	SOIL	10-12	1, 2
NAOU-00000246	ECNI-40	REG	8/8/19	1130	SOIL	18-20	1, 2
NAOU-00000247	ECNI-40	SPL	8/8/19	1130	SOIL	18-20	1, 2
NAOU-00000248	ECNI-41	FD	6/27/19	1030	SOIL	0-1	1, 2
NAOU-00000249	ECNI-41	REG	6/27/19	1030	SOIL	0-1	1, 2
NAOU-00000250	ECNI-41	REG	6/27/19	1035	SOIL	1-4	1, 2
NAOU-00000251	ECNI-41	REG	8/8/19	1240	SOIL	8-10	1, 2
NAOU-00000252	ECNI-41	REG	8/8/19	1245	SOIL	10-12	1, 2
NAOU-00000253	ECNI-41	REG	8/8/19	1300	SOIL	18-20	1, 2
NAOU-00000254	ECNI-41	REG	8/15/19	1015	GRWATER	47-50	1, 2
NAOU-00000255	RINSATE	RB	6/24/19	1425	WATER	-	1, 2, 4, 5, 6, 7, 8
NAOU-00000256	RINSATE	RB	6/27/19	1120	WATER	-	1, 2, 4, 5, 6, 7, 8
NAOU-00000257	RINSATE	RB	8/15/19	1300	WATER	-	1, 2
NAOU-00000258	RINSATE	RB	7/15/19	1120	WATER	-	1, 2, 4, 5, 6, 7, 8
NAOU-00000259	RINSATE	RB	8/28/19	1310	WATER	-	1, 2, 4, 5, 6, 7, 8

Table J.1-1. Sample Identification (ID) Summary *(Continued)*

Sample ID	Station ID	Sample Type	Sample Date	Sample Time	Matrix	Interval *(ft)*	Analysis Requested
NAOU-00000260	RINSATE	RB	9/04/19	1240	WATER	-	1, 2, 4, 5, 6, 7, 8
NAOU-00000261	FIELD BLANK	FB	6/25/19	1330	WATER	-	1, 2, 3, 4, 7, 8
NAOU-00000262	FIELD BLANK	FB	7/15/19	1200	WATER	-	1, 2, 3, 4, 7, 8
NAOU-00000263	FIELD BLANK	FB	8/15/19	0945	WATER	-	1, 2
NAOU-00000264	FIELD BLANK	FB	8/28/19	1100	WATER	-	1, 2, 3, 4, 7, 8
NAOU-00000265	FIELD BLANK	FB	9/04/19	1400	WATER	-	1, 2, 3, 4, 7, 8
NAOU-00000267	TRIP BLANK	TB	7/09/19	0800	WATER	-	3
NAOU-00000268	TRIP BLANK	TB	7/10/19	0800	WATER	-	3
NAOU-00000270	TRIP BLANK	TB	6/12/19	0859	WATER	-	3
NAOU-00000271	TRIP BLANK	TB	6/19/19	1042	WATER	-	3
NAOU-00000272	TRIP BLANK	TB	6/24/19	0800	WATER	-	3
NAOU-00000273	TRIP BLANK	TB	6/25/19	0800	WATER	-	3
NAOU-00000274	TRIP BLANK	TB	6/26/19	0700	WATER	-	3
NAOU-00000275	TRIP BLANK	TB	7/01/19	0800	WATER	-	3
NAOU-00000276	TRIP BLANK	TB	7/11/19	0800	WATER	-	3
NAOU-00000277	TRIP BLANK	TB	7/15/19	0800	WATER	-	3
NAOU-00000278	TRIP BLANK	TB	7/16/19	0800	WATER	-	3
NAOU-00000279	TRIP BLANK	TB	7/17/19	0800	WATER	-	3
NAOU-00000280	TRIP BLANK	TB	7/18/19	0800	WATER	-	3
NAOU-00000281	TRIP BLANK	TB	7/22/19	0800	WATER	-	3
NAOU-00000282	TRIP BLANK	TB	7/23/19	0800	WATER	-	3
NAOU-00000283	TRIP BLANK	TB	7/24/19	0800	WATER	-	3
NAOU-00000284	TRIP BLANK	TB	8/19/19	0800	WATER	-	3
NAOU-00000285	TRIP BLANK	TB	8/21/19	0800	WATER	-	3
NAOU-00000286	TRIP BLANK	TB	8/22/19	0800	WATER	-	3
NAOU-00000287	TRIP BLANK	TB	8/26/19	0800	WATER	-	3
NAOU-00000288	TRIP BLANK	TB	8/27/19	0800	WATER	-	3
NAOU-00000289	TRIP BLANK	TB	8/28/19	0800	WATER	-	3
NAOU-00000290	TRIP BLANK	TB	8/29/19	0800	WATER	-	3
NAOU-00000291	TRIP BLANK	TB	9/03/19	0900	WATER	-	3
NAOU-00000292	TRIP BLANK	TB	9/04/19	0800	WATER	-	3
NAOU-00000293	TRIP BLANK	TB	9/05/19	0830	WATER	-	3

Analyses Requested:

1. ICP Metals
2. Mercury, Total Recoverable
3. Volatile Organics
4. Semi-Volatiles
5. Polychlorinated Biphenyl's (PCBs)
6. Pesticides
7. Gross Alpha
8. Non-Volatile Beta
9. Tritium
10. Alpha Spectroscopy
11. Gamma Spectroscopy
12. Carbon-14
13. Iodine-129
14. Nickel-59
15. Nickel-63
16. Strontium-90
17. Technetium-99
18. Radium-226
19. Radium-228
20. Promethium-147
21. Total Petroleum Hydrocarbons
22. Hexavalent Chromium

A total of 31,070 analytical records were produced consisting of 28,479 regular records and 2,591 Quality Control (QC) records. See Table 2.

Table J.1-2. Total Number of Records

Number of Records	Chemical	Radiochemical	Totals
Analytical	27,760	719	28,479
Field QC	2,573	18	2,591
Totals	30,333	737	31,070

The verification process was conducted to review completeness of the sampling and analytical requirements. Validation has been performed to assess compliance with methods, procedures, and contracts, and to assess a comparison with measurement performance criteria in the ER-SOP-033, Analytical Data Qualification (SRNS 2015). A usability assessment will provide the data user with an assessment of whether the process execution and resulting data meet project quality objectives in the Quality Assurance Project Plan (SRNS 2012) and the *Sampling and Analysis Plan for Pre-Work Plan Characterization of the ECODS-N-1 (NBN), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (Ford Building) Operable Unit (U)* (SRNS 2019). These processes involve examination of electronic data files, the field data, analytical data, and laboratory records. Computer programs are used to verify that samples were properly preserved and were analyzed within the required holding time, that QC results were within specified acceptable ranges, and that the appropriate detection limits were employed by the laboratories. Additionally, manual reviews of field data and laboratory records are conducted to ensure the quality of these items. Validation summaries for holding time, preservation, calibration, analyte identification, and analyte quantitation can be found in Subsections 3.1, Holding Times; 3.2, Preservation; and 3.3, Calibration, Identification, and Quantitation.

The data were validated to determine if the records conform to the technical criteria associated with definitive data per ER-SOP-033 (SRNS 2015). Table 3 provides a brief validation summary for the project. Review qualifiers are assigned by a data validator internal to Savannah River Nuclear Solutions and external to the analytical laboratory. Environmental records include regular sample, split and field duplicate records.

Table J.1-3. Environmental Record Review Qualifier Summary

	Detects		Non-detects		Rejected	
Method Code	**# NULL Qualifiers**	**# J Qualifiers**	**# U Qualifiers**	**# UJ Qualifiers**	**# R Qualifiers**	**Total**
A-01-RMOD	9	3	14	0	0	26
EERFC-01	0	0	2	0	0	2
GA-01-RMOD	11	1	10	0	0	22
SR-03-RCMOD	0	0	2	0	0	2
STL-RC-0055	0	0	5	0	1	6
TC-02-RCMOD	0	0	2	0	0	2
EPA903.0MOD	1	1	0	0	0	2
EPA904.0MOD	0	2	0	0	0	2
EPA6010D	2,903	978	1,323	10	0	5,214
EPA6020A	142	48	52	0	0	242
EPA7196A	4	3	0	0	0	7
EPA7470A	0	1	11	0	0	12
EPA7471B	110	82	37	6	1	236
EPA8015D	0	4	1	4	0	9
EPA8081B	15	32	1,297	0	0	1,344
EPA8082A	43	40	1,037	0	0	1,120
EPA8260B	59	127	8,158	110	0	8,454
EPA8270D	158	296	7,496	2,863	309	11,222
EPA9310	4	9	1	0	0	14
RADA-001	290	26	6	0	0	322
RADA-002	2	0	7	0	0	9
RADA-011	10	14	126	0	0	150

Table J.1.3. Environmental Record Review Qualifier Summary *(Continued/End)*

	Detects		Non-detects		Rejected	
Method Code	**# NULL Qualifiers**	**# J Qualifiers**	**# U Qualifiers**	**# UJ Qualifiers**	**# R Qualifiers**	**Total**
RADA-013	56	19	24	0	1	100
RADA-032	0	0	15	0	0	15
RADA-038	12	24	9	0	0	45
Total	**3,829**	**1,710**	**19,635**	**2,993**	**312**	**28,479**
% of Total	**13.4**	**6.0**	**68.9**	**10.5**	**1.1**	**100%**

J.1.2 Assessment of Precision, Accuracy, Representativeness, Comparability, and Completeness Data Quality Indicators and Measurement Perfomance Criteria

This section discusses the analytical data in terms of the following indicators of data quality: precision, accuracy, representativeness, comparability, and completeness. Precision is determined from the field and laboratory duplicate analyses and indicates the consistency of field and laboratory techniques. Accuracy is determined from the laboratory control samples (LCS), matrix spikes (MS) and the results of the results of the method blanks (MBs), field, trip and rinsate blanks (RBs); it indicates the ability of the laboratory to generate correct results. Representativeness measures how well the data represents the sample population. Comparability expresses the confidence with which data from different laboratories are considered to be equivalent. Representative completeness measures the amount of data resulting from the data collection activity.

J.1.2.1 Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Field duplicates measure the repeatability of the sampling and analytical techniques, and laboratory duplicates measure the ability of the laboratory to reproduce a result. Low precision can be caused by poor instrument performance, poor operator technique, inconsistent application of method protocols, laboratory environment, time between analyses, or by a difficult, heterogeneous sample matrix. Precision is especially important when the action limit approaches the quantification limit. A total of 5.3 % of the samples were collected in duplicate for this project in accordance with the Sample Analysis Plan. The laboratory performs duplicate analyses on at least 5% of the samples received.

Precision is expressed in terms of the relative percent differences (RPD) as follows:

$$RPD = \frac{|x - y|}{\left(\frac{x + y}{2}\right)} \times 100$$

where x is the original sample result and y is the duplicate sample result. When one result of a duplicate pair is below the Minimum Detectable Limit (MDL), the sample specific estimated quantification limit (ssEQL) is used for that result in the calculation. When both results are below the MDL, the RPD is not calculated.

The RPD should be less than 20% for water samples and less than 35% for solid samples when results are greater than the ssEQL. In the case where results are between the ssEQL and the MDL, the RPD should be less than 100% for water samples and less than 200% for soil samples. In the event analytical precision goals are not met, a determination of the usability of that information is made through the environmental data assessment process.

No records were rejected due to precision issues. Details for this project can be found in subsections 3.6, Laboratory Duplicate RPD; and 3.7, Field Duplicate RPD.

J.1.2.2 Accuracy

Accuracy is defined as the closeness of agreement between an observed value and an accepted reference value. Accuracy is especially important when the concentration of concern approaches the detection limit and/or the action limit. When the concentration is underestimated near the detection limit, the analyte may be present but reported as not detected. When the concentration is underestimated near the action limit, the analyte may be at a concentration that would require remediation, but the remediation would not be performed. When the concentration is overestimated near the detection limit, the analyte may not be present but reported as detected. When the concentration is overestimated near the action limit, the analyte may not be at a concentration that would require remediation, but the remediation would be performed. The sample types used to evaluate accuracy are performance evaluation studies LCSs, surrogate spikes, MSs, MBs, trip blanks (TBs), and RBs.

LCSs monitor the performance of all steps in the analytical process, including sample preparation, and are used to identify problems with the analytical procedure. LCSs are deionized water that is spiked with the target analyte, digested, and analyzed with the regular samples. The LCS spiking solution is obtained from a third-party supplier, or is prepared in the laboratory using chemicals from a different source than the calibration standards.

The LCS percent recovery is calculated as follows:

$$\% \text{ Recovery} = \frac{\text{Blank spike concentration}}{\text{Spike concentration}} \times 100$$

One hundred percent recovery is equivalent to 100% accuracy. Values less than 100% or greater than 100% may indicate a sample matrix effect and a false reading. A periodic program of sample spiking is required (e.g., one MS and one MS duplicate per 20 samples). If analytical accuracy goals are not met, a determination is made through the environmental data assessment process relative to the usability of that information.

No environmental records were rejected because the matrix spike was outside of limits. Details for this project can be found in Subsections 3.4, Trip Blanks; 3.5, Method Blanks; 3.8, Matrix Spike Recovery; 3.9, LCS Recovery; and 3.10, Surrogate/Tracer Recovery.

J.1.2.3 Representativeness

The representativeness of samples collected is controlled by adhering to the detailed descriptions of sampling procedures. Representativeness expresses the relative degree to which the data depict

the characteristics of a population, parameter, sampling point, process condition, or environmental condition. The objective of this study is to accurately represent the concentrations of target analytes or compounds. Representative samples for this investigation will be required by implementing approved sampling and analytical procedures that will generate data representative of the sampling point location and will be maintained. Analytical methods are selected that will most accurately represent the true concentration of the parameter of interest. The accumulation of QC procedures and information (i.e., RPD values, blank QC concentrations, MS percent recoveries, etc.) employed for a given analysis combine to exhibit the representativeness of the data generated.

The goal for representative sample data will therefore be met by properly documenting field and analytical protocols. In the event these procedures and methods are not able to be implemented, the appropriate corrective action documentation should encompass the impact on the representativeness of the information. When review of the data and documentation determines the data to be non-representative, the information is qualified in its use or is not used by the project.

All samples were collected and analyzed per established procedures.

J.1.2.4 Comparability

Comparability is the degree to which different methods, data sets, and decisions agree or can be represented as similar. The comparability of the data from the laboratories is based on the results of the split samples and on confirmation that the laboratories used the same standardized procedures for sample analysis, the same reporting unit, and obtained similar quantitation limits. Comparability of the data produced for this investigation may be obtained by implementing the identified protocols for sampling and analysis of samples. Implementation of traceable reference materials such as laboratory standards, expression of results in standard concentration units, and successful participation by the laboratories in external performance evaluation programs will enable the information produced through this investigation to be compared with future data sets, if required. For this project, 3 split samples were collected and sent to the designated QC laboratory.

J.1.2.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct, normal circumstances. The Quality Assurance completeness objective for RCRA Facility Investigation/Remedial Investigation (RFI/RI) projects is to obtain valid field and laboratory analytical results for at least 90% of the samples collected during the project. This implies that completeness of sample collection (i.e., the number of samples collected compared to the number of samples planned) must be virtually 100% to allow for some loss of data during the laboratory analytical process. Accountability of samples collected, from field to final disposal, must be 100%.

Completeness is a measure of the amount of data obtained from a measurement process that achieves the project goals as compared to the amount of data planned to be obtained by the project. Completeness is affected by unexpected conditions during the data collection process that reduce the usable data achieved relative to the data planned.

When review of the data and documentation determines the data to be incomplete, the impact relative to the project objective will be assessed and documented.

The following are measures of completeness:

Sample Collection:

$$\text{Completeness} = \frac{\text{Number of Sample Points Sampled}}{\text{Number of Sample Points Planned}} \times 100$$

Field Measurement:

$$\text{Completeness} = \frac{\text{Number of Valid Measurements Made}}{\text{Number of Measurements Planned}} \times 100$$

Laboratory Analysis:

$$\text{Completeness} = \frac{\text{Number of Valid Data Points}}{\text{Number of Data Points Planned}} \times 100$$

The completeness numbers for this project are listed below:

Sample Collection Completeness	98%
Field Measurement Completeness	100%
Laboratory Analysis Completeness	100%

J.1.3 Validation Findings

J.1.3.1 Holding Times

J.1.3.1.1 EPA7471B, Mercury

Four mercury records were qualified as approximate because the sample was held beyond normal holding time prior to analysis, UJ/Q.

Thirty mercury records were qualified as estimated because the sample was held beyond normal holding time prior to analysis, J/Q.

One mercury record was rejected because the sample was held beyond normal holding time prior to analysis, R/Q.

J.1.3.1.2 EPA8015D, Total Petroleum Hydrocarbons (TPH)

Four TPH records were qualified as approximate because the sample was held beyond normal holding time prior to analysis, UJ/Q.

Five TPH records were qualified as estimated because the sample was held beyond normal holding time prior to analysis, J/Q.

J.1.3.1.3 EPA8260B, Volatile Organics

Ninety-eight volatile organic records were qualified as approximate because the sample was held beyond normal holding time prior to analysis, UJ/Q.

Six volatile organic records were qualified as estimated because the sample was held beyond normal holding time prior to analysis, J/Q.

J.1.3.1.4 EPA8270D, Semi-Volatiles

Twelve hundred seventeen semi-volatile records were qualified as approximate because the sample was held beyond normal holding time prior to analysis, UJ/Q.

Twenty-seven semi-volatile records were qualified as estimated because the sample was held beyond normal holding time prior to analysis, J/Q.

Table J.1-4. Holding Time Review Qualifier Summary

Method Code	Total # of Records	# of Records Qualified for Holding Time	Associated Samples Qualified
A-01-RMOD	26	0	
EERFC-01	2	0	
GA-01-RMOD	22	0	
SR-03-RCMOD	2	0	
STL-RC-0055	6	0	
TC-02-RCMOD	2	0	
EPA903.0MOD	2	0	
EPA904.0MOD	2	0	
EPA6010D	5,214	0	
EPA6020A	242	0	
EPA7196A	7	0	
EPA7470A	12	0	
EPA7471B	236	35	NAOU-00000096, NAOU-00000191, NAOU-00000194, NAOU-00000195, NAOU-00000196, NAOU-00000197, NAOU-00000200, NAOU-000002001, NAOU-00000204, NAOU-00000206, NAOU-00000210, NAOU-00000211, NAOU-00000212, NAOU-00000213, NAOU-00000216, NAOU-00000217, NAOU-00000218, NAOU-00000220, NAOU-00000223, NAOU-00000224, NAOU-00000226, NAOU-00000229, NAOU-00000230, NAOU-00000231, NAOU-00000234, NAOU-00000235, NAOU-00000236, NAOU-00000239, NAOU-00000240, NAOU-00000244, NAOU-00000245, NAOU-00000246, NAOU-00000251, NAOU-00000252, NAOU-00000253
EPA8015D	9	9	NAOU-00000152, NAOU-00000155, NAOU-00000156, NAOU-00000157, NAOU-00000158, NAOU-00000168, NAOU-00000169, NAOU-00000170, NAOU-00000171
EPA8081B	1,344	0	
EPA8082A	1,120	0	
EPA8260B	8,454	104	NAOU-00000169, NAOU-00000170
EPA8270D	11,122	1234	NAOU-00000032, NAOU-00000045, NAOU-00000060, NAOU-00000068, NAOU-00000069, NAOU-00000130, NAOU-00000131, NAOU-00000135, NAOU-00000136, NAOU-00000152, NAOU-00000155, NAOU-00000156, NAOU-00000157, NAOU-00000158, NAOU-00000165, NAOU-00000167, NAOU-00000168, NAOU-000001169, NAOU-00000170
EPA9310	14	0	
RADA-001	322	0	
RADA-002	9	0	
RADA-011	150	0	
RADA-013	100	0	
RADA-032	15	0	
RADA-038	45	0	

J.1.3.2 Preservation

All chemical and physical preservation for the reported analyses were properly applied. No qualification was required.

Table J.1-5. Preservation Review Qualifier Summary

Method Code	Total # of Records	# of Records Qualified for Preservation	Associated Samples Qualified
A-01-RMOD	26	0	
EERFC-01	2	0	
GA-01-RMOD	22	0	
SR-03-RCMOD	2	0	
STL-RC-0055	6	0	
TC-02-RCMOD	2	0	
EPA903.0MOD	2	0	
EPA904.0MOD	2	0	
EPA6010D	5,214	0	
EPA6020A	242	0	
EPA7196A	7	0	
EPA7470A	12	0	
EPA7471B	236	0	
EPA8015D	9	0	
EPA8081B	1,344	0	
EPA8082A	1,120	0	
EPA8260B	8,454	0	
EPA8270D	11,122	0	
EPA9310	14	0	
RADA-001	322	0	
RADA-002	9	0	
RADA-011	150	0	
RADA-013	100	0	
RADA-032	15	0	
RADA-038	45	0	

J.1.3.3 Calibration, Identification, and Quantitation

J.1.3.3.1 RADA-013, Gamma Spectroscopy

One cesium-137 record was rejected due to compound identification criteria was not met, R/1.

Table J.1-6. Calibration, Identification, and Quantitation Review Summary

Method Code	Total # of Records	# of Records Qualified for CAL, ID, and Quantitation	Associated Samples Qualified
A-01-RMOD	26	0	
EERFC-01	2	0	
GA-01-RMOD	22	0	
SR-03-RCMOD	2	0	
STL-RC-0055	6	0	
TC-02-RCMOD	2	0	
EPA903.0MOD	2	0	
EPA904.0MOD	2	0	
EPA6010D	5,214	0	
EPA6020A	242	0	
EPA7196A	7	0	
EPA7470A	12	0	
EPA7471B	236	0	
EPA8015D	9	0	
EPA8081B	1,344	0	
EPA8082A	1,120	0	
EPA8260B	8,454	0	
EPA8270D	11,122	0	
EPA9310	14	0	
RADA-001	322	0	
RADA-002	9	0	
RADA-011	150	0	
RADA-013	100	1	NAOU-00000118
RADA-032	15	0	
RADA-038	45	0	

J.1.3.4 Trip Blanks and Rinsate Blanks

J.1.3.4.1 EPA8260B, Volatile Organics

Thirteen acetone records were qualified as detects due to the analyte being detected in the TB, 8.

One acetone was qualified as estimated due to the analyte being detected in the TB, UJ/14.

Eleven dichloromethanes records were qualified as estimated due to the analyte being detected in the TB, J/8.

One dichloromethane record was qualified as detected due to the analyte being detected in the TB, 8.

One dichloromethane record was qualified as non-detected due to the analyte being detected in the TB, U/8.

Twelve methyl ethyl ketone records were qualified as detected due to the analyte being detected in the TB, 8.

Table J.1-7A. Trip Blank Review Qualifier Summary

Method Code	Total # of TB Records	# of TB Records Qualified	Associated Samples Qualified
EPA8260B	1352	39	NAOU-00000268, NAOU-00000272, NAOU-00000273, NAOU-00000274, NAOU-00000275, NAOU-00000276, NAOU-00000277, NAOU-00000278, NAOU-00000279, NAOU-00000280, NAOU-00000281, NAOU-00000282, NAOU-00000283

One zinc record was qualified as estimated due to the analyte was detected in the RB, J/7.

Table J.1-7B. Rinsate Blank Review Qualifier Summary

Method Code	Total # of RB Records	# of RB Records Qualified	Associated Samples Qualified
EPA6010D	132	1	NAOU-00000257
EPA7470A	6	0	
EPA8081B	105	0	
EPA8082A	35	0	
EPA8270D	402	0	
RADA-001	10	0	

J.1.3.4.2 EPA6010D, ICP-ES Metals

One zinc record was qualified as estimated due to the analyte was detected in the field blank (FB), J/6.

J.1.3.4.3 EPA8260D, Volatile Organics

One acetone record was detected as estimated due to the analyte was detected in the FB, J/6.

Three acetone records were qualified as detected due to the analyte was detected in the FB, 6.

Four dichloromethane records were detected as estimated due to the analyte was detected in the FB, J/6.

One methyl ethyl ketone record was detected as estimated due to the analyte was detected in the FB, J/6.

Three methyl ethyl ketone records were qualified as detected due to the analyte was detected in the FB, 6.

Table J.1-7C. Field Blank Review Qualifier Summary

Method Code	Total # of RB Records	# of RB Records Qualified	Associated Samples Qualified
EPA6010D			
EPA7196A	13	0	
EPA8081B			
EPA8082A			
EPA8260D			
EPA8270E			
RADA-001	8	0	

J.1.3.5 Method Blanks

J.1.3.5.1 EPA6010D, ICP-ES Metals

Three antimony records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

Four antimony records were qualified as estimated due to the detection of the analyte in the MB, J/V.

Eighteen arsenic records were qualified as estimated due to the detection of the analyte in the MB, J/V.

Eight barium records were qualified as estimated due to the detection of the analyte in the MB, J/V.

One lead record was qualified as non-detect due to the detection of the analyte in the MB, U/V.

Nine lead records were qualified as estimated due to the detection of the analyte in the MB, J/V.

Seven manganese records qualified as estimated due to the detection of the analyte in the MB, J/V.

Thirteen potassium records were qualified as estimated due to the detection of the analyte in the MB, J/V.

Thirty-eight selenium records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

Twenty-nine selenium records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

Six sodium records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

Eighteen sodium records were qualified as estimated due to the detection of the analyte in the MB, J/V.

Twelve zinc records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

Ninety-six zinc records were qualified as estimated due to the detection of the analyte in the MB, J/V.

J.1.3.5.2 EPA7471B, Mercury

Two mercury records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

Ten mercury records were qualified as estimated due to the detection of the analyte in the MB, J/V.

J.1.3.5.3 EPA8260B, Volatile Organics

Seventeen acetone records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

Eight acetone records were qualified as estimated due to the detection of the analyte in the MB, J/V.

Seven acetones were qualified as approximate due to the detection of the analyte in the MB, UJ/V.

J.1.3.5.4 EPA8015D, Total Petroleum Hydrocarbons

One total petroleum hydrocarbon record was qualified as non-detect due to the detection of the analyte in the MB, U/V.

Three total petroleum hydrocarbon records were qualified as estimated due to the detection of the analyte in the MB, UJ/V.

J.1.3.5.5 EPA9310, Non-Volatile Beta

One non-volatile beta record was qualified as non-detect due to the detection of the analyte in the MB, U/V.

Two non-volatile beta records were qualified as estimated due to the detection of the analyte in the MB, J/V.

J.1.3.5.6 RADA-001, Non-Volatile Beta

Eight non-volatile beta records qualified as estimated due to the detection of the analyte in the MB, J/V.

J.1.3.5.7 RADA-011, Uranium Series

Two uranium-233/234 records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

One uranium-235 record was qualified as non-detect due to the detection of the analyte in the MB, U/V.

Two uranium-238 records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

J.1.3.5.8 RADA-038, Alpha Spectroscopy, Thorium Series

Six thorium-230 records were qualified as non-detect due to the detection of the analyte in the MB, U/V.

Table J.1-8. Method Blank Review Qualifier Summary

Method Code	Total # of MB Records	# of MB Records Qualified	Associated Samples Qualified
A-01-RMOD	38	0	
EERFC-01	2	0	
EPA903.0MOD	4	0	
EPA904.0MOD	6	0	
EPA6010D	660	262	NAOU-00000001, NAOU-00000002, NAOU-00000005, NAOU-00000006, NAOU-00000007, NAOU-00000009, NAOU-00000010, NAOU-00000011, NAOU-00000012, NAOU-00000015, NAOU-00000021, NAOU-00000022, NAOU-00000023, NAOU-00000024, NAOU-00000025, NAOU-00000026, NAOU-00000027, NAOU-00000028, NAOU-00000029, NAOU-00000030, NAOU-00000032, NAOU-00000033, NAOU-00000034, NAOU-00000035, NAOU-00000036, NAOU-00000037, NAOU-00000038, NAOU-00000039, NAOU-00000040, NAOU-00000041, NAOU-00000042, NAOU-00000044, NAOU-00000045, NAOU-00000046, NAOU-00000047, NAOU-00000049, NAOU-00000050, NAOU-00000051, NAOU-00000053, NAOU-00000055, NAOU-00000057, NAOU-00000058, NAOU-00000059, NAOU-00000060, NAOU-00000061, NAOU-00000062, NAOU-00000064, NAOU-00000067, NAOU-00000068, NAOU-00000069, NAOU-00000070, NAOU-00000071, NAOU-00000073, NAOU-00000074, NAOU-00000076, NAOU-00000078, NAOU-00000080, NAOU-00000081, NAOU-00000082, NAOU-00000083, NAOU-00000084, NAOU-00000085, NAOU-00000086, NAOU-00000087, NAOU-00000088, NAOU-00000090, NAOU-00000091, NAOU-00000093, NAOU-00000094, NAOU-00000095, NAOU-00000096, NAOU-00000097, NAOU-00000100, NAOU-00000101, NAOU-00000110, NAOU-00000111, NAOU-00000112, NAOU-00000124, NAOU-00000125, NAOU-00000126, NAOU-00000125, NAOU-00000126, NAOU-00000127, NAOU-00000128, NAOU-00000129, NAOU-00000130, NAOU-00000131, NAOU-00000133, NAOU-00000134, NAOU-00000135, NAOU-00000136, NAOU-00000137, NAOU-00000138, NAOU-00000139, NAOU-00000140, NAOU-00000141, NAOU-00000142, NAOU-00000143, NAOU-00000144, NAOU-00000146, NAOU-00000147, NAOU-00000148, NAOU-00000149, NAOU-00000150, NAOU-00000151, NAOU-00000152, NAOU-00000153, NAOU-00000154, NAOU-00000155, NAOU-00000156, NAOU-00000157, NAOU-00000159, NAOU-00000160, NAOU-00000161, NAOU-00000162, NAOU-00000163, NAOU-00000164, NAOU-00000166, NAOU-00000167, NAOU-00000168, NAOU-00000169, NAOU-00000170, NAOU-00000172, NAOU-00000174, NAOU-00000175, NAOU-00000176, NAOU-00000177, NAOU-00000178, NAOU-00000179, NAOU-00000180, NAOU-00000181, NAOU-00000182, NAOU-00000183, NAOU-00000185, NAOU-00000186, NAOU-00000187, NAOU-00000188, NAOU-00000189, NAOU-00000190, NAOU-00000191, NAOU-00000192, NAOU-00000193, NAOU-00000196, NAOU-00000197, NAOU-00000198, NAOU-00000199, NAOU-00000202, NAOU-00000203, NAOU-00000208, NAOU-00000209, NAOU-00000214, NAOU-00000215, NAOU-00000219, NAOU-00000221, NAOU-00000222, NAOU-00000227, NAOU-00000228, NAOU-00000231, NAOU-00000232, NAOU-00000233, NAOU-00000234, NAOU-00000235, NAOU-00000236, NAOU-00000237, NAOU-00000238, NAOU-00000239, NAOU-00000240, NAOU-00000241, NAOU-00000242, NAOU-00000243, NAOU-00000244, NAOU-00000245, NAOU-00000246, NAOU-00000248, NAOU-00000249, NAOU-00000250, NAOU-00000251, NAOU-00000252, NAOU-00000253
EPA6020A	181	1	NAOU-00000114
EPA7196A	2	0	
EPA7470A	11	0	
EPA7471B	28	12	NAOU-00000102, NAOU-00000103, NAOU-00000106, NAOU-00000108, NAOU-00000109, NAOU-00000115, NAOU-00000116, NAOU-00000117, NAOU-00000119, NAOU-00000120, NAOU-00000121, NAOU-00000122
EPA8015D	6	4	NAOU-00000155, NAOU-00000156, NAOU-00000157, NAOU-00000168

Table J.1-8. Method Blank Review Qualifier Summary *(Continued/End)*

Method Code	Total # of MB Records	# of MB Records Qualified	.
EPA8260B	3123	32	NAOU-00000005, NAOU-00000006, NAOU-00000010, NAOU-00000012, NAOU-00000013, NAOU-00000014, NAOU-00000016, NAOU-00000017, NAOU-00000020, NAOU-00000022, NAOU-00000025, NAOU-00000026, NAOU-00000028, NAOU-00000029, NAOU-00000032, NAOU-00000033, NAOU-00000035, NAOU-00000036, NAOU-00000038, NAOU-00000039, NAOU-00000041, NAOU-00000042, NAOU-00000044, NAOU-00000047, NAOU-00000048, NAOU-00000049, NAOU-00000051, NAOU-00000052, NAOU-00000055, NAOU-00000056, NAOU-00000065, NAOU-00000066
EPA8270D	2190	0	
EPA8081B	276	0	
EPA8082A	182	0	
EPA9310	12	3	NAOU-00000008, NAOU-00000031, NAOU-00000145
GA-01-RMOD	24	0	
RADA-001	42	8	NAOU-00000009, NAOU-00000010, NAOU-00000032, NAOU-00000033, NAOU-00000035, NAOU-00000036, NAOU-00000044, NAOU-00000045
RADA-002	2	0	
RADA-011	98	5	NAOU-00000066, NAOU-00000134, NAOU-00000136
RADA-013	10	0	
RADA-032	14	0	
RADA-038	28	6	NAOU-00000080, NAOU-00000097, NAOU-00000101, NAOU-00000107, NAOU-00000115, NAOU-00000118
SR-03-RCMOD	6	0	
STL-RC-0055	10	0	
TC-02-RCMOD	4	0	

J.1.3.6 Laboratory Duplicate RPD

J.1.3.6.1 EPA6010D, ICP-ES Metals

Seven aluminum records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

Two barium records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

Two calcium records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

Three calcium records were qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

Three chromium records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

Nine iron records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

One lead record was qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

Two manganese records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

Three manganese records were qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

One magnesium record was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

Two magnesium records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

Two potassium records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

Two potassium records were qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

Two vanadium records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

One vanadium record was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

One zinc record was qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

J.1.3.6.2 EPA8082B, PCBs

One arochlor-1260 record was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

J.1.3.6.3 EPA8260B, GC-MS Volatile Organics

One acetone record was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

J.1.3.6.4 EPA8270D, GC-MS Semi-Volatiles

One benzo[b]fluoroanthene was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

One bis(2-ethylhexyl)phthalate was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

Two di-n-butyl phthalate records were qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

One fluoranthene was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

One phenanthrene was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

One pyrene was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

Table J.1-9. Laboratory Duplicate Qualifier Summary

Method Code	Total # of Duplicate Records	# of Duplicate Records Qualified	Associated Samples Qualified
A-01-RMOD	28	0	
EERFC-01	1	0	
GA-01-RMOD	24	0	
EPA6010D	1232	43	NAOU-00000005, NAOU-00000007, NAOU-00000009, NAOU-00000068, NAOU-00000012, NAOU-00000013, NAOU-00000051, NAOU-00000070, NAOU-00000072, NAOU-00000110, NAOU-00000124, NAOU-00000137, NAOU-00000191
EPA6020A	176	0	
EPA7196A	2	0	
EPA7470A	7	0	
EPA7471B	26	0	
EPA8081B	140	0	
EPA8082A	34	1	NAOU-00000130
EPA8260B	212	1	NAOU-00000031
EPA8270D	1,541	7	NAOU-00000035, NAOU-00000068, NAOU-00000073, NAOU-00000105
EPA903.0MOD	2	0	
EPA904.0MOD	2	0	
EPA9310	10	0	
RADA-001	28	0	
RADA-002	2	0	
RADA-011	70	0	
RADA-013	10	0	
RADA-032	7	0	
RADA-038	21	0	
SR-03-RMOD	2	0	
STL-RC-0055	6	0	
TC-02-RCMOD	2	0	

J.1.3.7 Field Duplicate RPD

J.1.3.7.1 EPA6010D, ICP-ES Metals

Eight aluminum records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Two arsenic records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Eight barium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Eight calcium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Eight chromium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Four copper records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Four iron records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Two lead records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Twelve manganese records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Six magnesium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Eight nickel records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Eight potassium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Two sodium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Four vanadium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Four zinc records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

J.1.3.7.2 EPA7471B, Mercury

Two mercury records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

J.1.3.7.3 EPA7196A, Hexavalent Chromium

Two hexavalent chromium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

J.1.3.7.4 EPA8015D, Total Petroleum Hydrocarbons

Two total petroleum hydrocarbon records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

J.1.3.7.5 EPA8260B, GC-MS Volatile Organics

One methyl tertiary butyl ether record was qualified as approximate due to the field duplicate RPD recovery was not within control limits, UJ/9.

One methyl tertiary butyl ether record was qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

J.1.3.7.6 EPA8270D, GC-MS Semi-Volatiles

Two bis(2-ethylhexyl) phthalate records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Table J.1-10. Field Duplicate Qualifier Summary

Method Code	Total # of Duplicate Records	# of Field Duplicate Records Qualified	Associated Samples Qualified
EPA6010D	264	88	NAOU-00000012, NAOU-00000013, NAOU-00000047, NAOU-00000048, NAOU-00000061, NAOU-00000064, NAOU-00000115, NAOU-00000116, NAOU-00000152, NAOU-00000156, NAOU-00000185, NAOU-00000186, NAOU-00000248, NAOU-00000249
EPA7196A	1	2	NAOU-00000196, NAOU-00000197
EPA7470A	1	0	
EPA7471B	11	2	NAOU-00000047, NAOU-00000048
EPA8015D	1	2	NAOU-00000152, NAOU-00000156
EPA8081B	56	0	
EPA8082A	84	0	
EPA8260B	416	2	NAOU-00000152, NAOU-00000156
EPA8270D	536	2	NAOU-00000012, NAOU-00000013
RADA-001	24	0	
RADA-002	1	0	
RADA-011	10	0	
RADA-032	1	0	
RADA-038	3	0	

J.1.3.8 Matrix Spike Recovery

J.1.3.8.1 EPA6010C/D, ICP-ES Metals

Seven antimony records were qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Seven calcium records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One chromium record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Seven manganese records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Six magnesium records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Five potassium records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Two selenium records were qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One selenium record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One sodium record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One thallium record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Two vanadium records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Five zinc records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

J.1.3.8.2 EPA6020A/B, ICP-MS Metals

One antimony record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One barium record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One manganese record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Two vanadium records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One zinc record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

J.1.3.8.3 EPA8260B, Volatile Organics GC/MS

One acrolein record was qualified as non-detect due to the MS/MSD recovery was outside the established control limits, U/11.

One 1,2-dichlorobenzene record was qualified as non-detect due to the MS/MSD recovery was outside the established control limits, U/11.

One 1,3-dichlorobenzene record was qualified as non-detect due to the MS/MSD recovery was outside the established control limits, U/11.

One 1,4-dichlorobenzene record was qualified as non-detect due to the MS/MSD recovery was outside the established control limits, U/11.

One naphthalene record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One vinyl acetate record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One acetone record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

J.1.3.8.4 EPA8270D, Semi-Volatiles, GC/MS

Two 1,1'-biphenyl records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two 1,2,4,5-tetrachlorobenzene records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two 2-chloronaphthalene records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2-chlorophenol record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two 2-chlorophenol records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2-methylnaphthalene record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One 2-methylnaphthalene record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One 2-methylnaphthalene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2-nitroaniline record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One 2-nitrophenol record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two 2-nitrophenol records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two 2,4-dichlorophenol records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two 2,4-dimethylphenol records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2,4-dinitrophenol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2,4,6-trichlorophenol record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One 2,4,6-trichlorophenol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two acenaphthylene records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One acenaphthene record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One acenaphthene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Three acetophenone records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Seven benzaldehyde records were qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two benzaldehyde records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One bis(2-chloroethoxy) methane record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One bis(2-chloroethyl) ether record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One bis(2-chloro-1-methylethyl) ether record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two bis(2-chloroethoxy) methane records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two bis(2-chloroethyl) ether records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two bis(2-chloro-1-methylethyl) ether records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One caprolactam record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One dibenzofuran record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One dibenzofuran record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One dimethyl phthalate record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One dinitro-o-cresol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One hexachlorobutadiene record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two hexachlorobutadiene records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One hexachlorocyclopentadiene record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Four hexachlorocyclopentadiene records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One hexachloroethane record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two hexachloroethane records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two isophorone records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two m/p-cresol records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One n-nitrosodipropylamine record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One naphthalene record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two naphthalene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One nitrobenzene record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two nitrobenzene records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One o-cresol record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two o-cresol records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One phenol record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two phenol records were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Table J.1-11. Matrix Spike Recovery Qualifier Summary

Method Code	Total # of MS/MSD Records	# of MS/MSD Records Qualified	Associated Samples Qualified
EPA6010D	1189	45	NAOU-00000005, NAOU-00000007, NAOU-00000009, NAOU-00000012, NAOU-00000013, NAOU-00000051, NAOU-00000068, NAOU-00000070, NAOU-00000072, NAOU-00000096, NAOU-00000110, NAOU-00000124, NAOU-00000176, NAOU-00000203
EPA6020A	352	7	NAOU-00000079, NAOU-00000114, NAOU-00000132
EPA7196A	2	0	
EPA7470A	14	0	
EPA7471B	53	0	
EPA8081B	280	0	
EPA8082A	68	0	
EPA8260B	361	7	NAOU-00000008
EPA8270D	3082	90	NAOU-00000012, NAOU-00000013, NAOU-00000035, NAOU-00000052, NAOU-00000105, NAOU-00000159
RADA-002	2	0	

J.1.3.9 LCS Recovery

J.1.3.9.1 EPA6020A, ICP-MS Metals

Two manganese records were qualified as estimated because the LCS recovery was outside the established control limits, J/2.

J.1.3.9.2 EPA7471B, Mercury

Two mercury records were qualified as approximate estimated because the LCS recovery was outside the established control limits, UJ/2.

Four mercury records were qualified as estimated because the LCS recovery was outside the established control limits, J/2.

J.1.3.9.3 EPA8270D, GC-MS Semi-Volatiles

Two 2-methylnaphthalene records were qualified as non-detect because the LCS recovery was outside the established control limits, U/2.

Fourteen 2, 4-Dinitrophenol records were rejected because the LCS recovery was outside the established control limits, R/2.

Fifty-eight benzaldehyde records were qualified as approximate because the LCS recovery was outside the established control limits, UJ/2.

Five benzaldehyde records were rejected because the LCS recovery was outside the established control limits, R/2.

Fourteen dinitro-o-cresol records were qualified as approximate because the LCS recovery was outside the established control limits, UJ/2.

Table J.1-12. Laboratory Control Samples Qualifier Summary

Method Code	Total # of LCS Records	# of LCS Records Qualified	Associated Samples Qualified
A-01-RMOD	25	0	
EERFC-01	2	0	
GA-01-RMOD	8	0	
EPA6010D	748	0	
EPA6020A	181	3	NAOU-00000054, NAOU-00000079, NAOU-00000132
EPA7470A	10	0	
EPA7471B	28	6	NAOU-00000008, NAOU-00000031, NAOU-00000132, NAOU-00000184, NAOU-00000225, NAOU-00000247
EPA7196A	4	0	
EPA8015D	10	0	
EPA8081B	306	0	
EPA8082A	80	0	

Table J.1-12. Laboratory Control Samples Qualifier Summary

Method Code	Total # of LCS Records	# of LCS Records Qualified	Associated Samples Qualified
EPA8260B	3758	0	
EPA8270D	2262	93	NAOU-00000008, NAOU-00000009, NAOU-00000010, NAOU-00000031, NAOU-00000032, NAOU-00000033, NAOU-00000035, NAOU-00000036, NAOU-00000044, NAOU-00000045, NAOU-00000051, NAOU-00000052, NAOU-00000055, NAOU-00000056, NAOU-00000065, NAOU-00000066, NAOU-00000068, NAOU-00000069, NAOU-00000070, NAOU-00000072, NAOU-00000073, NAOU-00000074, NAOU-00000075, NAOU-00000076, NAOU-00000077, NAOU-00000078, NAOU-00000080, NAOU-00000081, NAOU-00000082, NAOU-00000083, NAOU-00000084, NAOU-00000085, NAOU-00000090, NAOU-00000091, NAOU-00000092, NAOU-00000093, NAOU-00000094, NAOU-00000095, NAOU-00000096, NAOU-00000097, NAOU-00000100, NAOU-00000101, NAOU-00000102, NAOU-00000103, NAOU-00000104, NAOU-00000106, NAOU-00000109, NAOU-00000117, NAOU-00000118, NAOU-00000119, NAOU-00000120, NAOU-00000121, NAOU-00000122, NAOU-00000130, NAOU-00000131, NAOU-00000135, NAOU-00000136, NAOU-00000152, NAOU-00000155, NAOU-00000156, NAOU-00000157, NAOU-00000167, NAOU-00000168, NAOU-00000169, NAOU-00000170
EPA903.0MOD	4	0	
EPA904.0MOD	6	0	
EPA9310	12	0	
RADA-001	44	0	
RADA-002	2	0	
RADA-011	56	0	
RADA-013	3	0	
RADA-032	14	0	
RADA-038	14	0	
SR-03-RCMOD	6	0	
STL-RC-0055	10	1	NAOU-00000054
TC-02-RCMOD	4	0	

J.1.3.10 Surrogate/Tracer Recovery

J.1.3.10.1 EPA8015D, Total Petroleum Hydrocarbons

Four total petroleum hydrocarbon records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two total petroleum hydrocarbon records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

J.1.3.10.2 EPA8260B, GC-MS Volatiles

Nine acetone records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four acetone records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

One benzene record was qualified as estimated because surrogate recovery was outside of specifications, J/14.

One cumene record was qualified as estimated because surrogate recovery was outside of specifications, J/14.

One dichloromethane record was qualified as estimated because surrogate recovery was outside of specifications, J/14.

Nine methyl ethyl ketone records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

One methyl tertiary butyl ether record was qualified as estimated because surrogate recovery was outside of specifications, J/14.

One styrene record was qualified as estimated because surrogate recovery was outside of specifications, J/14.

J.1.3.10.3 EPA8270D, GC-MS Semi-Volatiles

Twenty-nine 1,1'-biphenyl records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 1,1'-biphenyl records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine 1,2,4,5-tetrachlorobenzene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 1,2,4,5-tetrachlorobenzene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine 2-chloronaphthalene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 2-chloronaphthalene records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen 2-chlorophenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five 2-chlorophenol records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine 2-methylnaphthalene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 2-methylnaphthalene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine 2-nitroanaline records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 2-nitroanaline records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen 2-nitrophenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five 2-nitrophenol records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen 2,3,4,6-tetrachlorophenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five 2,3,4,6-tetrachlorophenol records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen 2, 4-dichlorophenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five 2, 4-dichlorophenol records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen 2, 4-dimethylphenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five 2, 4-dimethylphenol records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen 2, 4-dinitrophenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five 2, 4-dinitrophenol records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine 2,4-dinitrotolunene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 2,4-dinitrotolunene records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen 2,4,5-trichlorophenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five 2,4,5-trichlorophenol records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen 2,4,6-trichlorophenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five 2,4,6-trichlorophenol records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine 2,6-dinitrotoluene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 2,6-dinitrotoluene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine 3,3-dichlorobenzidine records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 3,3-dichlorobenzidine records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine 4-bromophenyl phenyl ether records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 4-bromophenyl phenyl records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine 4-chloroaniline records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 4-chloroaniline records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine 4-chlorophenyl ether records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four 4-chlorophenyl phenyl records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen 4-nitrophenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five 4-nitrophenol records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine acenaphthene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four acenaphthene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine acenaphthylene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four acenaphthylene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine acetophenone records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four acetophenone records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine anthracene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four anthracene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine atrazine records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four atrazine records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine benzaldehyde records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four benzaldehyde records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-four benzo[a]anthracene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Six benzo[a]anthracene records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three benzo[a]anthracene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-three benzo[b]fluoranthene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Seven benzo[b]fluoranthene records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three benzo[b]fluoranthene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-six benzo[k]fluoranthene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four benzo[k]fluoranthene records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three benzo[k]fluoranthene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-six benzo[a]pyrene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four benzo[a]pyrene records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three benzo[a]pyrene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-seven benzo[g,h,i]perylene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Three benzo[g,h,i]perylene records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three benzo[g,h,i]perylene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine bis(2-chloroethyl) ether records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four bis(2-chloroethyl) ether records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine bis(2-chloroethoxy) methane records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four bis(2-chloroethoxy) methane records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine bis(2-chloro-1-methylethyl) ether records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four bis(2-chloro-1-methylethyl) ether records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-four bis(2-ethylhexyl) phthalate records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five bis(2-ethylhexyl) phthalate records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Four bis(2-ethylhexyl) phthalate records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-eight butyl benzyl phthalate records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One butyl benzyl phthalate record was qualified as estimated because surrogate recovery was outside of specifications, J/14.

Four butyl benzyl phthalate records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-eight carbazole records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One carbazole record was qualified as estimated because surrogate recovery was outside of specifications, J/14.

Four carbazole records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine caprolactam records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four caprolactam records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-four chrysene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Six chrysene records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three chrysene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine dibenz[ah]anthracene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One dibenz[ah]anthracene record was qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three dibenz[ah]anthracene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine dibenzofuran records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four dibenzofuran records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine diethyl phthalate records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four diethyl phthalate records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine dimethyl phthalate records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four dimethyl phthalate records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen dinitro-o-cresol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five dinitro-o-cresol records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-two di-n-butyl phthalate records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Ten di-n-butyl phthalate records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

One di-n-butyl phthalate record was rejected because surrogate recovery was outside of specifications, R/14.

Twenty-four fluoranthene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Six fluoranthene records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three fluoranthene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine fluorene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four fluorene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine hexachlorobenzene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four hexachlorobenzene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine hexachlorobutadiene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four hexachlorobutadiene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine hexachloroethane records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four hexachloroethane records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-eight hexachlorocyclopentadiene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five hexachlorocyclopentadiene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-seven indeno[1,2,3-cd]pyrene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Three indeno[1,2,3-cd]pyrene records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three indeno[1,2,3-cd]pyrene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine isophorone records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four isophorone records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine m-nitroaniline records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four m-nitroaniline records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen m/p-cresol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five m/p-cresol records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine n-dioctyl phthalate records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four n-dioctyl phthalate records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine n-nitrosodiphenylamine+diphenylamine records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four n-nitrosodiphenylamine+diphenylamine records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine n-nitrosodipropylamine records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four n-nitrosodipropylamine records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine naphthalene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four naphthalene records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine nitrobenzene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four nitrobenzene records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen o-cresol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five o-cresol records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen pentachlorophenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five pentachlorophenol records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-six phenanthrene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four phenanthrene records were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three phenanthrene records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen phenol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five phenol records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-four pyrene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Six pyrene were qualified as estimated because surrogate recovery was outside of specifications, J/14.

Three pyrene records were rejected because surrogate recovery was outside of specifications, R/14.

Eighteen p-chloro-m-cresol records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Five p-chloro-m-cresol records were rejected because surrogate recovery was outside of specifications, R/14.

Twenty-nine p-nitroanaline records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Four p-nitroanaline records were rejected because surrogate recovery was outside of specifications, R/14.

Table J.1-13. Surrogate/Tracer Recovery Qualifier Summary

Method Code	Total # of Surr/Tracer Records	# of Surr Records Qualified	Associated Samples Qualified
A-01-RMOD	10	0	
EPA8015D	9	6	NAOU-00000156, NAOU-00000157, NAOU-00000158, NAOU-00000168, NAOU-00000159, NAOU-00000171
EPA8081B	128	0	
EPA8082A	320	0	
EPA8260B	582	27	NAOU-00000010, NAOU-00000013, NAOU-00000014, NAOU-00000023, NAOU-00000025, NAOU-00000026, NAOU-00000028, NAOU-00000029, NAOU-00000044, NAOU-00000047, NAOU-00000049, NAOU-00000057, NAOU-00000167
EPA8270D	996	2061	NAOU-00000001, NAOU-00000002, NAOU-00000003, NAOU-00000004, NAOU-00000007, NAOU-00000009, NAOU-00000014, NAOU-00000015, NAOU-00000025, NAOU-00000032, NAOU-00000034, NAOU-00000035, NAOU-00000036, NAOU-00000042, NAOU-00000044, NAOU-00000045, NAOU-00000056, NAOU-00000060, NAOU-00000069, NAOU-00000070, NAOU-00000071, NAOU-00000074, NAOU-00000075, NAOU-00000076, NAOU-00000077, NAOU-00000078, NAOU-00000081, NAOU-00000085, NAOU-00000097, NAOU-00000101, NAOU-00000103, NAOU-00000104, NAOU-00000113, NAOU-00000118, NAOU-00000119, NAOU-00000125, NAOU-00000158, NAOU-00000159, NAOU-00000165, NAOU-00000168, NAOU-00000171
EPA903.0MOD	2	0	
EPA904.0MOD	4	0	
RADA-011	60	0	
RADA-032	15	0	
RADA-038	15	0	
SR-03-RCMOD	4	0	
STL-RC-0055	4	0	
TC-02-RCMOD	2	0	

J.1.3.11 Split Samples Comparability

Table J.1-14. Split Samples

Station ID	Sample ID	Interval *(ft.)*	Date/Time	Sample Type	Matrix	Lab
CSSLP-1	NAOU-00000008	0-1	6/26/19 1305	SPL	SOIL	TAL/SHE
CSSLP-1	NAOU-00000005	0-1	6/26/19 1305	REG	SOIL	GEL
CSSLP-8	NAOU-00000031	1-2.5	6/26/19 1305	SPL	SOIL	TAL/SHE
CSSLP-8	NAOU-00000029	1-2.5	6/26/19 1305	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	8-10	9/04/19 1300	SPL	SOIL	TAL/SHE
CSSLP-15	NAOU-00000053	8-10	9/04/19 1300	REG	SOIL	GEL
FBFA-4	NAOU-00000079	1-4	7/10/19 1325	SPL	SOIL	TAL
FBFA-4	NAOU-00000078	1-4	7/10/19 1325	REG	SOIL	GEL
FBFA-17	NAOU-00000114	8-10	8/21/19 1120	SPL	SOIL	TAL
FBFA-17	NAOU-00000110	8-10	8/21/19 1120	REG	SOIL	GEL
FBFA-25	NAOU-00000132	1-4	8/22/19 1240	SPL	SOIL	TAL
FBFA-25	NAOU-00000131	1-4	8/22/19 1240	REG	SOIL	GEL
FBFA-32	NAOU-00000145	1-4	7/22/19 1300	SPL	SOIL	TAL
FBFA-32	NAOU-00000144	1-4	7/22/19 1300	REG	SOIL	GEL
CBR 3D	NAOU-00000173	45.5-65.5	6/12/19 1403	SPL	GRWATER	TAL
CBR 3D	NAOU-00000172	45.5-65.5	6/12/19 1403	REG	GRWATER	GEL
ECN1-29	NAOU-00000184	1-4	6/20/19 0840	SPL	SOIL	GEL
ECN1-29	NAOU-00000180	1-4	6/20/19 0840	REG	SOIL	GEL
ECN1-36	NAOU-00000225	8-10	8/07/19 1340	SPL	SOIL	TAL
ECN1-36	NAOU-00000220	8-10	8/07/19 1340	REG	SOIL	GEL
ECN1-40	NAOU-00000247	18-20	8/08/19 1130	SPL	SOIL	TAL
ECN1-40	NAOU-00000246	18-20	8/08/19 1130	REG	SOIL	GEL

Split soil and groundwater samples were taken from eleven locations and were analyzed by similar methods at different laboratories (General Engineering Labs (GEL), and Test America Labs (TAL) and Shealy Labs (SHE) (eleven split samples total). Two organic methods (Volatile Organics and Semi-Volatile Organics) were performed by the Shealy Labs. Pesticides and PCBs were performed only at the GEL.

GEL	TAL	SHE
EPA6010D		EPA6020A
EPA7471B	EPA7471B	
EPA8081B		
EPA8082A		
EPA8260B		EPA8260B
EPA8270D		EPA8270D
RADA-001	EPA9310	
RADA-011	A-01-RMOD	
RADA-013	GA-01-RMOD	

The following table details the anomalies observed (RPD >200% for soil).

Station ID	Sample ID	Analyte	Result (*µ/kg*)	Sample Type	Matrix	Lab
CSSLP-15	NAOU-00000053	Acenaphthene	129	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Acenaphthene	27	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Anthracene	264	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Anthracene	41	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Benzo[a]anthracene	474	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Benzo[a]anthracene	80	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Benzo[b]fluoranthene	388	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Benzo[b]fluoranthene	79	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Benzo[k]fluoranthene	121	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Benzo[k]fluoranthene	26	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Benzo(g,h,i)perylene	84	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Benzo(g,h,i)perylene	23	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Benzo[a]pyrene	186	REG	SOIL	GEL
CSSLP-15	NAOU-00000053	Benzo[a]pyrene	39	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Chrysene	469	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Chrysene	97	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Fluorene	181	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Fluorene	35	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Indeno[1,2,3-cd]pyrene	102	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Indeno[1,2,3-cd]pyrene	21	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Phenanthrene	1520	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Phenanthrene	200	SPL	SOIL	SHE
CSSLP-15	NAOU-00000053	Pyrene	1520	REG	SOIL	GEL
CSSLP-15	NAOU-00000054	Pyrene	200	SPL	SOIL	SHE
FBFA-4	NAOU-00000078	Chromium	15700	REG	SOIL	GEL
FBFA-4	NAOU-00000079	Chromium	51000	SPL	SOIL	TAL
FBFA-4	NAOU-00000078	Iron	17800000	REG	SOIL	GEL
FBFA-4	NAOU-00000079	Iron	470000	SPL	SOIL	TAL
FBFA-4	NAOU-00000078	Vanadium	38000	REG	SOIL	GEL
FBFA-4	NAOU-00000079	Vanadium	120000	SPL	SOIL	TAL

J.1.4 Data Usability

The analytical data from this project are considered usable for purposes outlined *Sampling and Analysis Plan for Pre-Work Plan Characterization of the ECODS N-1 (NBN) Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (Ford Building) Operable Unit (U)* (SRNS 2019). A total of 312 environmental sample records were rejected (1.1%); the rejected data were not used. Most of qualified semi-volatile results (EPA8270D) were limited to a few laboratory batches that experienced extraction issues at the GEL laboratory. For example, in one lab batch #1893105, three samples contained 187 of the rejected semi-volatile results. Additionally, the lab experienced a high number (approximately 25%) of QC method (EPA6010D) blank contamination during the timeframe in which many of the metals' samples were analyzed. Split results for EPA8270D appear to be systematically biased low from SHE by a factor of approximately 5x and may indicate sample heterogeneity between the two aliquots, possibly due to samples not being adequately homogenized, rather than analytical uncertainty. Although these sample results were qualified based on poor surrogate recoveries and/or MB detections, the data is still considered usable in the quantitative analysis for the purposes of decision making in the RI/BRA. Qualification details are found in Section 3.0, Validation Findings.

J.1.5 References

SRNS, 2012. *Area Completion Projects Quality Assurance Project Plan for Environmental Data Collection and Management*, ERD-AG-2005-00001, Revision 5, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken SC

SRNS 2015. *Analytical Data Qualification, ER-SOP-033, Revision 6, Environmental Compliance and Area Completion Projects (EC&ACP) Geochemical Monitoring Procedures* Manual C-3, Volume 10, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken SC

SRNS 2019. *Sampling and Analysis Plan for Pre-Work Plan Characterization of the ECODS N-1 (NBN) Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (Ford Building) Operable Unit (U),* (SRNS-RP-2019-00203), Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken, SC

This page is intentionally left blank.

APPENDIX J.2

Data Usability Report for 2020 Workplan Characterization Samples

This page was intentionally left blank.

TABLE OF CONTENTS
(APPENDIX J.2)

Section **Page**

J.2.1 Project Summary J-59

J.2.2 Assessment of Precision, Accuracy, Representativeness, Comparability, and Completeness Data Quality Indicators and Measurement Performance Criteria J-63

J.2.2.1 Precision J-64
J.2.2.2 Accuracy J-64
J.2.2.3 Representativeness J-65
J.2.2.4 Comparability J-65
J.2.2.5 Completeness J-66

J.2.3 Validation Findings J-67

J.2.3.1 Holding Times J-67
J.2.3.2 Preservation J-68
J.2.3.3 Calibration, Identification, and Quantitation J-68
J.2.3.4 Trip Blanks and Rinsate Blanks J-69
J.2.3.5 Method Blanks J-70
J.2.3.6 Laboratory Duplicate RPD J-71
J.2.3.7 Field Duplicate RPD J-72
J.2.3.8 Matrix Spike Recovery J-73
J.2.3.9 LCS Recovery J-79
J.2.3.10 Surrogate/Tracer Recovery J-80
J.2.3.11 Split Samples Comparability J-81

J.2.4 Data Usability J-83

J.2.5 References J-83

LIST OF TABLES
(APPENDIX J.2)

Table		Page
Table J.2-1.	Sample Identification (ID) Summary	J-59
Table J.2-2.	Total Number of Records	J-62
Table J.2-3.	Environmental Record Review Qualifier Summary	J-63
Table J.2-4.	Holding Time (HT) Review Qualifier Summary	J-67
Table J.2-5.	Preservation Review Qualifier Summary	J-68
Table J.2-6.	Calibration (CAL), Identification (ID), and Quantitation Review Summary	J-68
Table J.2-7A.	Trip Blank (TB) Review Qualifier Summary	J-69
Table J.2-7B.	Rinsate Blank (RB) Review Qualifier Summary	J-69
Table J.2-7C.	Field Blank (FB) Review Qualifier Summary	J-69
Table J.2-8.	Method Blank (MB) Review Qualifier Summary	J-70
Table J.2-9.	Laboratory Duplicate Qualifier Summary	J-72
Table J.2-10.	Field Duplicate Qualifier Summary	J-73
Table J.2-11.	Matrix Spike (MS) Recovery Qualifier Summary	J-79
Table J.2-12.	LCS Qualifier Summary	J-79
Table J.2-13.	Surrogate/Tracer Recovery Qualifier Summary	J-81
Table J.2-14.	Split Samples	J-82

LIST OF ABBREVIATION AND ACRONYMS

(APPENDIX J.1)

%	percent
BRA	Baseline Risk Assessment
CAL	Calibration
ECODS	Early Construction and Operational Disposal Sites
ID	Identification
ft	feet
GEL	General Engineering Labs
LCS	laboratory control samples
µ/kg	microgram per kilogram
MDL	Minimum Detectable Limit
MB	method blank
MS	matrix spike
OU	Operable Unit
PCB	polychlorinated biphenyl
QC	Quality Control
RB	rinsate blank
RFI/RI	Resource Conservation and Recovery Act Facility Investigation / Remedial Investigation
RPD	relative percent differences
SHE	Shealy Labs
ssEQL	sample specific estimated quantification limit
TAL	Test America Labs
TB	trip blank
TPH	Total Petroleum Hydrocarbons

This page was intentionally left blank.

J.2.0 Data Usability Report for 2020 Workplan Characterization Samples

J.2.1 Project Summary

This report presents analytical data verification and validation for the 2020 sampling events associated with three waste units that are located in N-Area. The sampling was conducted in accordance with the *RFI/RI Work Plan Characterization for the ECODS N-1 (NBN), Central Shops Scrap Limber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (U)* (SRNS 2020). The project generated 80 regular field samples, 8 duplicate samples and 6 split samples. The samples, along with the requested analytical analyses are listed in Table 1.

Table J.2-1. Sample Identification (ID) Summary

Sample ID	Station ID	Sample Type	Sample Date	Sample Time	Matrix	Interval *(ft)*	Analysis Requested
3Q20CSSLP0001	CSSLP-20	REG	9/21/20	1445	SFWATER	-	1, 2, 3, 5, 6, 7, 8, 9, 10, 13, 14
3Q20CSSLP0002	CSSLP-20	SPL	9/21/20	1445	SFWATER	-	2, 4, 11
3Q20CSSLP0003	CB125-001-BKG	FD	10/06/20	1300	SFWATER	-	1, 2, 3, 5, 6, 7, 8, 9, 10, 13, 14
3Q20CSSLP0004	CB125-001-BKG	REG	10/06/20	1300	SFWATER	-	1, 2, 3, 5, 6, 7, 8, 9, 10, 13, 14
3Q20CSSLP0005	CB125-002-BKG	REG	9/22/20	1433	SFWATER	-	1, 2, 3, 5, 6, 7, 8, 9, 10, 13, 14
3Q20CSSLP0006	CB125-003-BKG	REG	9/29/20	1335	SFWATER	-	1, 3, 5, 6, 7, 8, 9, 10, 13, 14
3Q20CSSLP0007	CSSLP-21	REG	9/21/20	1530	SFWATER	-	1, 2, 3, 5, 6, 7, 8, 9, 10, 13, 14
3Q20CSSLP0008	CSSLP-22	REG	-	-	SFWATER	-	Unused COC, Inaccessible
3Q20CSSLP0009	CSSLP-23	REG	9/21/20	1350	SFWATER	-	1, 2, 3, 5, 6, 7, 8, 9, 10, 13, 14
3Q20CSSLP0010	RINSATE BLANK	RB	9/21/20	1605	WATER	-	1, 2, 3, 7, 8, 9, 10, 14
3Q20CSSLP0011	FIELD BLANK	FB	9/21/20	1552	WATER	-	1, 2, 3, 7, 8, 9, 10, 14
3Q20CSSLP0012	TRIP BLANK	TB	9/21/20	1350	WATER		6
3Q20CSSLP0013	CSSLP-20	REG	9/21/20	1445	SFWATER	-	1, 2, 3, 5, 10
3Q20CSSLP0014	CB125-001-BKG	REG	10/06/20	1300	SFWATER	-	1, 2, 3, 5, 10
3Q20CSSLP0015	CB125-002-BKG	FD	9/22/20	1433	SFWATER	-	1, 2, 3, 5, 10
3Q20CSSLP0016	CB125-002-BKG	REG	9/22/20	1433	SFWATER	-	1, 2, 3, 5, 10
3Q20CSSLP0017	CB125-003-BKG	REG	9/29/20	1313	SFWATER	-	1, 3, 5, 10
3Q20CSSLP0018	CSSLP-21	REG	9/21/20	1530	SFWATER	-	1, 2, 3, 5, 10
3Q20CSSLP0019	CSSLP-21	SPL	9/21/20	1530	SFWATER	-	2, 4, 11
3Q20CSSLP0020	CSSLP-22	REG	-	-	SFWATER	-	Unused COC, Inaccessible
3Q20CSSLP0021	CSSLP-23	REG	9/21/20	1350	SFWATER	-	1, 2, 3, 5, 10
3Q20CSSLP0024	TRIP BLANK	TB	9/22/20	1433	WATER		6
3Q20CSSLP0027	TRIP BLANK	TB	10/06/20	1300	WATER	-	6
4QCSSLPECN101	CB125-001-BKG	FD	10/08/20	1520	SEDIMENT	1-4	1, 2, 3, 5, 6, 7, 9, 10, 13, 14, 15
4QCSSLPECN102	CB125-001-BKG	REG	10/08/20	1520	SEDIMENT	0-1	1, 2, 3, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18
4QCSSLPECN103	CB125-001-BKG	REG	10/06/20	1520	SEDIMENT	1-4	1, 2, 3, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18
4QCSSLPECN104	CB125-002-BKG	REG	10/08/20	1320	SEDIMENT	1-4	1, 2, 3, 5, 6, 7, 9, 10, 13, 14, 15

Table J.2-1. Sample Identification (ID) Summary *(Continued)*

Sample ID	Station ID	Sample Type	Sample Date	Sample Time	Matrix	Interval *(ft)*	Analysis Requested
4QCSSLPECN105	CB125-002-BKG	REG	10/08/20	1235	SEDIMENT	0-1	1, 2, 3, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18
4QCSSLPECN106	CB125-003-BKG	REG	10/08/20	1020	SEDIMENT	0-1	1, 2, 3, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18
4QCSSLPECN107	CB125-003-BKG	REG	10/08/20	1105	SEDIMENT	1-4	1, 2, 3, 5, 6, 7, 9, 10, 13, 14, 15
4QCSSLPECN108	CSSLP-20-SED	FD	10/12/20	1450	SEDIMENT	1-4	1, 2, 3, 5, 6, 7, 9, 10, 13, 14, 15
4QCSSLPECN109	CSSLP-20-SED	REG	10/12/20	1330	SEDIMENT	0-1	1, 2, 3, 5, 6, 7, 9, 10, 14, 15, 16, 17, 18
4QCSSLPECN110	CSSLP-20-SED	REG	10/12/20	1440	SEDIMENT	1-4	1, 2, 3, 5, 6, 7, 9, 10, 14, 15, 16, 17, 18
4QCSSLPECN111	CSSLP-21-SED	REG	10/12/20	1125	SEDIMENT	0-1	1, 2, 3, 5, 6, 7, 9, 10, 13, 14, 15
4QCSSLPECN112	CSSLP-21-SED	REG	10/12/20	1200	SEDIMENT	1-4	1, 2, 3, 5, 6, 7, 9, 10, 14, 15, 16, 17, 18
4QCSSLPECN113	CSSLP-21-SED	SPL	10/12/20	1240	SEDIMENT	1-4	2, 3, 5, 13
4QCSSLPECN114	CSSLP-22-SED	REG	10/13/20	0905	SEDIMENT	0-1	1, 2, 3, 5, 6, 7, 8, 9, 10, 14, 15
4QCSSLPECN115	CSSLP-22-SED	REG	10/13/20	0950	SEDIMENT	1-4	1, 2, 3, 5, 6, 7, 8, 9, 10, 14, 15
4QCSSLPECN116	CSSLP-23-SED	REG	10/12/20	0930	SEDIMENT	0-1	1, 2, 3, 5, 6, 7, 8, 9, 10, 14, 15, 16, 17, 18
4QCSSLPECN117	CSSLP-23-SED	REG	10/12/20	1000	SEDIMENT	1-4	1, 2, 3, 5, 6, 7, 8, 9, 10, 14, 15
4QCSSLPECN118	CSSLP-028	REG	10/07/20	0850	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN119	CSSLP-028	REG	10/07/20	0900	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN120	CSSLP-028	REG	10/07/20	0925	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN121	CSSLP-028	REG	10/07/20	0930	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN122	CSSLP-027	REG	10/06/20	1415	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN123	CSSLP-027	REG	10/06/20	1420	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN124	CSSLP-027	REG	10/06/20	1430	SOIL	4-10	1, 2, 3, 5, 13
4QCSSLPECN125	CSSLP-027	REG	10/06/20	1440	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN126	CSSLP-029	REG	10/07/20	1050	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN127	CSSLP-029	REG	10/07/20	1100	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN128	CSSLP-029	REG	10/07/20	1120	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN129	CSSLP-029	REG	10/07/20	1130	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN130	CSSLP-030	FD	10/07/20	1245	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN131	CSSLP-030	REG	10/07/20	1235	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN132	CSSLP-030	REG	10/07/20	1240	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN133	CSSLP-030	REG	10/07/20	1355	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN134	CSSLP-030	REG	10/07/20	1400	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN135	CSSLP-031	REG	10/06/20	1255	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN136	CSSLP-032	REG	10/06/20	1240	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN137	CSSLP-024-BKG	REG	10/05/20	1105	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN138	CSSLP-024-BKG	REG	10/05/20	1115	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN139	CSSLP-024-BKG	REG	10/05/20	1345	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN140	CSSLP-024-BKG	REG	10/05/20	1355	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN141	CSSLP-024-BKG	SPL	10/05/20	1350	SOIL	8-10	1, 2, 3, 5, 13

Table J.2-1. Sample Identification (ID) Summary *(Continued)*

Sample ID	Station ID	Sample Type	Sample Date	Sample Time	Matrix	Interval *(ft)*	Analysis Requested
4QCSSLPECN142	CSSLP-025-BKG	FD	10/05/20	1150	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN143	CSSLP-025-BKG	REG	10/05/20	1140	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN144	CSSLP-025-BKG	REG	10/05/20	1145	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN145	CSSLP-025-BKG	REG	10/05/20	1457	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN146	CSSLP-025-BKG	REG	10/05/20	1510	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN147	CSSLP-026-BKG	REG	10/05/20	1215	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN148	CSSLP-026-BKG	REG	10/05/20	1220	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN149	CSSLP-026-BKG	REG	10/06/20	1010	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN150	CSSLP-026-BKG	REG	10/06/20	1020	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN151	ECN1-042	REG	9/23/20	1440	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN152	ECN1-042	REG	9/23/20	1445	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN153	ECN1-042	REG	9/28/20	1115	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN154	ECN1-042	REG	9/28/20	1125	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN155	ECN1-043	REG	9/29/20	1120	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN156	ECN1-043	REG	9/23/20	1355	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN157	ECN1-043	REG	9/23/20	1403	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN158	ECN1-043	REG	9/29/20	1045	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN159	ECN1-043	REG	9/29/20	1110	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN160	ECN1-043	SPL	9/29/20	1053	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN161	ECN1-044	REG	9/29/20	1300	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN162	ECN1-044	REG	9/29/20	1315	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN163	ECN1-044	REG	9/30/20	1030	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN164	ECN1-044	REG	9/30/20	1110	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN165	ECN1-045-BKG	REG	9/30/20	1310	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN166	ECN1-045-BKG	REG	9/30/20	1325	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN167	ECN1-045-BKG	REG	10/01/20	0915	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN168	ECN1-045-BKG	REG	10/01/20	0935	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN169	ECN1-045-BKG	SPL	10/01/20	0945	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN170	ECN1-046-BKG	REG	09/30/20	1402	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN171	ECN1-046-BKG	REG	09/30/20	1414	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN172	ECN1-046-BKG	REG	10/01/20	1202	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN173	ECN1-046-BKG	REG	10/01/20	1210	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN174	ECN1-047-BKG	FD	9/24/20	1055	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN175	ECN1-047-BKG	REG	9/23/20	1215	SOIL	0-1	1, 2, 3, 5, 13
4QCSSLPECN176	ECN1-047-BKG	REG	9/23/20	1220	SOIL	1-4	1, 2, 3, 5, 13
4QCSSLPECN177	ECN1-047-BKG	REG	9/24/20	0935	SOIL	8-10	1, 2, 3, 5, 13
4QCSSLPECN178	ECN1-047-BKG	REG	9/24/20	1025	SOIL	10-12	1, 2, 3, 5, 13
4QCSSLPECN179	EPT BK	RB	9/30/20	1425	WATER	-	1, 3, 5, 6, 8, 9, 10, 11, 14, 15
4QCSSLPECN180	EPT BK	RB	10/06/20	1520	WATER	-	1, 3, 5, 6, 8, 9, 10, 11, 14, 15
4QCSSLPECN181	EPT BK	RB	10/12/20	1425	WATER	-	1, 3, 5, 6, 8, 9, 10, 11, 14, 15

Table J.2-1. Sample Identification (ID) Summary *(Continued)*

Sample ID	Station ID	Sample Type	Sample Date	Sample Time	Matrix	Interval *(ft)*	Analysis Requested
4QCSSLPECN182	FIELD BLANK	FB	9/30/20	1450	WATER	-	1, 3, 5, 6, 8, 9, 10, 11, 14, 15
4QCSSLPECN183	FIELD BLANK	FB	10/12/20	1525	WATER	-	1, 3, 5, 6, 8, 9, 10, 11, 14, 15
4QCSSLPECN184	FIELD BLANK	FB	10/06/20	1530	WATER	-	1, 3, 5, 6, 8, 9, 10, 11, 14, 15
4QCSSLPECN185	TRIP BLANK	TB	9/23/20	1200	WATER	-	6
4QCSSLPECN186	TRIP BLANK	TB	9/24/20	0930	WATER	-	6
4QCSSLPECN187	TRIP BLANK	TB	9/28/20	1110	WATER	-	6
4QCSSLPECN188	TRIP BLANK	TB	9/29/20	1040	WATER	-	6
4QCSSLPECN189	TRIP BLANK	TB	9/30/20	1020	WATER	-	6
4QCSSLPECN191	TRIP BLANK	TB	10/08/20	1015	WATER	-	6
4QCSSLPECN192	TRIP BLANK	TB	10/06/20	1005	WATER	-	6
4QCSSLPECN193	TRIP BLANK	TB	10/12/20	0915	WATER	-	6
4QCSSLPECN194	TRIP BLANK	TB	10/13/20	0845	WATER	-	6

Analyses Requested:

1. Hexavalent Chromium, EPA7196A
2. Hexavalent Chromium, EPA7199
3. ICP Metals, EPA6010D
4. ICP Metals, EPA200.8
5. Cyanide, EPA9012B
6. Volatile Organics, EPA8260D
7. Semi-Volatiles, EPA8270D
8. Semi-Volatiles, EPA8270E
9. Pesticides, EPA8081B
10. PCBs, EPA8082A
11. Mercury, Total Recoverable, EPA7470A
12. Mercury, EPA245.1
13. Mercury, Total Recoverable, EPA7471B
14. Gross Alpha, RADA-001
15. Non-Volatile Beta, RADA-001
16. Alpha Spectroscopy, RADA-011
17. Neptunium, RADA-032
18. Thorium Series, RADA-038

A total of 8,166 analytical records were produced consisting of 6,252 regular records and 1,914 Quality Control (QC) records. See Table 2.

Table J.2-2. Total Number of Records

Number of Records	Chemical	Radiochemical	Totals
Analytical	6,086	166	6,252
Field QC	1,898	16	1,914
Totals	7,984	182	8,166

The verification process was conducted to review completeness of the sampling and analytical requirements. Validation has been performed to assess compliance with methods, procedures, and contracts, and to assess a comparison with measurement performance criteria in the ER-SOP-033, Analytical Data Qualification (SRNS 2015). A usability assessment will provide the data user with an assessment of whether the process execution and resulting data meet project quality objectives in the Quality Assurance Project Plan (QAPP) (SRNS 2012) and the RFI/RI Work Plan Characterization for the ECODS N-1 (NBN), Central Shops Scrap Limber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (U) (SRNS 2020). These processes involve examination of the electronic data files, the field data, analytical data, and laboratory records. Computer programs are used to verify that samples were properly preserved and were analyzed within the required holding time, that QC results were within specified acceptable ranges, and that the appropriate detection limits were employed by the laboratories. Additionally, manual reviews of field data and laboratory records are conducted to ensure the quality of these items. Validation summaries for holding time,

preservation, calibration, analyte identification, and analyte quantitation can be found in subsections 3.1, Holding Times; 3.2, Preservation; and 3.3, Calibration, Identification, and Quantitation.

The data were validated to determine if the records conform to the technical criteria associated with definitive data per ER-SOP-033 (SRNS 2015). Table 3 provides a brief validation summary for the project. Review qualifiers are assigned by a data validator internal to Savannah River Nuclear Solutions and external to the analytical laboratory. Environmental records include regular sample, split and field duplicate records.

Table J.2-3. Environmental Record Review Qualifier Summary

	Detects		Non-detects		Rejected	
Method Code	**# NULL Qualifiers**	**# J Qualifiers**	**# U Qualifiers**	**# UJ Qualifiers**	**# R Qualifiers**	**Total**
EPA200.8	25	0	19	0	0	44
EPA245.1	0	0	2	0	0	2
EPA6010D	1,021	415	585	3	0	2,024
EPA7196A	20	7	59	5	0	91
EPA7199	10	0	80	2	0	92
EPA7470A	0	0	14	0	0	14
EPA7471B	10	0	66	2	0	78
EPA8081B	0	0	447	35	1	483
EPA8082A	0	0	150	7	4	161
EPA8260D	17	15	1,164	0	0	1,196
EPA8270D	5	13	641	629	52	1,340
EPA8270E	0	0	104	302	63	469
EPA9012B	1	13	76	2	0	92
RADA-001	34	11	1	0	0	46
RADA-011	14	2	72	0	0	88
RADA-032	0	0	8	0	0	8
RADA-038	17	7	0	0	0	24
Total	**1,183**	**517**	**3,447**	**985**	**120**	**6,252**
% of Total	**18.9**	**8.3**	**55.1**	**15.8**	**1.9**	**100.0**

J.2.2 Assessment of Precision, Accuracy, Representativeness, Comparability, and Completeness Data Quality Indicators and Measurement Performance Criteria

This section discusses the analytical data in terms of the following indicators of data quality: precision, accuracy, representativeness, comparability, and completeness. Precision is determined from the field and laboratory duplicate analyses and indicates the consistency of field and laboratory techniques. Accuracy is determined from the laboratory control samples (LCS), matrix spikes (MS) and the results of the results of the method blanks, field, trip and rinsate blanks; it indicates the ability of the laboratory to generate correct results. Representativeness measures how well the data represents the sample population. Comparability expresses the confidence with which data from different laboratories are considered to be equivalent. Representative completeness measures the amount of data resulting from the data collection activity.

J.2.2.1 Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Field duplicates measure the repeatability of the sampling and analytical techniques, and laboratory duplicates measure the ability of the laboratory to reproduce a result. Low precision can be caused by poor instrument performance, poor operator technique, inconsistent application of method protocols, laboratory environment, time between analyses, or by a difficult, heterogeneous sample matrix. Precision is especially important when the action limit approaches the quantification limit. A total of 10 % of the samples were collected in duplicate for this project in accordance with the SAP. The laboratory performs duplicate analyses on at least 5% of the samples received.

Precision is expressed in terms of the relative percent differences (RPD) as follows:

$$\text{RPD} = \frac{|x - y|}{\left(\frac{x + y}{2}\right)} \times 100$$

where
pair is below the MDL, the sample specific estimated quantification limit (ssEQL) is used for that result in the calculation. When both results are below the MDL, the RPD is not calculated.

The RPD should be less than 20% for water samples and less than 35% for solid samples when results are greater than the ssEQL. In the case where results are between the ssEQL and the MDL, the RPD should be less than 100% for water samples and less than 200% for soil samples. In the event analytical precision goals are not met, a determination of the usability of that information is made through the environmental data assessment process.

No records were rejected due to precision issues. Details for this project can be found in subsections 3.6, Laboratory Duplicate RPD; and 3.7, Field Duplicate RPD.

J.2.2.2 Accuracy

Accuracy is defined as the closeness of agreement between an observed value and an accepted reference value. Accuracy is especially important when the concentration of concern approaches the detection limit and/or the action limit. When the concentration is underestimated near the detection limit, the analyte may be present but reported as not detected. When the concentration is underestimated near the action limit, the analyte may be at a concentration that would require remediation, but the remediation would not be performed. When the concentration is overestimated near the detection limit, the analyte may not be present but reported as detected. When the concentration is overestimated near the action limit, the analyte may not be at a concentration that would require remediation, but the remediation would be performed. The sample types used to evaluate accuracy are performance evaluation studies LCSs, surrogate spikes, MSs, method blanks, trip blanks, and rinsate blanks.

LCSs monitor the performance of all steps in the analytical process, including sample preparation, and are used to identify problems with the analytical procedure. LCSs are deionized water that is spiked with the target analyte, digested, and analyzed with the regular samples. The LCS spiking

solution is obtained from a third-party supplier, or is prepared in the laboratory using chemicals from a different source than the calibration standards.

The LCS percent recovery is calculated as follows:

$$\% \text{ Recovery} = \frac{\text{Blank spike concentration}}{\text{Spike concentration}} \times 100$$

One hundred percent recovery is equivalent to 100% accuracy. Values less than 100% or greater than 100% may indicate a sample matrix effect and a false reading. A periodic program of sample spiking is required (e.g., one MS and one MS duplicate per 20 samples). If analytical accuracy goals are not met, a determination is made through the environmental data assessment process relative to the usability of that information.

No environmental records were rejected because the matrix spike was outside of limits. Details for this project can be found in subsections 3.4, Trip Blanks; 3.5, Method Blanks; 3.8, Matrix Spike Recovery; 3.9, LCS Recovery; and 3.10, Surrogate/Tracer Recovery.

J.2.2.3 Representativeness

The representativeness of samples collected is controlled by adhering to the detailed descriptions of sampling procedures. Representativeness expresses the relative degree to which the data depict the characteristics of a population, parameter, sampling point, process condition, or environmental condition. The objective of this study is to accurately represent the concentrations of target analytes or compounds. Representative samples for this investigation will be required by implementing approved sampling and analytical procedures that will generate data representative of the sampling point location and will be maintained. Analytical methods are selected that will most accurately represent the true concentration of the parameter of interest. The accumulation of QC procedures and information (i.e., RPD values, blank QC concentrations, MS percent recoveries, etc.) employed for a given analysis combine to exhibit the representativeness of the data generated.

The goal for representative sample data will therefore be met by properly documenting field and analytical protocols. In the event these procedures and methods are not able to be implemented, the appropriate corrective action documentation should encompass the impact on the representativeness of the information. When review of the data and documentation determines the data to be non-representative, the information is qualified in its use or is not used by the project.

All samples were collected and analyzed per established procedures.

J.2.2.4 Comparability

Comparability is the degree to which different methods, data sets, and decisions agree or can be represented as similar. The comparability of the data from the laboratories is based on the results of the split samples and on confirmation that the laboratories used the same standardized procedures for sample analysis, the same reporting unit, and obtained similar quantitation limits. Comparability of the data produced for this investigation may be obtained by implementing the

identified protocols for sampling and analysis of samples. Implementation of traceable reference materials such as laboratory standards, expression of results in standard concentration units, and successful participation by the laboratories in external performance evaluation programs will enable the information produced through this investigation to be compared with future data sets, if required. For this project, 6 split samples were collected and sent to the designated QC laboratory.

J.2.2.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct, normal circumstances. The Quality Assurance (QA) completeness objective for RFI/RI projects is to obtain valid field and laboratory analytical results for at least 90% of the samples collected during the project. This implies that completeness of sample collection (i.e., the number of samples collected compared to the number of samples planned) must be virtually 100% to allow for some loss of data during the laboratory analytical process. Accountability of samples collected, from field to final disposal, must be 100%.

Completeness is a measure of the amount of data obtained from a measurement process that achieves the project goals as compared to the amount of data planned to be obtained by the project. Completeness is affected by unexpected conditions during the data collection process that reduce the usable data achieved relative to the data planned.

When review of the data and documentation determines the data to be incomplete, the impact relative to the project objective will be assessed and documented.

The following are measures of completeness:

Sample Collection:

$$\text{Completeness} = \frac{\text{Number of Sample Points Sampled}}{\text{Number of Sample Points Planned}} \times 100$$

Field Measurement:

$$\text{Completeness} = \frac{\text{Number of Valid Measurements Made}}{\text{Number of Measurements Planned}} \times 100$$

Laboratory Analysis:

$$\text{Completeness} = \frac{\text{Number of Valid Data Points}}{\text{Number of Data Points Planned}} \times 100$$

The completeness numbers for this project are listed below:

Sample Collection Completeness	97.6%
Field Measurement Completeness	100%
Laboratory Analysis Completeness	100%

J.2.3 Validation Findings

J.2.3.1 Holding Times

J.2.3.1.1 EPA7196A, Hexavalent Chromium

Five hexavalent chromium records were qualified as approximate because the sample was held beyond normal holding time prior to analysis, UJ/Q.

J.2.3.1.2 EPA8270D, Semi-Volatiles

Two hundred sixty-four semi-volatile records were qualified as approximate because the sample was held beyond normal holding time prior to analysis, UJ/Q.

Four semi-volatile records were qualified as estimated because the sample was held beyond normal holding time prior to analysis, J/Q.

J.2.3.1.3 EPA9012B, Cyanide

One cyanide record was qualified as approximate because the sample was held beyond normal holding time prior to analysis, UJ/Q.

Table J.2-4. Holding Time (HT) Review Qualifier Summary

Method Code	Total # of Records	# of Records Qualified for HT	Associated Samples Qualified
EPA200.8	44	0	
EPA245.1	2	0	
EPA6010D	2,024	0	
EPA7196A	91	5	3Q20CSSLP0003, 3Q20CSSLP0004, 3Q20CSSLP0006, 3Q20CSSLP0014, 3Q20CSSLP0017
EPA7199	92	0	
EPA7470A	14	0	
EPA7471B	78	0	
EPA8081B	483	0	
EPA8082A	161	0	
EPA8260D	1,196	0	
EPA8270D	1,340	268	4QCSSLPECN106, 4QCSSLPECN107, 4QCSSLPECN109, 4QCSSLPECN111
EPA8270E	469	0	
EPA9012B	92	1	4QCSSLPECN141
RADA-001	46	0	
RADA-011	88	0	
RADA-032	8	0	
RADA-038	24	0	

J.2.3.2 Preservation

All chemical and physical preservation for the reported analyses were properly applied. No qualification was required.

Table J.2-5. Preservation Review Qualifier Summary

Method Code	Total # of Records	# of Records Qualified for Preservation	Associated Samples Qualified
EPA200.8	44	0	
EPA245.1	2	0	
EPA6010D	2,024	0	
EPA7196A	91	0	
EPA7199	92	0	
EPA7470A	14	0	
EPA7471B	78	0	
EPA8081B	483	0	
EPA8082A	161	0	
EPA8260D	1,196	0	
EPA8270D	1,340	0	
EPA8270E	469	0	
EPA9012B	92	0	
RADA-001	46	0	
RADA-011	88	0	
RADA-032	8	0	
RADA-038	24	0	

J.2.3.3 Calibration, Identification, and Quantitation

All calibration, identification and quantitation criteria were met for the reported analyses. No qualification was required.

Table J.2-6. Calibration (CAL), Identification (ID), and Quantitation Review Summary

Method Code	Total # of Records	# of Records Qualified for CAL, ID and Quantitation	Associated Samples Qualified
EPA200.8	44	0	
EPA245.1	2	0	
EPA6010D	2,024	0	
EPA7196A	91	0	
EPA7199	92	0	
EPA7470A	14	0	
EPA7471B	78	0	

Table J.2-6. Calibration (CAL), Identification (ID), and Quantitation Review Summary *(Continued/End)*

Method Code	Total # of Records	# of Records Qualified for CAL, ID and Quantitation	Associated Samples Qualified
EPA8081B	483	0	
EPA8082A	161	0	
EPA8260D	1,196	0	
EPA8270D	1,340	0	
EPA8270E	469	0	
EPA9012B	92	0	
RADA-001	46	0	
RADA-011	88	0	
RADA-032	8	0	
RADA-038	24	0	

J.2.3.4 Trip Blanks and Rinsate Blanks

Table J.2-7A. Trip Blank (TB) Review Qualifier Summary

Method Code	Total # of TB Records	# of TB Records Qualified	Associated Samples Qualified
EPA8260B	624	0	

Table J.2-7B. Rinsate Blank (RB) Review Qualifier Summary

Method Code	Total # of RB Records	# of RB Records Qualified	Associated Samples Qualified
EPA6010D	88	4	3Q20CSSLP0010, 3Q20CSSLP0013, 3Q20CSSLP0018, 3Q20CSSLP0021
EPA7196A	4	0	
EPA7199	1	0	
EPA7470A	4	0	
EPA8081B	84	0	
EPA8082A	28	0	
EPA8260D	156	0	
EPA8270E	268	0	
EPA9012A	4	0	
RADA-001	8	0	

Table J.2-7C. Field Blank (FB) Review Qualifier Summary

Method Code	Total # of RB Records	# of RB Records Qualified	Associated Samples Qualified
EPA6010D	88	4	3Q20CSSLP0011, 3Q20CSSLP0013, 3Q20CSSLP0018, 3Q20CSSLP0021
EPA7196A	4	0	
EPA7199	1	0	
EPA7470A	4	0	
EPA8081B	84	0	
EPA8082A	28	0	
EPA8260D	156	0	
EPA8270E	268	0	
EPA9012A	4	0	
RADA-001	8	0	

J.2.3.5 Method Blanks

J.2.3.5.1 EPA6010D, ICP-ES Metals

Six antimony records were qualified as non-detect due to the detection of the analyte in the method blank, U/V.

Five antimony records were qualified as estimated due to the detection of the analyte in the method blank, J/V.

One chromium record was qualified as estimated due to the detection of the analyte in the method blank, J/V.

Twenty lead records were qualified as estimated due to the detection of the analyte in the method blank, J/V.

Nine selenium records were qualified as non-detect due to the detection of the analyte in the method blank, U/V.

Sixty-four zinc records were qualified as estimated due to the detection of the analyte in the method blank, J/V.

J.2.3.5.2 EPA7196A, Hexavalent Chromium

Two hexavalent chromium records were qualified as estimated due to the detection of the analyte in the method blank, J/V.

Table J.2-8. Method Blank (MB) Review Qualifier Summary

Method Code	Total # of MB Records	# of MB Records Qualified	Associated Samples Qualified
EPA200.8	23	0	
EPA245.1	1	0	
EPA6010D	330	103	3Q20CSSLP0003, 3Q20CSSLP0004, 3Q20CSSLP0014, 4QCSSLPECN101, 4QCSSLPECN102, 4QCSSLPECN103, 4QCSSLPECN104, 4QCSSLPECN105, 4QCSSLPECN106, 4QCSSLPECN107, 4QCSSLPECN108, 4QCSSLPECN109, 4QCSSLPECN110, 4QCSSLPECN111, 4QCSSLPECN112, 4QCSSLPECN114, 4QCSSLPECN115, 4QCSSLPECN116, 4QCSSLPECN117, 4QCSSLPECN120, 4QCSSLPECN121, 4QCSSLPECN122, 4QCSSLPECN123, 4QCSSLPECN125, 4QCSSLPECN126, 4QCSSLPECN127, 4QCSSLPECN128, 4QCSSLPECN129, 4QCSSLPECN133, 4QCSSLPECN135, 4QCSSLPECN136, 4QCSSLPECN137, 4QCSSLPECN138, 4QCSSLPECN139, 4QCSSLPECN140, 4QCSSLPECN142, 4QCSSLPECN143, 4QCSSLPECN144, 4QCSSLPECN145, 4QCSSLPECN146, 4QCSSLPECN147, 4QCSSLPECN148, 4QCSSLPECN149, 4QCSSLPECN150, 4QCSSLPECN151, 4QCSSLPECN152, 4QCSSLPECN153, 4QCSSLPECN154, 4QCSSLPECN155, 4QCSSLPECN156, 4QCSSLPECN157, 4QCSSLPECN158, 4QCSSLPECN159, 4QCSSLPECN162, 4QCSSLPECN163, 4QCSSLPECN164, 4QCSSLPECN165, 4QCSSLPECN166, 4QCSSLPECN167, 4QCSSLPECN168, 4QCSSLPECN170, 4QCSSLPECN171, 4QCSSLPECN172, 4QCSSLPECN173, 4QCSSLPECN174, 4QCSSLPECN175, 4QCSSLPECN176, 4QCSSLPECN177, 4QCSSLPECN178

Table J.2-8. Method Blank (MB) Review Qualifier Summary

Method Code	Total # of MB Records	# of MB Records Qualified	Associated Samples Qualified
EPA7196A	13	2	4QCSSLPECN114, 4QCSSLPECN115
EPA7199	10	0	
EPA7470A	5	0	
EPA7471B	11	0	
EPA8081B	145	0	
EPA8082A	49	0	
EPA8260D	476	0	
EPA8270D	134	0	
EPA8270E	466	0	
EPA9012A	14	0	
RADA-001	13	0	
RADA-011	11	0	
RADA-032	1	0	
RADA-038	3	0	

J.2.3.6 Laboratory Duplicate RPD

J.2.3.6.1 EPA6010D, ICP-ES Metals

Six calcium records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

Two iron records were qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

One lead record was qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

One zinc record was qualified as estimated due to the %D between the parent sample and the serial dilution was above the established control limits, J/3.

One chromium record was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

One magnesium record was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

One vanadium record was qualified as estimated due to MS/MSD RPD was not within control limits, J/18.

Table J.2-9. Laboratory Duplicate Qualifier Summary

Method Code	Total # of Duplicate Records	# of Duplicate Records Qualified	Associated Samples Qualified
EPA6010D	286	13	3Q20CSSLP0003, 3Q20CSSLP0004, 3Q20CSSLP0005, 3Q20CSSLP0014, 3Q20CSSLP0015, 3Q20CSSLP0016, 3Q20CSSLP0133, 4QCSSLPECN113, 4QCSSLPECN176
EPA7196A	14	0	
EPA7199	3	0	
EPA7470A	5	0	
EPA7471B	8	0	
EPA8081B	20	0	
EPA8082A	2	0	
EPA8260B	50	0	
EPA9012B	17	0	
RADA-001	2	0	
RADA-011	11	0	
RADA-013	1	0	
RADA-032	1	0	
RADA-038	3	0	

J.2.3.7 Field Duplicate RPD

J.2.3.7.1 EPA6010D, ICP-ES Metals

Eight aluminum records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Two arsenic records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Two barium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Four calcium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Six chromium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Ten iron records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Four magnesium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Two manganese records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Two potassium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Two sodium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Four vanadium records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Four zinc records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

J.2.3.7.2 EPA8260B, GC-MS Volatile Organics

Two acetone records were qualified as estimated due to the field duplicate RPD recovery was not within control limits, J/9.

Table J.2-10. Field Duplicate Qualifier Summary

Method Code	Total # of Dup Records	# of Field Dup Records Qualified	Associated Samples Qualified
EPA6010D	176	52	3Q20CSSLP0003, 3Q20CSSLP0004, 3Q20CSSLP0015, 3Q20CSSLP0016, 4QCSSLPECN101, 4QCSSLPECN103, 4QCSSLPECN108, 4QCSSLPECN130, 4QCSSLPECN131, 4QCSSLPECN142, 4QCSSLPECN144, 4QCSSLPECN154, 4QCSSLPECN155, 4QCSSLPECN174, 4QCSSLPECN178
EPA7196A	8	0	
EPA7199	8	0	
EPA7470A	8	0	
EPA7471B	8	0	
EPA8081B	63	0	
EPA8082A	21	0	
EPA8260D	156	2	4QCSSLPECN108, 4QCSSLPECN110
EPA8270D	134	0	
EPA8270E	67	0	
EPA9012A	8	0	
RADA-001	6	0	

J.2.3.8 Matrix Spike Recovery

J.2.3.8.1 EPA6010D, ICP-ES Metals

Three aluminum records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Three antimony records were qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One antimony record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Two barium records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Two calcium records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One copper record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One chromium record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Three iron records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One lead record was qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Three magnesium records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

Four manganese records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One potassium record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One selenium record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Two vanadium records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

One zinc record was qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

J.2.3.8.2 EPA7199, Hexavalent Chromium

Two hexavalent chromium records were qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

J.2.3.8.3 EPA7471B, Mercury

Two mercury records were qualified as estimated due to the MS/MSD recovery was outside the established control limits, J/11.

J.2.3.8.4 EPA8081B, Pesticides

One aldrin record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

J.2.3.8.5 EPA8082A, PCBs

Two Aroclor 1016 were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two Aroclor 1260 were rejected due to the MS/MSD recovery was outside the established control limits, R/11.

J.2.3.8.6 EPA8270E, Semi-Volatiles

One acenaphthene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One acenaphthylene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One acetophenone record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One anthracene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One atrazine record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One benzaldehyde record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One benzo[a]pyrene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One benzo[b]fluoranthene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One benzo(g,h,i)perylene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One benzo[k]fluoranthene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One bis(2-chloroetyl)ether record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One bis(2-chloroethoxy)methane record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One bis(2-chloro-1-methylethyl)ether record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One butyl benzyl phthalate record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One carbazole record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One chrysene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One dibenzofuran record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One record dibenz[ah]anthracene was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One diethyl phthalate record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One record dimethyl phthalate was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One di-n-butyl phthalate record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One dinitro-o-cresol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One fluorene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One fluoranthene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One hexachlorobenzene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One hexachlorobutadiene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Three hexachlorocyclopentadiene record were qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One hexachlorocyclopentadiene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One indeno[1,2,3,-CD]pyrene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One isophorone record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One naphthalene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One n-dioctyl phthalate record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One nitrobenzene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One n-nitrosodiphenylamine record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One n-nitrosodipropylamine record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two pentachlorophenol records were qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One pentachlorophenol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One phenanthrene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One phenol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One pyrene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 1,1'biphenyl record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 1,2,4,5-tetrachlorobenzene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2-chloronaphthalene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2-methylnaphthalene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2-nitroanaline record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2-nitrophenol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2,3,4,6-tetrachloroprophenol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

Two 2,4-dichlorophenol records were qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

One 2,4-dichloropheno record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2,4-dinitrophenol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2,4-dinitrotoluene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2,4,5-trichlorophenol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2,4,6-trichlorophenol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 2,6-dinitrotoluene record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 3,3dichlorobenzidine record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 4-bromophenyl phenyl ether record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 4-chlorophenyl phenyl ether record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

One 4-nitrophenol record was rejected due to the MS/MSD recovery was outside the established control limits, R/11.

J.2.3.8.7 EPA9012B, Cyanide

Two cyanide records were

qualified as approximate due to the MS/MSD recovery was outside the established control limits, UJ/11.

Table J.2-11. Matrix Spike (MS) Recovery Qualifier Summary

Method Code	Total # of MS/MSD Records	# of MS/MSD Records Qualified	Associated Samples Qualified
EPA6010D	725	30	4QCSSLPECN105, 4QCSSLPECN113, 4QCSSLPECN115, 4QCSSLPECN133, 4QCSSLPECN136, 4QCSSLPECN141, 4QCSSLPECN169, 4QCSSLPECN176,
EPA7196A	18	0	
EPA7199	16	2	4QCSSLPECN120, 4QCSSLPECN137
EPA7470A	10	0	
EPA7471B	20	2	4QCSSLPECN133, 4QCSSLPECN163
EPA8081B	200	1	3Q20CSSLP0005
EPA8082A	28	4	3Q20CSSLP0003, 3Q20CSSLP0004
EPA8260B	800	0	
EPA8270D	268	1	4QCSSLPECN104
EPA8270E	268	64	3Q20CSSLP0001, 3Q20CSSLP0006, 3Q20CSSLP0009
EPA9012B	19	2	4QCSSLPECN115, 4QCSSLPECN169

J.2.3.9 LCS Recovery

J.2.3.9.1 EPA8081B, Pesticides

One aldrin record was as rejected because the LCS recovery was outside the established control limits, UJ/2.

J.2.3.9.2 EPA8270E, Semi-Volatiles

Two caprolactam records were qualified as approximate because the LCS recovery was outside the established control limits, UJ/2.

Table J.2-12. LCS Qualifier Summary

Method Code	Total # of LCS Records	# of LCS Records Qualified	Associated Samples Qualified
y	23	0	
EPA245.1	1	0	
EPA6010D	352	0	
EPA7196A	20	0	
EPA7199	14	0	
EPA7470A	5	0	
EPA7471B	11	0	
EPA8081B	158	1	3Q20CSSLP0005
EPA8082A	14	0	
EPA8260B	512	0	
y	134	0	
EPA8270E	466	2	3Q20CSSLP0001, 3Q20CSSLP0009
RADA-001	15	0	
RADA-002	2	0	
RADA-011	4	0	
RADA-032	1	0	
RADA-038	1	0	

J.2.3.10 Surrogate/Tracer Recovery

J.2.3.10.1 EPA8081B, Pesticides

One aldrin record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two alpha-benzene hexachloride records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two alpha-chlordane records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One beta-benzene hexachloride record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One delta-benzene hexachloride record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two dieldrin record were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two DDD records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two DDE records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two DDT records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two endrin records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One endrin aldehyde record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two endrin ketone records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two gamma-chlordane records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One heptachlor record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One heptachlor epoxide record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two lindane records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two methoxychlor records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Two toxaphene records were qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

J.2.3.10.2 EPA8082A, PCBs

One Aroclor 1016 record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One Aroclor 1221 record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One Aroclor 1232 record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One Aroclor 1248 record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One Aroclor 1254 record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

One Aroclor 1260 record was qualified as approximate because surrogate recovery was outside of specifications, UJ/14.

Table J.2-13. Surrogate/Tracer Recovery Qualifier Summary

Method Code	Total # of Surr/Tracer Records	# of Surr Records Qualified	Associated Samples Qualified
y	70	35	3Q20CSSLP0004, 3Q20CSSLP0006
EPA8082A	74	7	3Q20CSSLP0006
EPA8260D	117	2	4QCSSLPECN105
EPA8270D	144	417	4QCSSLPECN115, 4QCSSLPECN103, 4QCSSLPECN106, 4QCSSLPECN107, 4QCSSLPECN109, 4QCSSLPECN110, 4QCSSLPECN111, 4QCSSLPECN115
EPA8270E	66	365	3Q20CSSLP0001, 3Q20CSSLP0003, 3Q20CSSLP0004, 3Q20CSSLP0005, 3Q20CSSLP0006, 3Q20CSSLP0007, 3Q20CSSLP0009
RADA-011	32	0	
RADA-032	8	0	
RADA-038	8	0	

J.2.3.11 Split Samples Comparability

Split soil, sediment and surface water samples were taken from six locations and were analyzed by similar methods at two different laboratories, General Engineering Labs (GEL) and Test and

Shealy Labs (SHE) samples (six split samples total). Anomalies (RPD >200% for soil) were observed in four of the split samples.

GEL	SHE
EPA6010D	EPA200.8/EPA6010D
EPA7196A/EPA7199	EPA7196A/EPA7199
EPA7471B	EPA245.1/EPA7471B

Table J.2-14. Split Samples

Station ID	Sample ID	Interval *(ft.)*	Date/Time	Sample Type	Matrix	Lab
CSSLP-21-SED	4QCSSLPECN112	0-1	10/12/20 1200	REG	SED	GEL
CSSLP-21-SED	4QCSSLPECN113	0-1	10/12/20 1240	SPL	SED	SHE

Anomalies observed were:

Analyte	Conc. *(mg/kg)*	Lab
Aluminum	88,600	GEL
Aluminum	33,000	SHE
Cobalt	6.05	GEL
Cobalt	2	SHE
Copper	3.67	GEL
Copper	9	SHE
Magnesium	230	GEL
Magnesium	520	SHE

Analyte	Conc. *(mg/kg)*	Lab
Nickel	2.04	GEL
Nickel	7.7	SHE
Potassium	216	GEL
Potassium	490	SHE
Zinc	9.5	GEL
Zinc	20	SHE

Station ID	Sample ID	Interval *(ft.)*	Date/Time	Sample Type	Matrix	Lab
CSSLP-024-BKG	4QCSSLPECN1	8-10	10/05/20 1350	REG	SOIL	GEL
CSSLP-024-BKG	4QCSSLPECN141	8-10	10/05/20 1350	SPL	SOIL	SHE

Anomalies observed were:

Analyte	Conc. *(mg/kg)*	Lab
Aluminum	45.2	GEL
Aluminum	20	SHE
Chromium	5.25	GEL
Chromium	13	SHE
Copper	2.89	GEL
Copper	9.5	SHE

Analyte	Conc. *(mg/kg)*	Lab
Magnesium	72.4	GEL
Magnesium	290	SHE
Nickel	1.06	GEL
Nickel	6.4	SHE
Zinc	3.63	GEL
Zinc	15	SHE

Station ID	Sample ID	Interval *(ft.)*	Date/Time	Sample Type	Matrix	Lab
ECN1-043	4QCSSLPECN1	8-10	09/29/20 1350	REG	SOIL	GEL
ECN1-043	4QCSSLPECN160	8-10	09/29/20 1053	SPL	SOIL	SHE

Anomalies observed were:

Analyte	Conc. *(mg/kg)*	Lab
Aluminum	72,900	GEL
Aluminum	24,000	SHE
Barium	2.15	GEL
Barium	8.8	SHE
Manganese	8.92	GEL
Manganese	13	SHE

Analyte	Conc. *(mg/kg)*	Lab
Nickel	0.9	GEL
Nickel	2.7	SHE
Zinc	1.5	GEL
Zinc	8.2	SHE
Hex Chrom	0.6	GEL
Hex Chrom	2.9	SHE

Station ID	Sample ID	Interval *(ft.)*	Date/Time	Sample Type	Matrix	Lab
ECN1-045-BKG	4QCSSLPECN168	10-12	10/01/20 0935	REG	SOIL	GEL
ECN1-045-BKG	4QCSSLPECN169	10-12	10/01/20 0945	SPL	SOIL	SHE

Anomalies observed were:

Analyte	Conc. *(mg/kg)*	Lab
Aluminum	10,000	GEL
Aluminum	26,200	SHE

Analyte	Conc. *(mg/kg)*	Lab
Barium	0.473	GEL
Barium	2.8	SHE

J.2.4 Data Usability

The analytical data from this project are considered usable for purposes outlined in the *RFI/RI Work Plan Characterization for the ECODS N-1 (NBN), Central Shops Scrap Limber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (U)* (SRNS 2020). A total of 120 environmental sample records were rejected (1.9%), which consisted primarily of the semi-volatile results from two samples; the rejected data were not used. Although some samples results were qualified (estimated results = 8.3%) based on poor surrogate recoveries and/ or method blank detections, the data is still considered usable for the purposes of decision making in the RI/BRA. Differences in sample results may also be attributed to sample matrix heterogeneity between sample aliquots, possibly due to samples not being adequality homogenized rather than analytical uncertainty. Qualification details are found in Section 3.0, Validation Findings.

J.2.5 References

SRNS, 2012. *Area Completion Projects Quality Assurance Project Plan for Environmental Data Collection and Management,* ERD-AG-2005-00001, Revision 5, Savannah River Nuclear Solutions, Savannah River Site, Aiken SC

SRNS 2015. *Analytical Data Qualification, ER-SOP-033, Revision 6, Environmental Compliance and Area Completion Projects (EC&ACP) Geochemical Monitoring Procedures* Manual C-3, Volume 10, Savannah River Nuclear Solutions, Savannah River Site, Aiken SC

SRNS 2020. *RFI/RI Work Plan Characterization for the ECODS N-1 (NBN), Central Shops Scrap Limber 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, Savannah River Site, Aiken, SC