



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)

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Attachment 1	ECODS N-1 Data Review Summary	Att1-1

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LIST OF ABBREVIATIONS AND ACRONYMS

~	approximate, approximately
<	less than
>	greater than
%	percent
ac	acre
ACP	Area Completion Projects
bgs	below ground surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CM	Contaminant Migration
CMS/FS	Corrective Measures Study/Feasibility Study
COC	Constituent(s) of Concern
CRDL	Contract Required Detection Limit
DPT	Direct Push Technology
DQD	Decision Quality Data
DQO	Data Quality Objective
DRO	Diesel Range Organics
ECODS	Early Construction and Operational Disposal Site
ERDMS	Environmental Restoration Data Management System
ESV	Ecological Screening Value(s)
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	foot, feet
ft ²	square feet
ha	hectare
HEPA	High Efficiency Particulate Air
HH	human health
HQ	Hazard Quotient
IDW	Investigation Derived Waste
kg	kilogram
km	kilometer(s)
km ²	square kilometer(s)
kV	kiloVolt
L	liter(s)
µg	microgram(s)
m	meter(s)
m ²	square meter(s)
MCL	Maximum Contaminant Level(s)
MDL	Method Detection Limit
mg	milligram(s)

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

mi	mile(s)
mi ²	miles squared
mL	milliliter(s)
msl	mean sea level
NAOU	N-Area Operable Unit
NBN	no building number
NPDES	National Pollutant Discharge Elimination System
OU	Operable Unit
PCB	polychlorinated biphenyl(s)
pCi	picocurie(s)
PQO	Project Quality Objective(s)
PRG	Preliminary Remediation Goal(s)
PTSM	Principal Threat Source Material
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCOC	refined constituent(s) of concern
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RPD	relative percent difference
RSL	Regional Screening Level(s)
ssEQL	sample-specific Estimated Quantitation Limit
SAP	Sampling and Analysis Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCE	Trichloroethylene
TCL	Target Compound List
TPH	Total Petroleum Hydrocarbon(s)
USEPA	United States Environmental Protection Agency
USDOE	United States Department of Energy
VOA	volatile organic analyte
VOC	Volatile Organic Compound
VV	Validated and Verified
WSRC	Washington Savannah River Company (2005 – 2008)
WSRC	Westinghouse Savannah River Company (1989 – 2005)

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) was prepared in accordance with the United States Environmental Protection Agency (USEPA) *Uniform Federal Policy for Quality Assurance Project Plans* (USEPA, et al, 2005) and the *Area Completion Projects Programmatic Quality Assurance Project Plan for Environmental Data Collection and Management* (SRNS 2012a). Project or task specific information for the waste unit is documented in the SAP and refers to the program level Quality Assurance Program Plan (QAPP) (SRNS 2012a) for the program level quality objectives, standard operating procedures, and quality assurance/quality control procedures.

1.1 Sampling Unit Name and Purpose for Sampling

This SAP was prepared to direct pre-work plan characterization sampling, analysis, and related activities at the Early Construction and Operational Disposal Site (ECODS) N-1 (No Building Number [NBN]), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (Ford Building) Operable Unit (OU) [ECODS N-1, 631-2G, and 690-N OU] located at the Savannah River Site (SRS) in Aiken, South Carolina. The ECODS N-1, 631-2G, and 690-N OU is in various stages of assessment, cleanup, and deactivation and decommissioning. The subunits in this OU were separated from the N-Area Operable Unit (NAOU) to become a standalone OU. The ECODS N-1, 631-2G, and 690-N OU is comprised of both industrially developed zones and undeveloped areas. These subunits are listed in the Federal Facility Agreement (FFA) for SRS (FFA 1993).

The primary objective of this pre-work plan characterization is to generate sufficient representative data to support the remedial decision process, including document preparation (e.g., Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation Report with Baseline Risk Assessment and Corrective Measures Study/Feasibility Study (RFI/RI/BRA CMS/FS), Statement of Basis/Proposed Plan, Record of Decision, etc.) and to determine if any remedial actions will be required. Specifically, the pre-work plan SAP is being developed to determine the nature and extent of contamination resulting from past facility operation at the ECODS N-1, 631-2G, and 690-N OU. The results from this data collection may

also identify additional data gaps to be filled by a future characterization effort. The OU is to be addressed under an integrated RFI program with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements to provide for a focused environmental program.

1.2 Sampling Unit Location

The SRS occupies an area of approximately (~) 800 square kilometers (km²) (310 square miles [mi²]) adjacent to the Savannah River, principally in the Aiken and Barnwell Counties of South Carolina (Figure 1). The ECODS N-1, 631-2G, and 690-N OU consists of three separate subunits within and around N-Area. N-Area, also known as Central Shops, lies in the central portion of the SRS ~10.5 km (6.5 mi) from the SRS boundary (Figure 2). ECODS N-1 is located outside of the southeastern boundary of N Area, the Central Shops Scrap Lumber Pile (631-2G) is located outside of the northern boundary of N-Area and Building 690-N is located in the southeastern portion of N-Area (Figure 3).

1.3 Statement of Broad Objectives for the Sampling

The objective of this sampling activity is to collect samples of various media to characterize the ECODS N-1, 631-2G, and 690-N OU for assessment in a future RFI/RI/BRA CMS/FS, identify any additional data gaps, and to help determine if early actions are appropriate. In addition, groundwater samples will be collected at select locations to evaluate support contaminant migration evaluation conclusions. Groundwater is not part of this OU. Groundwater will be investigated and remediated, as applicable, under the Central Shops Groundwater OU.

2.0 SAMPLING UNIT BACKGROUND

In the FFA Revision 0, Appendix E for Fiscal Year 2014 submittal, based on a request from the USEPA and South Carolina Department of Health and Environmental Control (SCDHEC), the following subunits were separated from the NAOU to become a standalone OU (United States Department of Energy [USDOE] 2013):

- ECODS N-1 (NBN) (Figure 4),

- Central Shops Scrap Lumber Pile (631-2G) (Figure 5),
- Sandblast Area CMN-001 (NBN), and
- Building 690-N, Process Heat Exchanger Repair Facility (Ford Building) (Figure 6).

The Sandblast Area CMN-001 (NBN) is an active unit and will continue to remain active. Therefore, it was removed from the standalone OU and returned to the NAOU in the FFA Revision 0, Appendix E for Fiscal Year 2018 submittal (USDOE 2017).

The physical and geographical description (Section 2.1), operational history (Section 2.2), previous investigations and regulatory actions (Section 2.3), and summary of existing data (Section 2.4) as discussed in the noted sections influenced the ECODS N-1, 631-2G, and 690-N OU SAP design.

2.1 Sampling Area Physical and Geographical Description

This section presents background information about the physical characteristics of the sampling unit such as unit-specific geologic and hydrogeologic description, size, physical setting, and history.

2.1.1 ECODS N-1

ECODS N-1 is in a relatively flat area that gradually slopes to the south. It is ~107-meters (m) long by 15-m wide (350-feet (ft) long by 50-ft wide). Historical aerial photographs revealed that the area where the subunit is located was farmland prior to construction of the SRS (WSRC 2001). The subunit is currently comprised of a wooded area containing mature pine trees and provides moderate habitat quality for wildlife receptors. The trees within the subunit were removed during logging operations in the summer of 2000 and replanted sometime in the early 2000-time frame.

The subunit is located within the Pen Branch Watershed (Figure 7). As reported in the *Site Evaluation Report for Early Construction and Operational Disposal Site (ECODS) N-1 (NBN)* (WSRC 2001), ground surface elevation at this subunit 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 ~366 m (1,200 ft) to the south. From this point, the unnamed tributary flows south

for 1.9 km (1.2 mi) before discharging into Pen Branch, which then flows south and west for an additional 16.9 km (10.5 mi) before entering the Savannah River. Drainage from the subunit does not discharge to a National Pollutant Discharge Elimination System (NPDES)-permitted storm water outfall, as it is in an area not served by storm sewers. Soils in much of the subunit consist of Dothan Sand. This soil type is a well-drained sandy loam which is strongly acidic, with moderately low permeability and moderate water capacity. The surface soil is sand, with a subsoil of sandy loam and sandy clay loam (SCS 1990).

No groundwater monitoring has occurred related to ECODS N-1. However, the nearest monitoring well is CBR 3D (Figure 9), which is associated with the Central Shops Burning/Rubble Pit (631-6G) characterization. Based on first quarter 1995 monitoring data depth-to-water at well CBR 3D is 14 m (46 ft). There are no down-gradient wells in the vicinity of the subunit. Analysis of first quarter 2001 groundwater data indicates that groundwater beneath the subunit flows to the southwest (Figure 8) (WSRC 2001).

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

Central Shops Scrap Lumber Pile (631-2G) lies in a southwestern sloping plain adjacent to the Central Shops Burning/Rubble Pits (631-1G and 631-3G) and north of a surface water impoundment area (southwestern portion of the subunit), a wetland area (southwest of the impoundment area) and intermittent stream (located within the wetland area). Toxicity tests (aquatic and sediment) were conducted on the surface water impoundment area, wetland area and intermittent stream and the results are presented in the RFI/RI with BRA for the Central Shops Burning/Rubble Pits (631-1G and 631-3G) (WSRC 1998). No ecological refined constituents of concern (RCOCs) were identified in surface water or sediment as a result of these tests; therefore, the area will not be included as part of this SAP (WSRC 2003a). The subunit measures 91.4 m by 91.4 m (300 ft by 300 ft) and covers ~0.84 hectare (ha [2.07 acres {ac}]). Prior to 1951, the area was used as farmland (WSRC 2003a). This subunit is currently covered by immature volunteer pine trees and provides marginal habitat quality for wildlife receptors. Although 631-2G is referred to as a pit, it is more accurately referred to as a scrap lumber pile, which was an active burning area up until the mid-2000s.

Building 631-2G is within the Fourmile Branch watershed (Figure 7). As reported in the RFI/RI with BRA for the Central Shops Burning/Rubble Pits (631-1G and 631-3G) (WSRC 1998), ground surface elevation in the area is ~84-m (275-ft) above msl. Surface waters in the vicinity of the area flow into an unnamed intermittent stream, which feeds directly into Fourmile Branch about 2.6 km (1.6 mi) to the northwest at ~55-m (180-ft) above msl. Fourmile Branch drains into the Savannah River ~14.5-km (9-mi) downstream. Directly to the north of the unnamed tributary and south of 631-2G is a ponded area, which includes the surface water impoundment area and the adjacent wetland, which received surface runoff from the active burning area and the east side of Pit 631-1G (Figure 5). This natural wetland is less than 0.4 ha (1 ac) in size. The impoundment area also receives runoff from Pits 631-1G and 631-3G and drains to NPDES Outfall N-17 (previously referred to as CS-17) (Figure 5). Drainage ditches and the flow paths of stormwater runoff have changed over time.

Soils in the subunit are fill material from some other area (WSRC 2000a). Surface soils in the vicinity of the subunit belong to the Fuquay-Blanton-Dothan association, which includes well-drained and somewhat excessively drained soils that have a loamy subsoil (SCS 1990). These sloping to nearly horizontal soil layers occur on broad upland ridges. The association makes up 47 percent (%) of the surface soils on SRS (WSRC 1998). The backfill material within the subunit belongs to the Udorthents soil series. Udorthents soils are disturbed soils that include firm and friable substratum in industrialized areas. The Udorthents series is difficult to define because the diagnostic horizons used to classify soils have been destroyed or rearranged by heavy equipment to such an extent that the horizons cannot be identified.

The top of the water table aquifer, as recorded by the CSR well series, is about 4.6- to 10.7-m (15- to 35-ft) below ground surface (bgs), and the hydraulic gradient indicates flow is to the west (Figure 8) (WSRC 1998).

2.1.3 Building 690-N

Building 690-N lies within the N-Area facility boundary. It is a one-story metal frame structure on a concrete pad, covering ~900 square meters (m²) (9,700 square ft [ft²]) (Figure 6). The primary

area consists of a machine shop with offices, storage rooms, restrooms and a service area. Ancillary equipment or facilities include the remnants of a 1) 13.8 kV Substation (652-44N) located north of 690-N, 2) a deionizer trailer, located southwest of 690-N, 3) a Fuel Oil Containment Dike which currently contains no equipment, located south of 690-N, and 4) shielding remnants located southwest of 690-N (Figure 6). Other ancillary equipment included a retention tank, pumping station, process sewer lines and a seepage basin; these that have been removed or remediated (WSRC 2003b). A 745-N Excess Equipment Yard (Figure 6), which included 49 Reactor Heat Exchangers, a Handi-House entry point, a contaminated Model 845- DLS filter/transport trailer and the deionizer trailer, has also been demolished. The associated equipment excluding the deionizer trailer was removed from the area. The deionizer trailer is currently located southwest of 690-N (SRNS 2013). The building is in an industrial area and provides no habitat for wildlife receptors.

The area surrounding 690-N is on an interfluvial divide between the Pen Branch stream valley to the south and the Fourmile Branch stream valley to the north (Figure 7). As reported in the *Removal Site Evaluation Report for the Ford Building Seepage Basin* (WSRC 1997), topography slopes very gently to the southeast to an unnamed tributary of Pen Branch about 457 m (1,500 ft) to the south. Ground surface elevations in the vicinity of the unit are ~91.4-m (300-ft) above msl. Pen Branch is ~2.1-km (1.3-mi) south of the subunit and drains into the Savannah River 14.5-km (9-mi) downstream. An unnamed tributary of Pen Branch is about 457 m (1,500 ft) to the south. The elevation at the confluence of the unnamed tributary within Pen Branch is 58-m (189-ft) above msl. Fourmile Branch is ~4.0-km (2.5-mi) north of the subunit and drains into the Savannah River 16-km (10-mi) downstream. An unnamed tributary of Fourmile Branch is located ~549 m (1,800 ft) to the northeast. The elevation at the confluence of the unnamed tributary within Fourmile Branch is 5- m (179-ft) above msl. Three NPDES Outfalls N-7, N-8, and N-9 drain surface water from the vicinity. The outfalls were previously designated as CS-007, CS-008, and CS-009; S-7, S-8, and S-9; and CS-7, CS-8, and CS-9. Outfall N-7 flows from the north side of the Ford Building and drains into the Fourmile Branch drainage system. Outfall N-8 flows from the south side of the Ford Building and flows east into the Pen Branch drainage system. Outfall N-9 drains the south side of the seepage basin and flows into Outfall N-8.

Surface soils in the vicinity of the subunit belong to the Udorthents soil series, which are disturbed soils that include firm and friable substrata in industrialized areas (WSRC 1997). The Soil Conservation Service has described Udorthents as well drained soils formed in heterogeneous materials that are derived as spoil or refuse from excavations and major construction operations (SCS 1990). The Udorthents series is difficult to define because the diagnostic horizons used to classify soils have been destroyed or rearranged by heavy equipment to such an extent that the horizons cannot be identified. The properties of Udorthents soils can change dramatically within a few feet. Udorthents generally include varying amounts of gravel, sand, and clay. The gravels and sands tend to prevent the accumulation of rainwater at the surface and the clays tend to inhibit the migration of inorganics. A potentiometric map of the water table aquifer was generated in July 1996 for Central Shops using synchronous water table elevations in monitoring wells screened in the water table aquifer. The map indicates that the unconfined groundwater in the vicinity of the subunit flows from northeast to southwest (Figure 8), with the water table in the area at ~13- to 16-m (43- to 53-ft) bgs (WSRC 1997).

2.2 Operational History

This section presents any operational knowledge about each sampling unit such as history of contamination, type of contaminants, nature of contamination, and any details concerning process knowledge.

2.2.1 ECODS N-1 (NBN)

ECODS N-1 is one of 25 ECODS which were identified during a review of early 1950s aerial photographs. These sites were used during the construction and early operation of SRS for disposal of construction debris and other waste materials. Waste disposed of in ECODS N-1 was buried in two trenches each ~46-m (150-ft) long and located end-to-end. Some sections of these sites may have also been used as burn pits for disposal of combustible waste. ECODS N-1 was used to dispose of materials, potentially containing asbestos, associated with the construction and operation of N Area. N Area is an industrialized area which maintained a high level of activity in prior years. It includes SRS construction offices and administrative facilities, several large fabrication shops, and various material and equipment storage and laydown areas. Aerial

photographs identify the subunit as being in use from approximately August 1952 to June 1954 (WSRC 2001).

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

Central Shops Scrap Lumber Pile (631-2G) was cleared in 1951 and was used for equipment laydown and rubble storage, in addition to a burning area. Since 1975, its operating procedures have called for the area to receive inert, nonhazardous materials. It has received such materials as nails, hinges, scrap lumber, poles, crates, pallets, and unsalvageable wood products (WSRC 1998). Historically, 631-2G has been used to burn various unknown types and quantities of wood. These types of wood may have included treated lumber and creosote-treated wood. Historical burning at the Central Shops Scrap Lumber Pile (631-2G) resulted in ash that was placed directly into Pits 631-1G and 631-3G. Since the 2000s, burning operations at 631-2G were limited to untreated wood products, such as shipping pallets, and the ash was collected and hauled to the Burma Road Landfill at SRS (WSRC 1998). There are no records of hazardous wastes or hazardous constituents disposed of at this site. There have been no hazardous constituents detected in the groundwater monitoring wells installed in the vicinity of the site.

2.2.3 Building 690-N

Building 690-N 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. 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 leaking contaminated process water heat exchangers from SRS reactors. 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 Building 690-N. The facility operated for about six 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 (SRNS 2009a).

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. Repair workers sent the wastewater to a 22,712.5 liters (6,000-gallon) underground retention tank adjacent to the Ford Building, where the wastewater was analyzed for radionuclides. Depending on the results, the wastewater was either released to the Ford Building Seepage Basin through an underground process sewer pipeline or transferred to other SRS operations for proper disposal (SRNS 2009a).

2.3 Previous Investigations/Regulatory Actions

Provides a brief discussion of the regulatory history, previous sampling results, chronology, and outcome of previous investigations and any remedial, removal, or interim actions previously completed (reference any parent document(s)).

2.3.1 ECODS N-1 (NBN)

In January 2001, composite soil sampling was performed at ECODS N-1 for target analyte list (TAL) constituents (inorganics) and target compound list (TCL) compounds (organic chemicals, pesticides, and polychlorinated biphenyl [PCBs]) at 0- to 0.3-m (0- to 1-ft), 0.3- to 1.2-m (1- to 4-ft), and 2.4- to 3-m (8- to 10-ft) depths. A total of 90 samples were collected. A review of the analytical results for these constituents indicated that soil at two adjacent sample locations, ECN1-8 and ECN1-11 (Figure 9), were found to contain concentrations above the Region IX residential preliminary remediation goals (PRGs) for antimony, arsenic, cadmium, lead, iron, and benzo(a)pyrene. In addition, arsenic and iron were present in many other locations at concentrations above the Region IX residential PRGs, with arsenic concentrations also exceeding the Region IX industrial PRG for most samples. It was determined that potential impacts to human health or the environment through soil or groundwater pathways could be present. Therefore, problems

warranting further investigation and action associated with ECODS N-1 were identified (WSRC 2001).

Based on these findings, in accordance with 300.420(b)(1)(I) of the National Oil and Hazardous Substances Pollution Contingency Plan, the subunit was removed from Appendix G.1, Areas to Be Investigated, and placed in Appendix C, RCRA/CERCLA Units, of the SRS FFA, for further action (WSRC 2001).

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

Historically, 631-2G has been used to burn various unknown types and quantities of wood. These types of wood may have included treated lumber and creosote-treated wood. Burning treated wood can result in the release of heavy metals including arsenic, chromium, and copper. Based on the geologic log of a soil boring collected in the center of the subunit (CSBRP-14), fill was brought in and spread over the burning area (WSRC 1998).

Several debris piles within the scrap lumber pile were located in the wooded areas near the 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. There is no record of disposal of hazardous wastes in either the debris piles or the Central Shops Scrap Lumber Pile. All of the debris (including construction debris, plastics, and metal shavings) was removed in 11 skid pans to a landfill or recycled. There did not appear to be any evidence of CERCLA hazardous waste.

In January 1999 toxicity tests were performed on the sediment and surface water within the wetland and surface water impoundment area. The results suggested that the surface water and sediment within the subunit was not toxic to the biota that inhabit the wetland and surface water impoundment area. As a result, no final constituents of concern (COCs) were identified for ecological health. (WSRC 1998).

2.3.3 *Building 690-N*

In October 1997 it was determined that cutting oil used in some of the machinery inside the radiological-contaminated areas of 690-N contained PCBs, a Toxic Substances Control Act regulated chemical. PCB concentrations were found in sufficient quantities to require cleanup. As a result, cleanup activities were performed in 1998 and the floor was encapsulated with epoxy primer and basecoat floor coatings to prevent further spread of PCB contamination (SRNS 2014). In August 2009, a third coat of paint was added to seal radioactive contamination. Site PCB labels were placed on the final layer of paint. The building entry points were also posted as a PCB contamination area (SRNS 2009a).

On August 20, 2012, an inspection was performed to determine the presence of any asbestos containing material used in construction and maintenance of Building 690-N. Twenty-one suspect homogenous type materials were identified in this inspection. After the hands-on inspection, the description of the 44 linear ft of material in question was revised to fiberglass thermal system insulation finished with an un-sized or coated cloth canvas jacketing material. Approximately six elbows, one valve and one tee were identified containing asbestos. These joints were insulated with an asbestos containing insulation cement (SRNS 2012b).

In 2014, SRS performed further characterization of 690-N using more aggressive methods (i.e., more sampling). The additional assessment concluded that minimal radiological, PCB, or RCRA hazardous contamination is present in the concrete floor slab, soils below the concrete floor slab, steel hut containment walls of the 690-N facility and the ancillary equipment and facilities (SRNS 2014).

Deactivation and decommissioning activities and removal of various components, equipment and facilities within the subunit area have taken place over the years. Associated equipment and areas outside of the building have also been decommissioned and demolished or remediated including the Ford Building Seepage Basin (904-91G), the substation area (652-44N), the fuel oil tank, and the Excess Equipment Yard (745-N).

In 2013, a *Decommissioning Project Plan for Building 690-N (Ford Building), and Its Ancillary Equipment/Facilities*, was issued verifying that 690-N meets and satisfies the requirements of Manual C2 Procedure 2.04, *Electrical and Mechanical Isolations of Facilities To Support D&D Work*, in that the facility is electrically and mechanically isolated (i.e., cold and dark) and is ready for further deactivation and decommissioning activities (SRNS 2014).

In 2015, the 745-N Excess Equipment Yard was demolished, and soil sampling was performed within the area. It was determined that radiological analyses exceeded risk-based thresholds (SRNS 2015).

2.4 Summary of Existing Data Compared to Risk-Based Thresholds

The primary goal of the SAP is to collect representative surface and subsurface soil data as well as groundwater data within and/or adjacent to the ECODS N-1, 631-2G, and 690-N OU in order to determine if contamination is present; and if so, to define the nature and extent of contamination. The sampling results generated from this pre-work plan characterization will be used to support the need for early actions at the individual subunits, as appropriate, and support future remedial decision-making at the ECODS N-1, 631-2G, and 690-N OU.

2.4.1 ECODS N-1 (NBN)

ECODS N-1 was investigated by the Site Evaluation program (WSRC 2001). Construction debris and other waste materials were found in the trenches. A portion of the trenches may have also used as burning pits for combustible waste. Composite soil sampling was conducted at 27 locations including three background locations. Samples were collected from 0- to 0.3 m (0- to 1 ft), 0.3- to 1.2 m (1- to 4 ft) and 2.4- to 3 m (8- to 10 ft). The soil samples were analyzed for the complete list of TAL/TCL constituents.

Comparison of the analytical data to USEPA Region 9 PRGs indicated benzo(a)pyrene, antimony, arsenic, cadmium, iron, and lead exceeded residential PRGs but all constituents remained below their respective industrial PRGs. Antimony, cadmium, lead, and one of the two benzo(a)pyrene, as well as the four highest arsenic exceedances were in two samples, ECN1-08-01 and ECN1-11-02. The other benzo(a)pyrene exceedance was from sample ECN1-01-02

(WSRC 2001). Asbestos is assumed to be present at ECODS based on programmatic agreements by the Core Team (SCDHEC, USEPA, and USDOE).

A recent evaluation of all existing data from the Site Evaluation report (WSRC 2001) was conducted using the most recent PRGs. Results are concluded in Attachment A.

The primary data needs for the ECODS N-1 include the following:

- Surface, subsurface, and deep subsurface soil samples will be collected around the subunit boundaries to determine the nature and horizontal extent of soil contamination, if any.
- Groundwater samples will be collected from an existing upgradient well and downgradient by direct push technology (DPT) to verify that no groundwater contamination has occurred as a result of operations at this subunit.

The above data will be used to support the need for early actions at this subunit and support future remedial decision-making using ecological and human health risks, principal threat source material (PTSM), and contaminant migration evaluations. In addition, groundwater samples will be used to corroborate the results of the contaminant migration evaluation. Groundwater is not part of this OU. Groundwater will be investigated and remediated, as applicable, under the Central Shops Groundwater OU.

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

The Central Shops Scrap Lumber Pile (631-2G) was used for equipment laydown and rubble storage, in addition to a burning area. Operating procedures for the unit have called for the area to receive inert, nonhazardous materials. It has received such materials as nails, hinges, scrap lumber, poles, crates, pallets, and unsalvageable wood products. 631-2G is adjacent to the Central Shops Burning/Rubble Pits (631-1G and 631-3G) and north of a surface water impoundment area (southwestern portion of the subunit), a wetland area (southwest of the impoundment area), and intermittent stream (located within the wetland area) (Figure 5). All of the associated areas have been characterized with the exception of the Central Shops Scrap Lumber Pile itself. The Central Shops Burning/Rubble Pits (631-1G and 631-3G) identified arsenic, dibenz(a,h)anthracene, and

indeno(1,2,3-cd)pyrene as refined human health constituents of concern (HH RCOCs) in soil. Arsenic was also identified as an HH RCOC in sediment within the ponded area (WSRC 1998). No final COCs were identified in the surface water impoundment area, wetland area, or intermittent stream for ecological health (WSRC 1998).

Therefore, the primary data needs for the Central Shops Scrap Lumber Pile (631-2G) include the following:

- Surface, subsurface, and deep subsurface soil samples will be collected within and around the subunit to determine the nature and horizontal extent of soil contamination, if any.
- Groundwater samples will be collected from existing upgradient and downgradient wells to verify that no groundwater contamination has occurred as a result of operations at this unit.

Data gathered from the pre-characterization effort will be used to support the need for early actions at this subunit and support future remedial decision-making using ecological and human health risks, PTSM, and contaminant migration evaluations. In addition, groundwater samples will be used to corroborate the results of the contaminant migration evaluation. Groundwater is not part of this OU. Groundwater will be investigated and remediated, as applicable, under the Central Shops Groundwater OU.

2.4.3 Building 690-N

The area surrounding 690-N is the primary concern of this SAP. Building 690-N was the process heat exchanger repair facility for the SRS reactors. Building 690-N is a one-story metal frame structure on a concrete pad. Building 690-N and other ancillary equipment and facilities within the area were previously characterized and the results are documented in a characterization report. Minimal radiological, PCB, or RCRA hazardous contamination is present in the concrete floor slab, soils below the concrete floor slab and the steel hut containment walls of the 690-N facility and the ancillary equipment and facilities (SRNS 2014)

The 745-N Excess Equipment Yard housed 49 Reactor Heat Exchangers, a Handi-House entry point, a contaminated Model 845-DLS filter/transport trailer and the deionizer trailer. The Excess

Equipment Yard was demolished in 2015 and soil sampling concluded that radiological analyses exceeded risk-based thresholds (SRNS 2015).

The Ford Building Seepage Basin received wastewater from 690-N. The Ford Building Seepage Basin was remediated in accordance with the information documented in the *Record of Decision Remedial Alternative Selection for the Ford Building Seepage Basin (904-91-G) Operable Unit* (WSRC 2000b). HH RCOCs identified for the Ford Building Seepage Basin were arsenic, cesium-137, cobalt-60, and europium-154. Aroclor 1254 was the only ecological RCOC.

The primary data needs for Building 690-N include the following:

- Surface, subsurface, and deep subsurface soil samples will be collected around the facility area to determine the nature and horizontal extent of soil contamination, if any.
- Groundwater samples will be collected from proposed upgradient and downgradient by DPT to verify that no groundwater contamination has occurred as a result of operations at this subunit.

The above data will be used to support the need for early actions at this subunit and support future remedial decision-making using ecological and human health risks, PTSM, and contaminant migration evaluations. In addition, groundwater samples will be used to corroborate the results of the contaminant migration evaluation. Groundwater is not part of this OU. Groundwater will be investigated and remediated, as applicable, under the Central Shops Groundwater OU.

3.0 PROJECT DATA QUALITY OBJECTIVES

The Data Quality Objective (DQO) process is a series of logical steps that guides managers or staff to a plan for the resource-effective acquisition of environmental data. It is both flexible and iterative, and applies to both decision-making (e.g., compliance/non-compliance with a standard) and estimation (e.g., ascertaining the mean concentration level of a contaminant). The DQO process is used to establish performance and acceptance criteria, which serve as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of the study. Use of the DQO process leads to efficient and effective expenditure of resources; consensus

on the type, and quantity of data needed to meet the project goal; and the full documentation of actions taken during the development of the project. The DQO process is a series of seven planning steps based on the scientific method (Sections 3.1 to 3.7 below) and is detailed in the USEPA Guidance (USEPA 2006).

3.1 State the Problem

The following ECODS N-1, 631-2G, and 690-N OU subunits have, or may have, contaminants that exceed the human health risk thresholds, or constituents that impact groundwater at levels exceeding maximum contaminant levels (MCLs), or contaminants that exceed PTSM threshold (risk >1E-03) for an industrial worker:

- ECODS N-1 (NBN),
- Central Shops Scrap Lumber Pile (631-2G), and
- Building 690-N, Process Heat Exchanger Repair Facility (Ford Building).

The following ECODS N-1, 631-2G, and 690-N OU subunits have, or may have, contaminants that exceed a Hazard Quotient (HQ) of 1 for ecological receptors:

- ECODS N-1 (NBN),
- Central Shops Scrap Lumber Pile (631-2G).

3.2 Identify Goals of the Study

The objective of this sampling activity is to collect representative data of sufficient quality that will be used to make remedial decisions concerning human health and ecological risks, PTSM, and contaminant migration evaluations for all subunits that comprise the ECODS N-1, 631-2G, and 690-N OU, as described in Section 4.0 of this document. Some ECODS N-1, 631-2G, and 690-N OU subunits have very little existing data and will require more extensive characterization. However, the ECODS N-1 subunit has sufficient existing data and requires little additional characterization.

All existing data will be used to the extent possible for determining subunit risks. Biased sampling plans have been developed for each subunit as a conservative approach to identify the highest

constituent levels for each subunit, as detailed in Section 4.0 of this document. The specific goals for this SAP are to provide sufficient data for future regulatory documents to determine which of the following likely response actions is most appropriate for each subunit:

- ECODS N-1 (NBN)
 - No Action;
 - Land Use Controls;
 - Cover;
 - Excavation of contaminated soil.

- Central Shops Scrap Lumber Pile (631-2G)
 - No Action;
 - Land Use Controls;
 - Cover;
 - Excavation of contaminated soil.

- Building 690-N, Process Heat Exchanger Repair Facility (Ford Building)
 - No Action;
 - Land Use Controls;
 - Cover;
 - Excavation of contaminated soil.

3.3 Identify Information Inputs

All historical data collected for the ECODS N-1, 631-2G, and 690-N OU subunits have been reviewed and summarized in Section 2.4 of this document. The data is of sufficient quality to make remedial decisions, but more data is required for individual subunits. Evaluation of the previous data requires a new data collection event due to identification of data gaps in the existing data set.

USEPA Regional Screening Levels (RSLs), Radiological PRGs, ecological screening values (ESVs), and MCLs will be used as basis for acceptance/performance criteria to determine if contaminated media poses a risk to human health or the environment. RSLs and radiological PRGs, ESVs, and MCLs will be used as the basis to guide remedial decisions concerning human health risk, ecological risk, and groundwater contamination, respectively. Additionally, radionuclide and metals data for the vadose zone samples will be compared against SRS

background soil values (WSRC 2006) to identify COCs. A contaminant migration analysis will be conducted on any resulting COCs to determine the potential for groundwater impacts.

3.4 Define the Boundaries of the Study

The administrative boundaries specific to each ECODS N-1, 631-2G, and 690-N OU subunit are delineated in Figures 4 to 6. Soil and groundwater samples will be collected at all of the subunits within the ECODS N-1, 631-2G, and 690-N OU, per planned locations shown on Figures 8 to 10. These locations will be subject to adjustment in the field based on potential interferences. The locations reflect the likely extent, or location of potential contamination, based on historical process history and field walkdowns.

3.5 Develop the Analytical Approach

Samples will be analyzed by laboratories that have passed the USDOE Consolidated Audit Program qualification audit and using USEPA SW846 methods, or approved equivalents, which have been certified by SCDHEC. Radiological analyses are performance based and evaluated by the USDOE Mixed Analyte Performance Evaluation Program. Laboratory developed radionuclide methods are typically based on USEPA or USDOE methods.

The COCs for the ECODS N-1, 631-2G, and 690-N OU subunits will be identified by comparing the analytical results to the USEPA RSLs, Radiological PRGs and ESVs for soil samples. Soil data exceeding RSL values, or Radiological PRG values, will be screened against SRS background soil values (WSRC 2006) to determine if inorganic, or radionuclide, concentrations are within normal ranges for SRS soil. In most cases, indicator analyses (i.e., gross alpha and nonvolatile beta) will be used to identify if a given media at a subunit requires more extensive radiological analyses. If the gross alpha result exceeds 20 pCi/g for a soil sample or exceeds 15 pCi/L for a water sample, then the Alpha spectroscopy radionuclides in Table 10 will also be analyzed for that sample. If the nonvolatile beta result exceeds 50 pCi/g for a soil sample or exceeds 50 pCi/L for a water sample, then the gamma spectroscopy radionuclides and individual beta analyses in Table 10 will also be analyzed for that sample.

MCLs will be the point of comparison for groundwater constituent concentrations according to the protocols established in the FFA. In the absence of an MCL for a constituent, the USEPA tap water RSLs, which specify a 1E-06 or an HQ of 1 human health risk-based threshold values for constituents, will be used as a comparison for groundwater concentrations. Therefore, MCLs will be the primary point of comparison for an Action Level; but if a constituent does not have an MCL, then the RSL will be the primary point of comparison for an Action Level. Additional details for the analytical approach are provided in Section 5 of this SAP.

3.6 Specify Performance or Acceptance Criteria

According to USEPA guidance (USEPA 2006), the USEPA has developed the DQO process as the agency's recommended planning process when environmental data are used to select between two or more alternatives or to derive an estimate of contamination. The DQO process is a seven-step method designed to ensure that the appropriate type, quantity, and quality of environmental data are collected for the intended application.

Tables 1 through 6 present DQO worksheets developed for each subunit and/or media and specifies the quantity, type, and quality, of data as well as ensuring representative data is collected for each sampling population. USEPA SW846 methods are analytical specifications for the TAL/TCL constituents (Tables 8 and 9), while radiological methods are generally performance based by each laboratory (Table 10). Additional analytical details are presented in the Analytical Plan, Section 5.0.

Total study error is the additive impact of two main sources of error: 1) sampling error and 2) measurement error, with sampling error being responsible for the vast majority of the total error. "As much as 90% or more of the uncertainty in environmental data sets is due to sampling variability as a direct consequence of the heterogeneity of the environmental matrices" (Crumbling 2001). The method best suited to reduce sampling error is to gather representative samples (Crumbling 2001).

It is incorrect to assume that randomly collected, non-representative samples, plus perfect analytical chemistry will always lead risk managers to correct risk management decisions. In order

to avoid incorrect risk management decisions, it is more important to develop Decision Quality Data (DQD). DQD is defined as “Data of known quality that can logically be demonstrated to be effective for making the specified decision because both the sampling and analytical uncertainties are managed to the degree necessary to meet clearly defined and stated data needs” (Crumbling 2001). Therefore, it is more important for the risk managers to use DQD, emphasizing representative sampling with a specified percentage of definitive data, in order to make a correct decision and should not be confused by emphasizing analytical data quality which does not necessarily equate to a correct risk management decision.

Because the SRS possesses significant process and historical knowledge and in most instances has preliminary or survey data results for the majority of its waste units, this sampling plan will largely control sampling error (the cause of greatest total error) and set tolerable limits on decision errors by gathering data by judgmental, judgmental-stratified, and systematic sampling designs based on process knowledge, existing data, historical information/data, survey data, and institutional knowledge to generate DQD. This is the method SRS will use to control decision errors, since sample collection will be focused in areas of known contamination rather than using a sampling design intended to randomly search for contamination. Judgment-based sampling provides a very conservative and certain method for collecting data with a high likelihood for detecting worst-case contaminant concentrations while reducing total study error. Project Quality Objectives (PQOs) are qualitative and quantitative statements derived from the DQO process that clarify study objectives for the measurement performance criteria which define the appropriate types of data and acceptance limits for data. PQOs are used as the basis for establishing the quality and quantity of data needed to support decisions. The PQOs for the ECODS N-1, 631-2G, and 690-N OU include the following:

- RPD (relative percent difference) <20% between regular groundwater sample and field duplicate when result \geq ssEQL (sample-specific estimated quantitation limit) for precision data quality indicator
- RPD <50% between regular soil sample and field duplicate when result \geq ssEQL for precision data quality indicator

- RPD <100% when groundwater sample result \geq Method Detection Limit (MDL) (method detection limit) but < ssEQL for precision data quality indicator
- RPD <200% when soil sample result \geq MDL but < ssEQL for accuracy/bias for precision data quality indicator
- Percent Recovery from Matrix Spike (MS) and Matrix Spike Duplicates are generally \geq 135% or <30% for accuracy/bias data quality indicator. MS recovery windows may be tighter than those listed. Refer to the Measurement Performance Criteria Tables in the QAPP (SRNS 2012a) for analyte and media-specific recovery percentages.
- No target compound \geq ssEQL for equipment blank, field blanks, method blanks, or instrument blanks for accuracy data quality indicator
- ssEQL < MCL, RSL, or PRG for sensitivity data quality indicator
- Split sample result will have an RPD <100% for groundwater samples and 200% for soil samples.
- 5% of the samples will be split samples for the comparability data quality indicator.
- 95% of samples sent to laboratory have useable (non-rejected) results for completeness data quality indicator
- 90% of planned samples are collected and their data are useable for completeness data quality indicator

The objective for the representativeness data quality indicator is qualitative and will 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 nonrepresentative, the information is qualified for use or is not used by the project.

3.7 Develop the Plan for Obtaining the Data

In general, shallow soil samples will be collected by hand auger, while deeper soil samples will be collected by DPT. Groundwater samples will be collected using existing monitoring wells and by DPT as part of the investigation for ECODS N-1, 631-2G, and 690-N OU. Soil and groundwater samples will typically be analyzed for the TAL/TCL constituents (Tables 8 and 9). Additionally, radiological indicator analyses will be performed on the 631-2G and 690-N subunit samples (Table 10). Those samples with radiological indicator analyses exceeding the trigger limits will receive the appropriate radionuclide-specific analyses for alpha-, beta-, and/or gamma emitting radionuclides (Table 10). The specific sampling and analysis plan for each ECODS N-1, 631-2G, and 690-N OU subunit is provided in Section 4.0 of this SAP.

4.0 SAMPLE DESIGN AND RATIONALE

Implementation of the SAP to obtain DQD for each subunit/media is documented in the remaining sections of this sampling and analysis plan. The following section describes how the plan is implemented to collect the physical data to meet the criteria developed during the DQO process.

4.1 ECODS N-1 (NBN)

ECODS N-1 was one of the disposal sites for the early construction of N-Area. ECODS N-1 has been investigated by the Site Evaluation program (WSRC 2001). It appears that the nature and extent of contamination was well bounded for the ECODS N-1 subunit, except for the western side of the subunit and two other locations along the southern boundary. Data is needed to more accurately define the extent of contamination at these locations. A previous ground penetrating radar (GPR) survey was conducted for the ECODS N-1 but was unsuccessful due the extensive debris left behind from previous forest service operations. Due to the heavily forested area within the ECODS N-1 a GPR survey will not be conducted during this pre-characterization effort. Locations along the western and southern boundary, ECN1-28 through ECN1-41, will be sampled to find the vertical and horizontal extent of contamination (Figure 9). 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 will receive TAL analyses.

Specific analyses for hexavalent- chromium will also be 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 (Figure 9). Groundwater samples will be taken from an existing upgradient well CBR 3D as well as from three proposed locations (ECN1-35, ECN1-39, and ECN1-41) by DPT and will receive TAL analyses (Figure 9). Groundwater in the area is ~14-m (46-ft) bgs. Groundwater is not part of this OU. Groundwater will be investigated and remediated, as applicable, under the Central Shops Groundwater OU.

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

The Central Shops Scrap Lumber Pile was an active burning area that received inert non-hazardous waste from SRS operations. Building 631-2G has not received any extensive characterization in the past. Sampling locations (CSSLP-1 through CSSLP-19) have been laid out in a grid orientation ~30.5-m (100-ft) apart across the unit (Figure 10). 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 will receive TAL, TCL and radiological indicator parameters (gross alpha and nonvolatile beta) analyses. Groundwater samples will be collected from existing wells within the area, one upgradient well CSR 4, and two downgradient wells CSR 1 and CSR 5D (Figure 10). Groundwater samples will also receive TAL, TCL and radiological indicator parameters (gross alpha and nonvolatile beta) analyses. If the gross alpha result exceeds 20 pCi/g for a soil sample or exceeds 15 pCi/L for a water sample, then the alpha spectroscopy radionuclides will also be analyzed for that sample (Table 10). If the nonvolatile beta result exceeds 50 pCi/g for a soil sample or exceeds 50 pCi/L for a water sample, then the gamma spectroscopy radionuclides and individual beta analyses will also be analyzed for that sample (Table 10).

4.3 Building 690-N

Building 690-N was the heat exchanger repair facility for SRS reactors. Radiological contaminants are the primary concern at this facility, but organic and inorganic contaminants may also be present. Previous characterization inside the facility has been completed (SRNS 2014). A GPR survey will be performed to identify any additional locations that may contain waste from previous operations. Sampling will be performed on the soils adjacent to the building as well as the surrounding

ancillary equipment and storage yard, FBFA-1 through FBFA-38 (Figure 11). 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 will receive TAL, TCL-semi-volatile organic compound (SVOC), TCL-volatile organic compound (VOC), TCL-PCB, and radiological indicator parameters (gross alpha and nonvolatile beta). Groundwater samples will be taken by DPT at sample locations FBFA-7, FBFA-17, FBFA-36, FBFA-37 and FBFA-38 (Figure 11). Groundwater samples will receive TAL, TCL-SVOC, TCL-VOC, TCL-PCB, radiological indicator parameters (gross alpha and nonvolatile beta), and tritium specific analyses. Groundwater in the area is ~13.1-16.2 m (43-53 ft) bgs. Soil and groundwater samples adjacent to the Fuel Containment Dike, FBFA-36 and FBFA-37 (Figure 11), will receive additional Total Petroleum Hydrocarbons Diesel Range Organics (TPH-DRO) analyses in the deep subsurface soils and within the water table column. If the gross alpha result for a soil sample is equal to or exceeds 20 pCi/g or exceeds 15 pCi/L for a water sample, then the alpha spectroscopy analyses will be performed on that sample (Table 10). If the nonvolatile beta result for a soil sample is equal to or exceeds 50 pCi/g or exceeds 50 pCi/L for a water sample, then the individual beta analyses will also be analyzed for that sample (Table 10).

5.0 ANALYTICAL PLAN

This section describes the data quality levels for each type of data being collected. All data collected under this SAP will follow the Area Completion Projects QAPP for Environmental Data Collection and Management (SRNS 2012a). The data quality level is determined by the intended use of the data.

5.1 Subunit Analytical Plans

The specific analytes and analytical methods and detection limits for the sampling project are listed in Tables 8 through 10. The list of TAL/TCL constituents for soil and water samples are listed in Tables 8 and 9. The radiological constituents for soil and water samples are listed in Table 10. Tables 1 to 6 present the DQOs developed for each of the subunits. Table 11 lists hold times,

preservatives, and sample containers for all analyses. The specific samples and analyses collected at each subunit are provided in Table 12.

5.2 Indicator Analyses

At SRS, radiological indicators (gross alpha and nonvolatile beta) are commonly used to identify soils and groundwater with concentrations of alpha- and beta-emitting radionuclides that may not be within the range of values expected in nature. If soil sample analytical results exceed predetermined trigger levels for gross alpha emitters (20 pCi/g) or nonvolatile beta emitters (50 pCi/g), radionuclide-specific analysis will be performed on the sample exceeding the trigger level. If groundwater sample analytical results exceed predetermined trigger levels for gross alpha emitters (15 pCi/L) or nonvolatile beta emitters (50 pCi/L), radionuclide-specific analysis will be performed on the sample exceeding the trigger level. For example, if the sample exceeds the trigger for the 20 pCi/g alpha radiation screen level, the sample will undergo radionuclide-specific analyses for alpha emitters. Use of gross alpha and nonvolatile beta trigger level is consistent with the known occurrence of natural isotopes as well as recognized characterization and investigation derived waste (IDW) management methods at SRS. The trigger levels for soil samples are based upon the maximum activities of naturally occurring isotopes in unimpacted SRS soils (WSRC 2006).

5.3 Field Analytical Sampling Quality Assurance/ Quality Control

Quality control (QC) samples will consist of field duplicates, rinsate/equipment blanks, trip blanks and split samples. Field quality assurance/quality control (QA/QC) will be maintained through the use of QA/QC samples and methods as described below.

1. **Field Duplicate (co-located) Samples:** Two or more independent samples collected from side-by-side locations at the same point in time and space so as to be considered identical. These separate samples are intended to represent the same population and are carried through all steps of the sampling and analytical procedures in an identical manner. These samples are used to assess precision of the total method, including sampling, analysis, and site heterogeneity. Field

duplicate samples are planned at a combined minimum rate of 5% according to ER-SOP-043, or typically 1 per 20 samples and analyzed for the same parameters as the associated samples.

2. **Equipment Blank:** A sample of water free of measurable contaminants poured over or through decontaminated field sampling equipment that is considered ready to collect or process an additional sample. The purpose of this blank is to assess the adequacy of the decontamination process. Also called rinse blank or rinsate blank. Equipment blanks are typically planned at a rate of 1 blank per 40 samples.
3. **Trip Blank:** A clean sample of water free of measurable contaminants that is taken to the sampling site and transported to the laboratory for analysis without having been exposed to sampling procedures. Trip blanks are analyzed to assess whether contamination was introduced during sample shipment (typically analyzed for VOCs only). A blank consists of distilled-deionized water provided by the laboratory to be placed in every cooler with VOC samples typically at the rate of 1 trip blank per cooler.
4. **Split Samples:** Two or more representative portions from a sample in the field, analyzed by at least two different laboratories and/or methods. Prior to splitting, a sample is mixed (except volatiles, oil and grease, or when otherwise determined) to minimize sample heterogeneity. These are quality control samples used to assess precision, variability, and data comparability between laboratories. Split samples are planned at a combined minimum rate of 5% or typically 1 per 20 samples and analyzed for the same parameters as the associated samples.

5.4 Data Quality Levels for the ECODS N-1, 631-2G, and 690-N OU

The characterization samples will be screening level data (SD) this data is Verified and Validated (VV) data, with 10% of the data receiving additional validation to the SRS Definitive (D) level (SRNS 2010b and SRNS 2010c). SD data is verified data which meet the following selected aspects of USEPA Functional Guideline criteria: Quantitation Limits, Surrogate or Tracer Recoveries, Blanks (Method/Lab/Prep, Trip, Field, Equipment/Rinsate), Laboratory Control Spike Recoveries, Matrix Spike Recoveries/Duplicates, Lab Replicates, Field Replicates, Cooler Temps, Chemical Preservation, Holding Times. Requirements for SD data are listed in Table 7.

5.5 Sample Matrix Table

Table 12 is a Sampling Matrix table that includes all the detailed information for all samples planned to be collected. The exact number of samples may change based on field conditions.

5.6 Sample Location Map

Figures 9 through 11 illustrates the proposed locations of samples to be collected.

6.0 FIELD IMPLEMENTATION

The following sections outline the field implementation procedures and processes for the ECODS N-1, 631-2G, and 690-N OU pre-work plan characterization effort. Additional implementing documents such as the environmental evaluation checklist, automated hazard analysis, radiological work instructions, and site-specific health and safety plan are internal to SRS, and detail day-to-day sampling operations and safety requirements.

6.1 Sample Collection Procedures and Processes

The ECODS N-1, 631-2G, and 690-N OU pre-work plan characterization effort will include soil and groundwater sampling. The following specific procedures will be followed:

- Sampling Surface and Sub-Surface Soils for Analytical Purposes, SRNS Manual 3Q1, Section 9016
- Soil and Sediment Sampling, SRNS Manual 3Q1, Section 3005
- Soil Boring Investigations, SRNS Manual 3Q1, Section 9006
- Technical Oversight Requirements for Groundwater Monitoring Wells and Soil Borings, SRNS Manual 3Q1, Section 9004

Sampling Groundwater Monitoring Wells, Tanks/Vessels (Sample Ports or Spigots) and Surface Water, SRNS Manual 3Q1, Section 9016 These procedures are consistent with the USEPA Region 4 Field Branches Quality System and Technical Procedures sampling procedures. Prior to

beginning all field activities, all field crews will be required to read the procedures listed above and the Technical Oversight will have had experience with that activity.

6.2 Equipment and Decontamination Procedures

In addition to the drilling rigs, as stated in the SAP, the following sampling equipment will be required:

- Camera for photo documentation;
- Field Logbook and/or Field Data Recorder with backup batteries;
- Global positioning system unit and backup batteries;
- Personal Protective Equipment;
- Hand auger system with bucket and extension rods;
- Stainless steel scoops, stainless steel mixing bowls, and VOC syringes;
- Balance capable of weighing to 0.01 grams;
- KIJ5 radio, Cell phone, and pager;
- All sample bottles with preservatives; and
- Cooler and frozen blue ice or equivalent for packing samples in the field.

Equipment needs will vary from day to day based on sampling requirements, field conditions, and drilling methods. Specific needs will be addressed at plan of the day meetings by the TO, industrial hygiene personnel, radiological controls inspector, and safety personnel. Decontamination of field sampling equipment will be done in accordance to the 3Q1 Manual Procedure 9016, Section 5.4. Disposal of IDW will follow the job specific waste management plan.

6.3 Sample Documentation

Overall documentation will be done in accordance with *Area Completion Projects Quality Assurance Project Plan for Environmental Data Collection and Management* (SRNS 2009b). Sample documentation will be conducted according to Manual C3, ER-SOP-043, standard operating procedure for *Obtaining and Managing Environmental Data for Environmental*

Compliance & Area Completion Projects, which provides the general requirements and guidelines that are necessary for the documentation, record keeping, mobilization, collection, processing, reporting and storage of environmental data. Data Management Plan Q-DMP-B-00001, Environmental Restoration Data Management System, requires sampling information, such as bar-coded dates, times, sample identifications, weather, etc., to be recorded and maintained in logbooks and chain-of-custody documents included in the sampling package delivered to the project. Sampling documentation is tracked through a series of documents including:

- Mobilization Report;
- Chain-of-Custody Forms;
- Field Log Books;
- Analytical Data Packages;
- SCDHEC and SRS required logs and forms.

A logbook for recording sample collection activities will be kept for this project. The subcontractor will ensure the logbook is correctly filled out and returned within two weeks after completion of sampling. Essential field information is: sample name, date of collection, time of collection, depth of sample and sampler's name. Space should be provided for any field observations or comments relating to the quality or representativeness of the sample. If the actual sample location differs from the planned sample location specified by the Chain-of-Custody, the revised sample location should be indicated in the sample logbook. Information on the parent sample of each field duplicate should be recorded.

6.4 Chain-of-Custody

Chain-of-Custody procedures establish requirements for sample custody and documenting custody from the time of collection through laboratory analysis. Chain-of-Custody demonstrates that samples obtained in the field have been securely collected and transported and have reached the analytical laboratory without alteration. Chain-of-Custody requirements are established by SRNS Manual 3Q1, Procedure 1001, *Chain-of-Custody Procedure*. At a minimum, Chain-of-Custody documents will include the following information which is compliant with USEPA requirements:

- Project name – i.e., monitoring well name, stream name, RFI/RI project name, etc.;
- Sample identification;
- Number of sample containers/bottles
- Sampler's signature for each sample, the sampler indicates;
- Date of sample collection;
- Time of sample collection;
- Sample identifiers (bar-coded labels);
- Sample description;
- Whether a sample is persevered or unpreserved;
- Analyses to be performed;

A Chain-of-Custody record is used as physical and legal evidence of sample custody to trace the sample from collection through delivery to the analyzing laboratory and where the samples were stored. The Chain-of-Custody record must originate with the responsible organization or the person collecting the sample. Every sample is assigned a unique identification number that is entered on the Chain-of-Custody document. The Chain-of-Custody records each transfer of custody of the samples by a relinquishing party to a receiving organization whose name and identifying contact information is located on the form.

6.5 Sample Management and Shipping

Soil samples will be collected in accordance with SRNS Manual 3Q1, Section 9000, *Hydrogeologic Data Collection Procedures and Specifications* (SRNS 2010a). Sample management for analytical laboratories and intra-SRS facilities is primarily controlled by SRNS Quality Assurance Manual 1Q, Procedure 13-1, *Packaging, Handling, Shipping, Storage and Receiving*. The purpose of this procedure is to define the requirements and specify the responsible parties and their roles for the packaging, handling, shipping, storage, and receiving of items to ensure that they are properly controlled to prevent damage or loss and to minimize their deterioration. Sample shipment is also regulated by SRNS Manual 19Q, Procedure 1.02, *General*

Transportation Requirements for Radioactive and Non-Radioactive Hazardous Materials. These manuals provide specific requirements to sampler personnel for the safe offsite shipment or onsite transfer of radioactive and non-radioactive hazardous materials and hazardous substances, mixed waste (radiological/nonradiological hazardous materials) and empty packaging that have previously contained mixed waste. It specifies the required packaging, labeling, record-keeping, selection of appropriate transportation carrier, and appropriate transport container based on the analytically pre-tested nature of a sample. Radiological samples must meet United States Department of Transportation shipping regulations as well. Samples associated with this SAP are expected to be non-hazardous and non-radiological as they represent environmental media rather than waste materials.

Soil and water samples will be stored in coolers with blue ice, if applicable, in the custody of the sampler, or designee, until delivered to the Area Completion Projects (ACP) Sample Packaging personnel in B-Area. If samples need to be stored over-night prior to delivery to the B-Area sample-packaging group, then they will be stored in a locked facility with the COC, and in a refrigerator ($4^{\circ}\text{C} + 2^{\circ}\text{C}$) if required for sample preservation. ACP Sample Packaging personnel in B-Area will manage, package, and ship samples to the laboratories in accordance with Manual C3, Volume IX, Procedure ER-SOP-803B, *Packaging of Non-Department of Transportation (DOT) Samples for On-Site Transfers/Off-Site Shipments*. Table 11 lists proper preservatives, holding times, and sample containers for samples collected in the field, stored, and transported to the analytical laboratories.

6.6 Data Validation and Data Management

Requirements for data validation/verification and data management procedures are found in SRNS Procedures and Standard Operating Procedures, the USEPA Functional Guidelines, and two USDOE National Policies and Procedures:

- SRNS Manual C1, ER-AP-305 – Use of Field-Generated Blanks;
- SRNS Manual C1, ER-AP-306 – Laboratory Data Records Review;
- SRNS Manual C3, Volume X, ER-SOP-033 – Analytical Data Qualification;

- SRNS Manual C3, Volume X, ER-SOP-043 – Obtaining and Managing Environmental Data for Environmental Compliance & Area Completion Projects;
- Data Management Plan, Q-DMP-B-00001, Environmental Restoration Data Management System;
- Department of Energy Consolidated Audit Program, Policies and Practices, Procedure AD-1, Revision 2, November 10, 2009; and
- Quality Systems for Analytical Services, Revision 2.5, Department of Energy, November 9, 2009.

In addition, SRS 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 QC criteria established by the DQOs and laboratory QAPPs; 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.

Depending upon the PQOs, data will be verified and/or validated according to the following criteria:

- Verification – Confirmation by examination and provision of objective evidence that the specified analytical requirements have been met. This is to be an electronic data deliverable completeness check for all required fields. Data verification consists of a completeness check to confirm that all sampling data and data fields requested from the laboratory have been received and comply with specified requirements.
- Validation – Confirmation by manual examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled. Data validation consists of any

analyte and sample specific process for evaluating compliance of the laboratory data received with methods, procedures, or contract requirements.

The ACP Data Management group will enter sample collection and laboratory data into the Environment Restoration Data Management System (ERDMS) in accordance with Procedure ER-SOP-43. Properly completed and qualified data is entered into the ERDMS Database. Data records are updated, re-qualified, and continuously corrected for usability based on the results of electronic verification and manual validation evaluations as corrective actions are resolved with the analytical laboratories.

6.7 Investigation Derived Waste

IDW will be managed according to the site-specific IDW management plan developed for the project.

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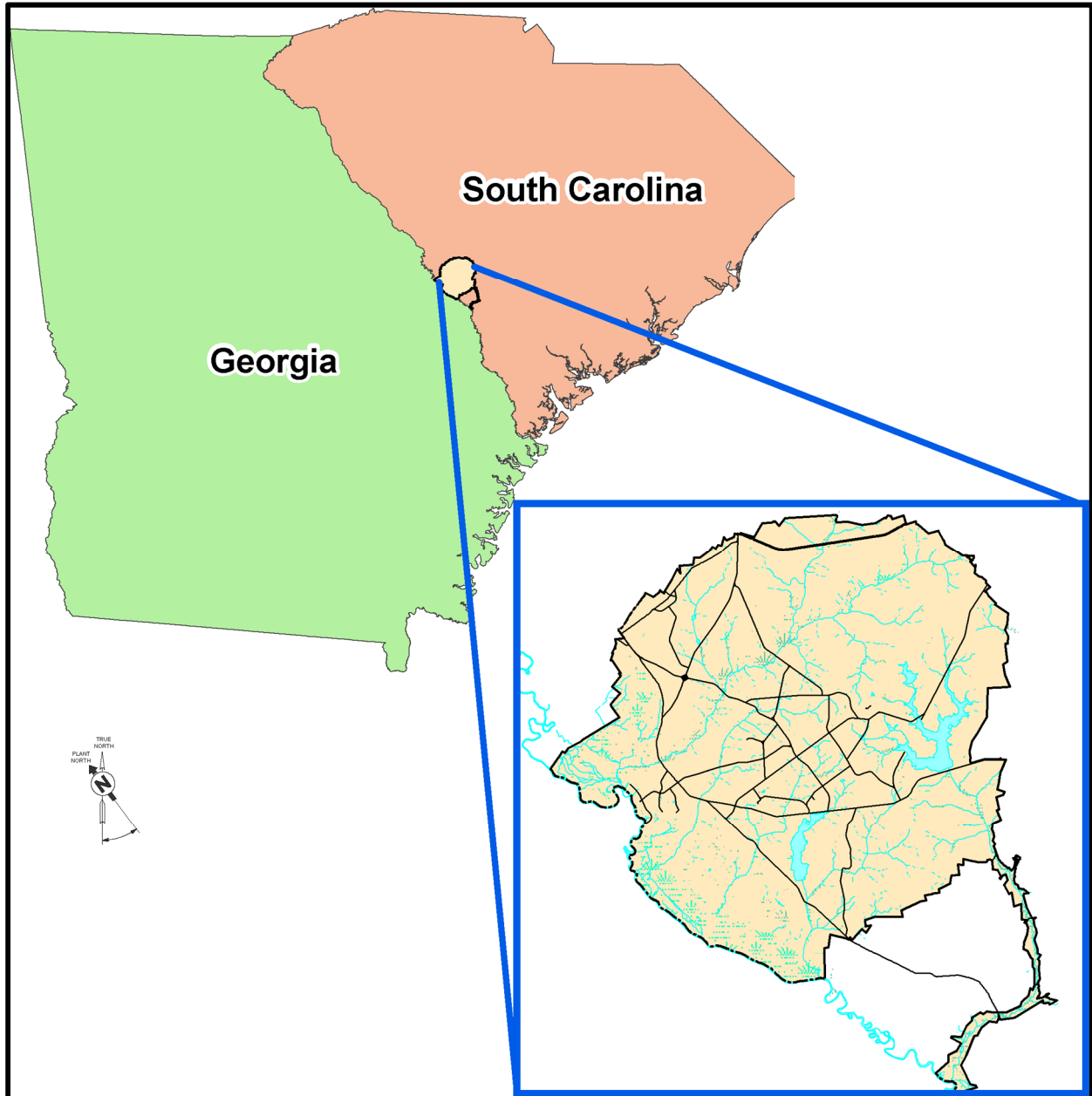


Figure 1. Location of SRS

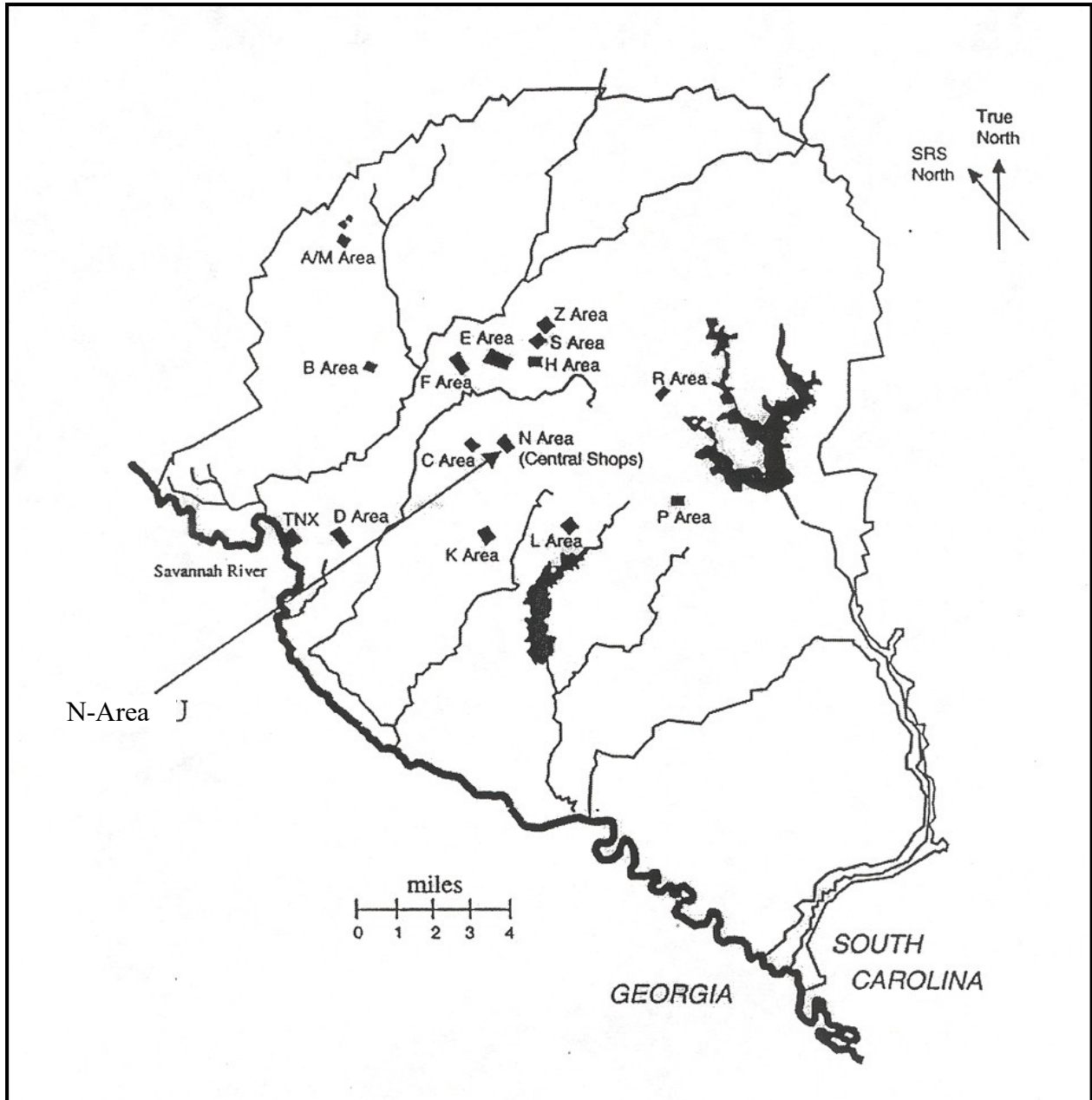


Figure 2. Location of N-Area

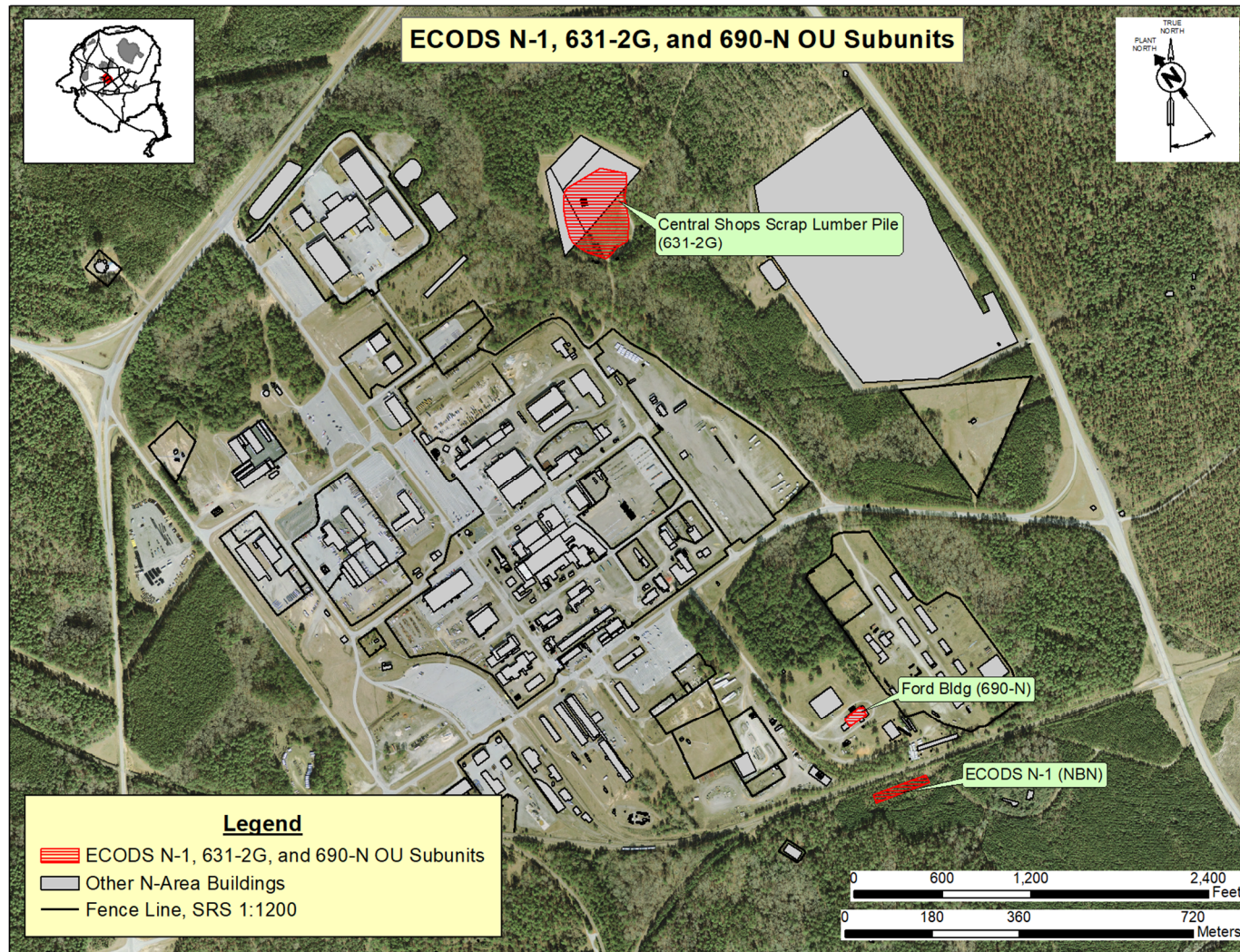


Figure 3. Location of ECODS N-1, 631-2G, and 690-N OU Subunits, 2010

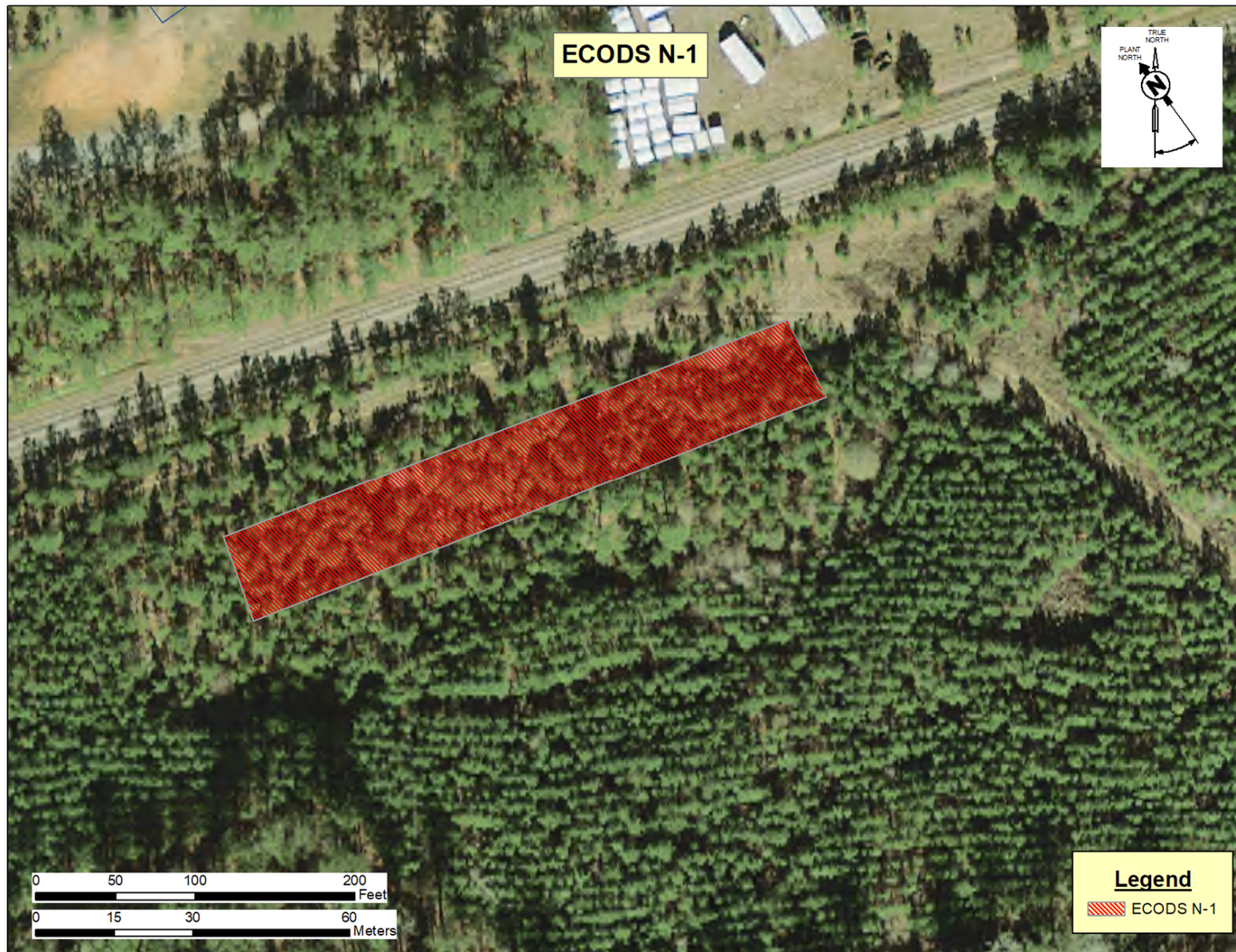


Figure 4. ECODS N-1 (NBN) Subunit, 2010

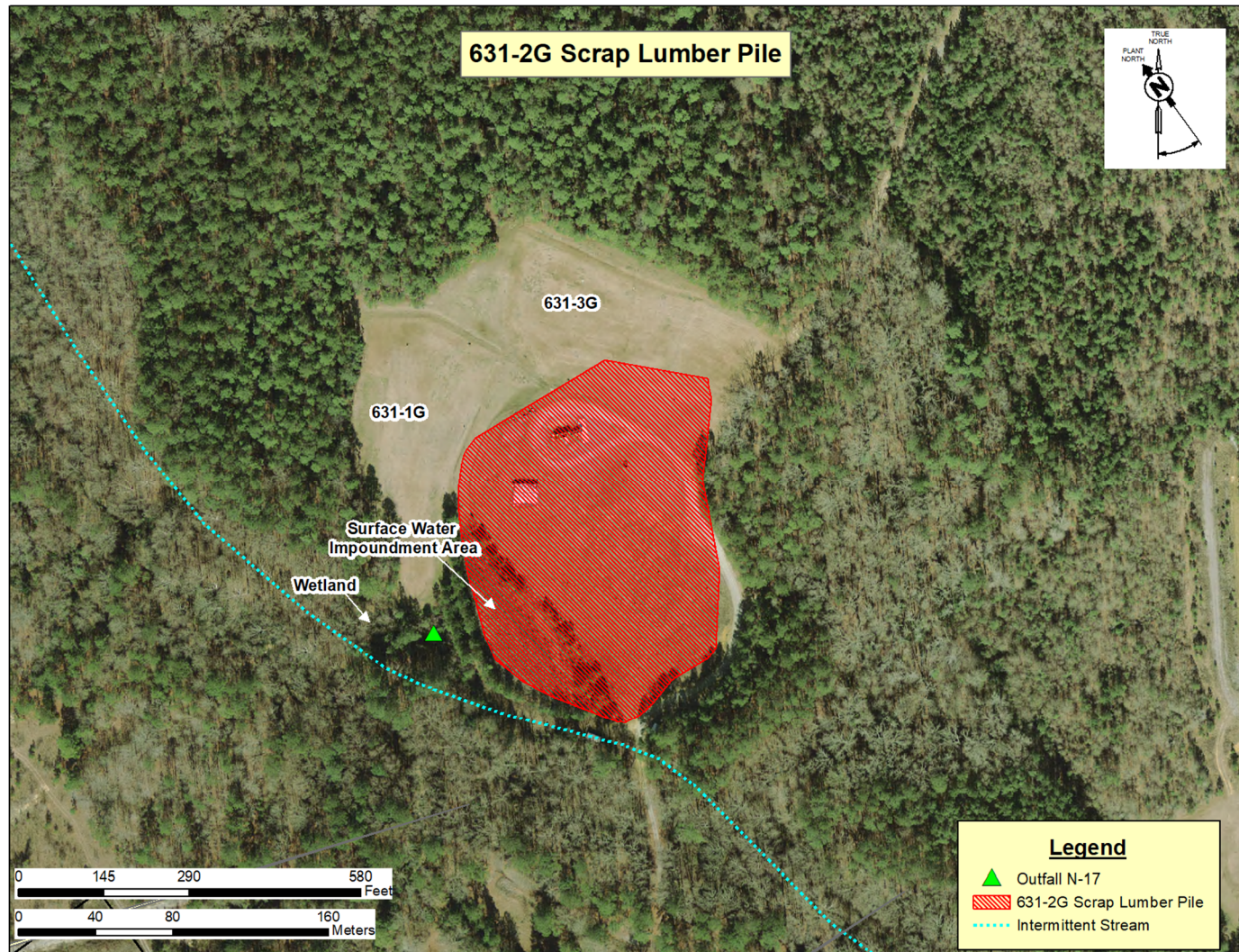


Figure 5. Central Shops Scrap Lumber Pile (631-2G) Subunit, 2010



Figure 6. Building 690-N, 2010

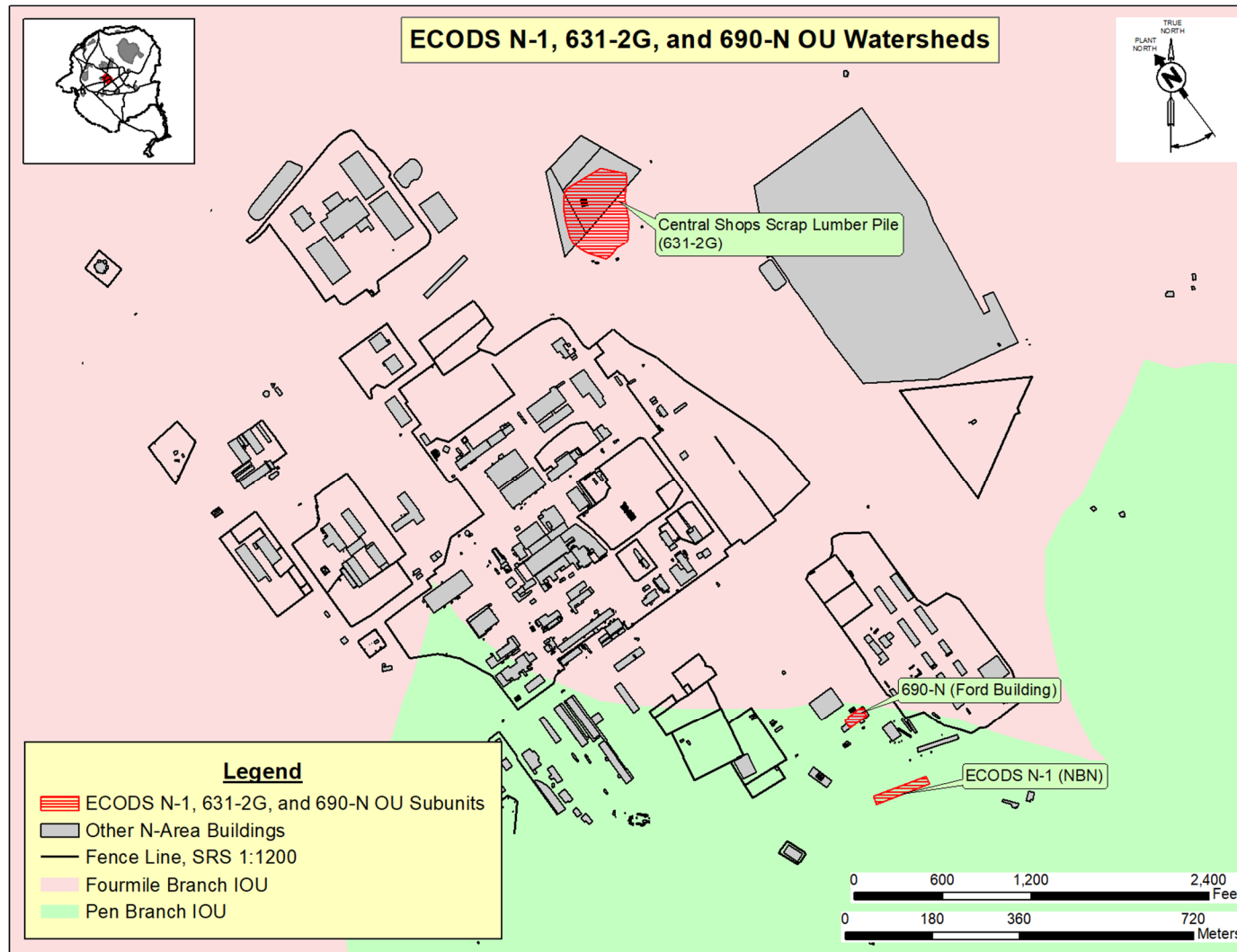


Figure 7. ECODS N-1, 631-2G, and 690-N OU Watershed Areas

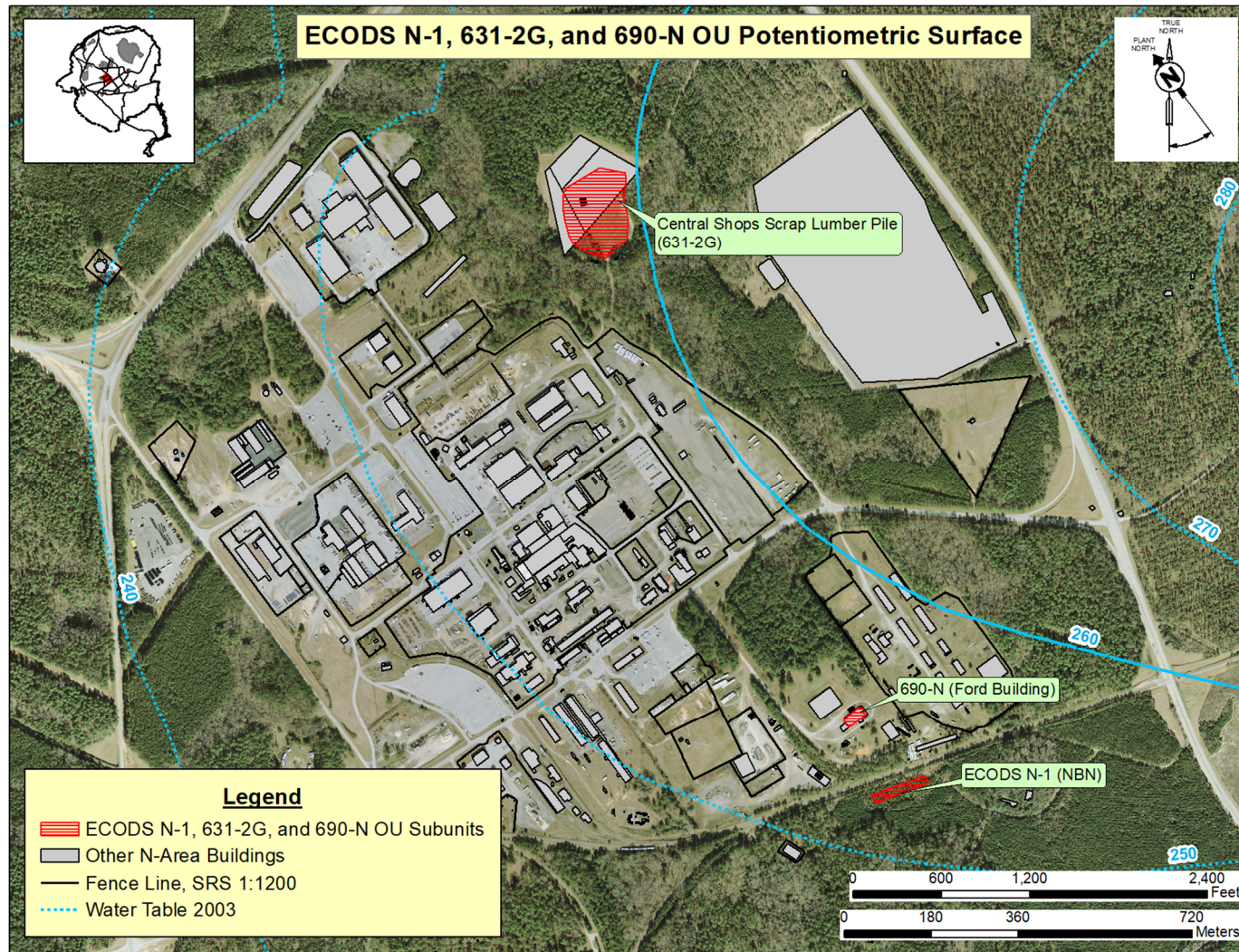


Figure 8. Potentiometric Surface of ECODS N-1, 631-2G, and 690-N OU Subunits, 2010

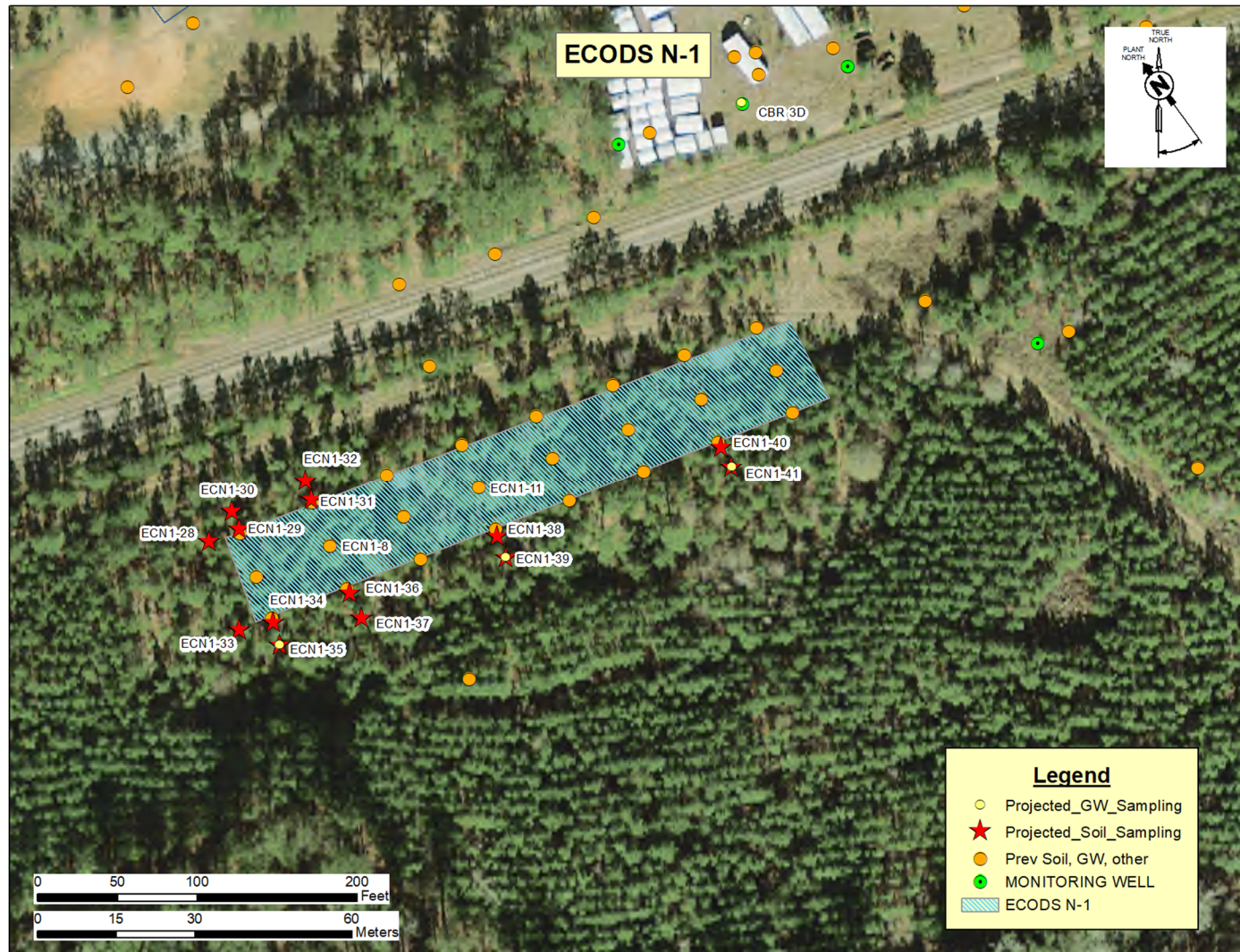


Figure 9. 2019 ECODS N-1 Proposed Locations

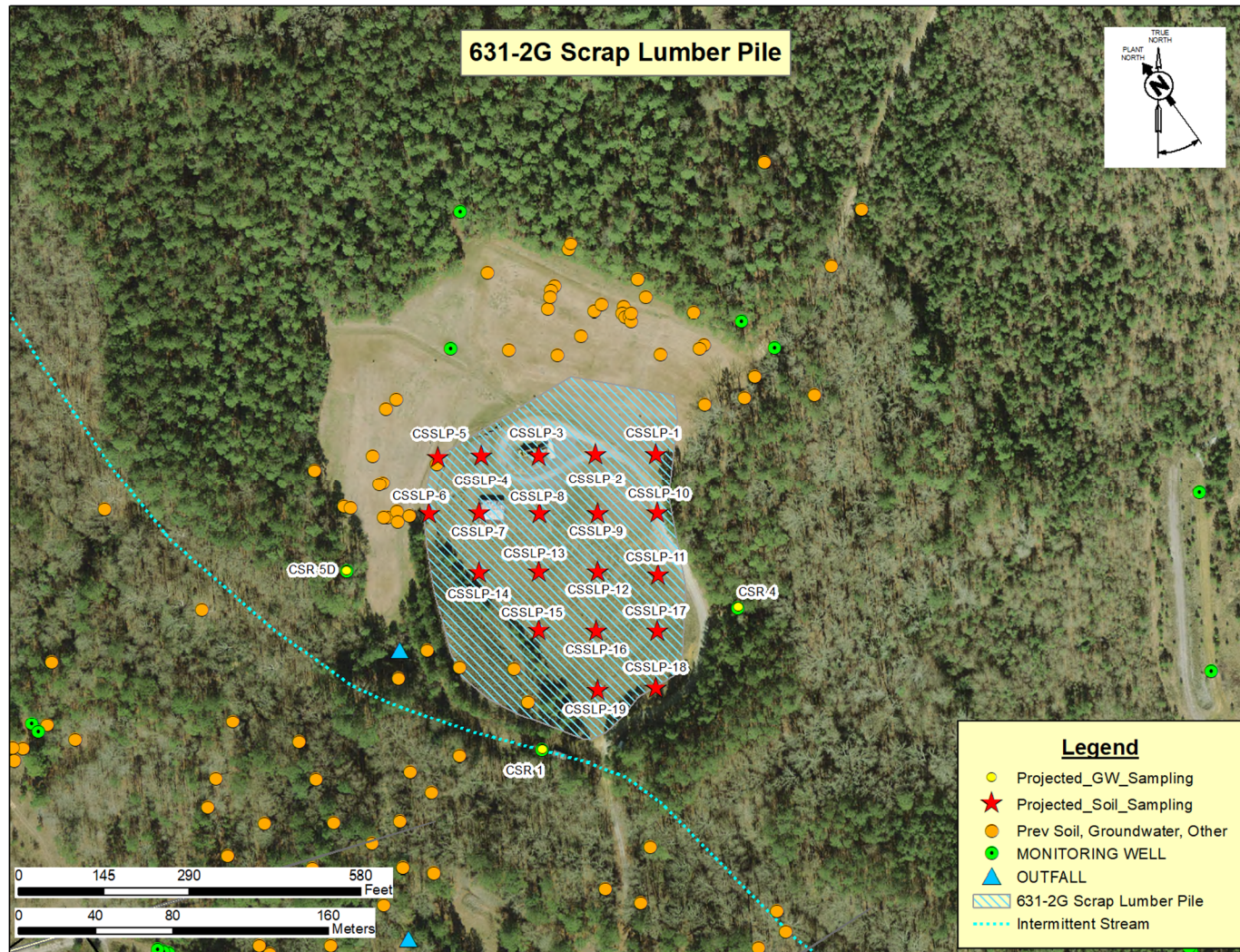


Figure 10. 2019 Central Shops Scrap Lumber Pile (631-2G) Proposed Locations

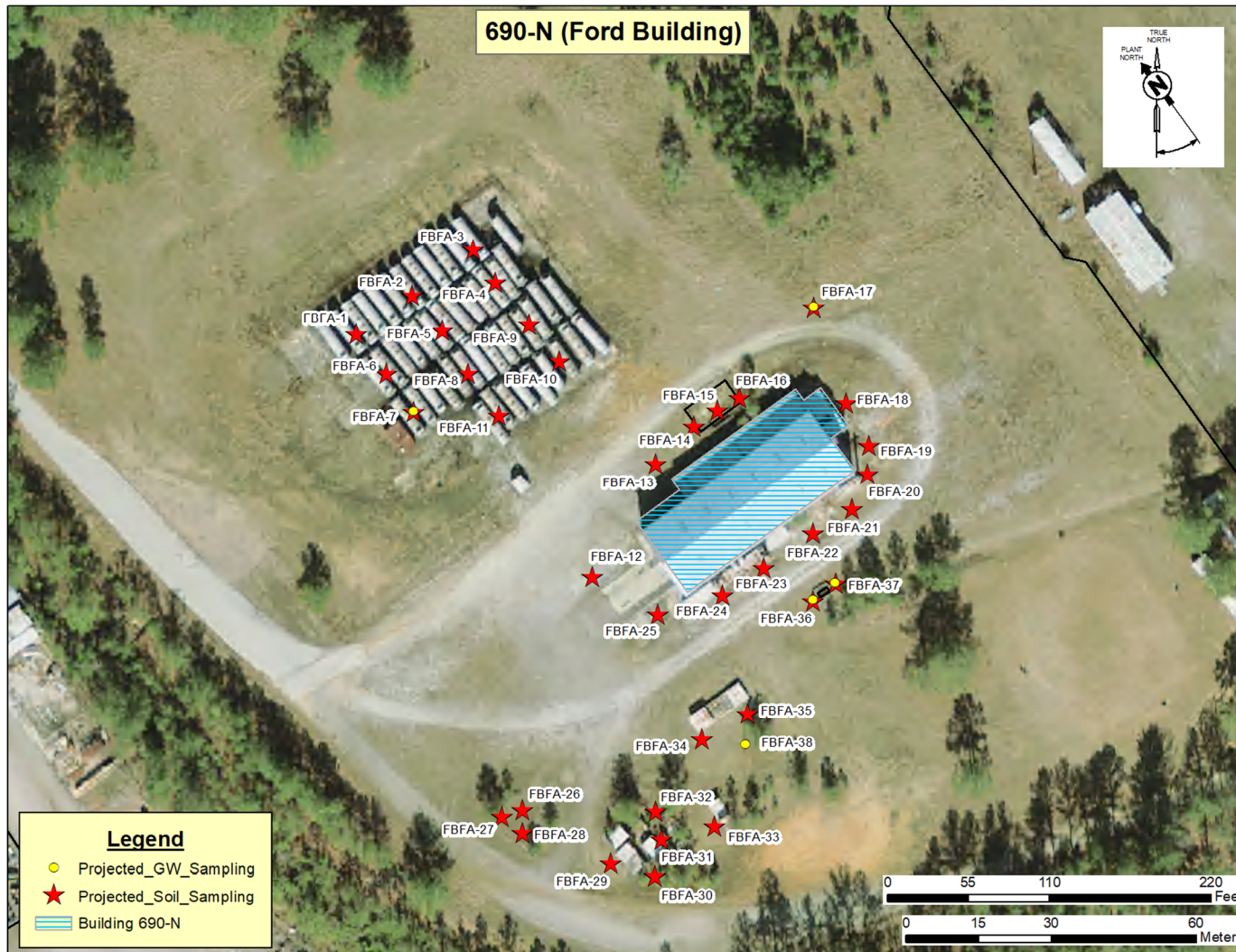


Figure 11. 2019 Building 690-N Proposed Locations

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Table 1. Data Quality Objectives for the ECODS N-1 for Soil Media

Pathway (Media)	Probable Conditions	Exposure Pathway and/or Release Mechanisms	Data Needs and DQOs Including Engineering / Physical Processes	Field Activities Including Removal and Characterization	Parameters	Potential Remedial Action Alternatives
Surface soil, subsurface soil, deep soil	Contamination of surface soil from construction material and burning from deposition of waste material on ground surface and in trenches Infiltration/ percolation of contamination through surface soils into subsurface soils	Ingestion, inhalation, absorption, and/or direct exposure with soils and/or debris presently buried in the subunit	Determine the nature and extent of contamination Determine any human health and ecological COCs and surficial risk due to direct exposure with contaminated soils Determine any PTSM locations from identified COCs Determine if there is any contaminant migration potential through contaminant migration evaluation	Collection of surface soils, subsurface, and deep soils from 0 to 1 ft, 1 to 4 ft, 8 to 10 ft, 10 to 12 ft, and 1 to -20 ft	Data validated to SRS electronic verified and validated level, with 10% of the sampling batches validated to the SRS definitive level. Full TAL suite Hexavalent chromium will be analyzed for in the 8- to 10-ft interval	No Action Land Use Controls Excavation of contaminated soils Cover System

Table 2. Data Quality Objectives for the ECODS N-1 for Groundwater Media

Pathway (Media)	Probable Conditions	Exposure Pathway and/or Release Mechanisms	Data Needs and DQOs Including Engineering / Physical Processes	Field Activities Including Removal and Characterization	Parameters	Potential Remedial Action Alternatives
Groundwater	Contamination of groundwater from leaching from primary sources	Ingestion or dermal contact with groundwater and/or inhalation of vapor from groundwater	Support contaminant migration evaluation conclusions Determine groundwater background concentrations using existing upgradient well Determine groundwater concentrations downgradient by DPT Qualitative and quantitative concentration data of groundwater contaminants	Collect groundwater samples at up- and down-gradient locations	Data validated to SRS electronic verified and validated level, with 10% of the sampling batches validated to the SRS definitive level. Full TAL suite	No Action

Table 3. Data Quality Objectives for the Central Shops Scrap Lumber Pile(631-2G) for Soil Media

Pathway (Media)	Probable Conditions	Exposure Pathway and/or Release Mechanisms	Data Needs and DQOs Including Engineering / Physical Processes	Field Activities Including Removal and Characterization	Parameters	Potential Remedial Action Alternatives
Surface soil, subsurface soil, deep soil	Contamination of surface soil from construction material and burning from deposition of waste material on ground surface and in trenches Infiltration/ percolation of contamination through surface soils into subsurface soils	Ingestion, inhalation, absorption, and/or direct exposure with soils and/or debris presently buried in the subunit	Determine the nature and extent of contamination Determine any human health and ecological COCs and surficial risk due to direct exposure with contaminated soils Determine any PTSM locations from identified COCs Determine if there is any contaminant migration potential through contaminant migration evaluation	Collection of surface soils, subsurface, and deep soils from 0- to 1 ft, 1 to 4 ft, and 8 to 10 ft	Data validated to SRS electronic verified and validated level, with 10% of the sampling batches validated to the SRS definitive level. Full TAL/TCL suite with alpha/beta radiological indicators Radionuclide specific analyses if trigger levels are exceeded for radiological indicators	No Action Institutional Controls Excavation of contaminated gravel and/or soils Cover System

Table 4. Data Quality Objectives for the Central Shops Scrap Lumber Pile(631-2G) for Groundwater Media

Pathway (Media)	Probable Conditions	Exposure Pathway and/or Release Mechanisms	Data Needs and DQOs Including Engineering / Physical Processes	Field Activities Including Removal and Characterization	Parameters	Potential Remedial Action Alternatives
Groundwater	Contamination of groundwater from leaching from primary sources	Ingestion or dermal contact with groundwater and/or inhalation of vapor from groundwater	Support contaminant migration evaluation conclusions Determine groundwater background concentrations using existing upgradient well Determine groundwater concentrations at downgradient wells Qualitative and quantitative concentration data of groundwater contaminants	Collect groundwater samples at up- and down-gradient locations	Data validated to SRS electronic verified and validated level, with 10% of the sampling batches validated to the SRS definitive level. Full TAL/TCL suite with alpha/beta radiological indicators Radionuclide specific analyses if trigger levels are exceeded for radiological indicators	No Action

Table 5. Data Quality Objectives for the Building 690-N (Ford Building) for Soil Media

Pathway (Media)	Probable Conditions	Exposure Pathway and/or Release Mechanisms	Data Needs and DQOs Including Engineering / Physical Processes	Field Activities Including Removal and Characterization	Parameters	Potential Remedial Action Alternatives
Surface soil, subsurface soil, deep soil	<p>Radiological contamination of surface soil from spills from primary sources</p> <p>Contamination of surface soil from cutting oil used in machinery.</p> <p>Infiltration/percolation of contamination through surface soils into subsurface soils</p>	Ingestion, inhalation, absorption, and/or direct exposure with soils	<p>Determine the nature and extent of contamination</p> <p>Determine any human health and ecological COCs and surficial risk due to direct exposure with contaminated soils</p> <p>Determine any PTSM locations from identified COCs</p> <p>Determine if there is any contaminant migration potential through contaminant migration evaluation</p>	<p>Conduct GPR survey of the entire waste unit</p> <p>Collection of surface, subsurface, and deep soils from 0- to 1-ft, 1- to 4-ft, 8- to 10-ft, 18- to 20-ft and 28- to 30-ft intervals</p> <p>Only samples that go to groundwater will be analyzed in the deep soils from 8- to 10-ft, 18- to 20-ft and 28- to 30-ft intervals</p>	<p>Data validated to SRS electronic verified and validated level, with 10% of the sampling batches validated to the SRS definitive level.</p> <p>TAL, TCL-SVOC, TCL-VOC, TCL-PCB,</p> <p>alpha/beta radiological indicators</p> <p>TPH-DRO analyses in deep soils around the fuel containment dike</p> <p>Radionuclide specific analyses if trigger levels are exceeded for radiological indicators</p>	<p>No Action</p> <p>Institutional Controls</p> <p>Excavation of contaminated soils</p> <p>Cover System</p>

Table 6. Data Quality Objectives for the Building 690-N (Ford Building) for Groundwater Media

Pathway (Media)	Probable Conditions	Exposure Pathway and/or Release Mechanisms	Data Needs and DQOs Including Engineering / Physical Processes	Field Activities Including Removal and Characterization	Parameters	Potential Remedial Action Alternatives
Groundwater	Contamination of groundwater from leaching from primary sources	Ingestion or dermal contact with groundwater and/or inhalation of vapor from groundwater	Support contaminant migration evaluation conclusions Determine background concentrations by DPT Determine concentrations downgradient by DPT Qualitative and quantitative concentration data of groundwater contaminants	Collect groundwater samples at up- and down-gradient locations	Data validated to SRS electronic verified and validated level, with 10% of the sampling batches validated to the SRS definitive level. TAL, TCL-SVOC, TCL-VOC, TCL-PCB, alpha/beta radiological indicators, and tritium specific analyses TPH-DRO analyses in samples around the fuel containment dike Radionuclide specific analyses if trigger levels are exceeded for radiological indicators	No Action

Table 7. Minimum Field Quality Control/Quality Assurance Sampling Requirements

Data Quality Level	Field Quality Control/Quality Assurance Samples	Frequency of Field Quality Control/Quality Assurance Sample
UU	None	
VU	None	
VV	Co-located Field Duplicate	Minimum 5% ²
	Trip Blank	Minimum 1 per cooler
	Equipment Blank	1 per 40 samples ³
	Field Blank	Optional; 1 per 40 samples ⁴
	Split Sample	Minimum 5%
SD ¹	Co-located Field Duplicate	Minimum 5% ²
	Trip Blank	1 per cooler
	Equipment Blank	1 per 40 samples ³
	Field Blank	Optional; 1 per 40 samples ⁴
	Split Sample	Minimum 5%
D	Co-located Field Duplicate	Minimum 5% ²
	Trip Blank	1 per cooler
	Equipment Blank	1 per 40 samples ³
	Field Blank	Optional; 1 per 40 samples ⁴
	Split Sample	Minimum 5%

Data Quality Levels

UU Data Unverified and Unvalidated Data (no errors from ERDMS database loading screens)
 VU Data Verified and Unvalidated Data (includes missing data checks)
 VV Data Verified and Validated Data (validated to automated criteria; equivalent to USEPA Screening Level Data)
 SD Data USEPA Screening Level Data with 10% Definitive Confirmation D Data USEPA Definitive LevelData

Footnotes:

1. Level of data quality used in this SAP
2. Minimum frequency established per ER-SOP-043
3. Typical frequency
4. Recommended based on project needs; typical frequency

Table 8. Laboratory Analytical Specifications Table TAL/TCL Analytes for Soil and Sediment Media

Analyte	Analyte ID	Preparation ^B Method	USEPA ^B Method	CRDL ^A (µg/kg)
Target Analyte List				
Metals				
Aluminum	7429-90-5	3051A,3052	EPA6010C	1,900
Antimony	7440-36-0	3051A,3052	EPA6010C	350
Arsenic	7440-38-2	3051A,3052	EPA6010C	312
Barium	7440-39-3	3051A,3052	EPA6010C	21
Beryllium	7440-41-7	3051A,3052	EPA6010C	31.1
Cadmium	7440-43-9	3051A,3052	EPA6010C	40
Calcium	7440-70-2	3051A,3052	EPA6010C	69
Chromium	7440-47-3	3051A,3052	EPA6010C	90
Cobalt	7440-48-4	3051A,3052	EPA6010C	80
Copper	7440-50-8	3051A,3052	EPA6010C	100
Iron	7439-89-6	3051A,3052	EPA6010C	2,190
Lead	7439-92-1	3051A,3052	EPA6010C	590
Magnesium	7439-95-4	3051A,3052	EPA6010C	14.1
Manganese	7439-96-5	3051A,3052	EPA6010C	88.5
Mercury	7439-97-6	3051A,3052	EPA7471B	15.2
Nickel	7440-02-0	3051A,3052	EPA6010C	88
Potassium	7440-09-7	3051A,3052	EPA6010C	80
Selenium	7782-49-2	3051A,3052	EPA6010C	5.7
Silver	7440-22-4	3051A,3052	EPA6010C	101
Sodium	7440-23-5	3051A,3052	EPA6010C	298
Thallium	7440-28-0	3051A,3052	EPA6010C	160
Vanadium	7440-62-2	3051A,3052	EPA6010C	74
Zinc	7440-66-6	3051A,3052	EPA6010C	4.3
Specific Analysis				
Hexavalent chromium (Cr ⁺⁶)	1333-82-0	3060A	EPA7196A/7199	TBD
Target Compound List				
PCBs				
AROCLOR 1016	12674-11-2	3540C,3541,3545A	EPA8082A	3.2
AROCLOR 1221	11104-28-2	3540C,3541,3545A	EPA8082A	0.22
AROCLOR 1232	11141-16-5	3540C,3541,3545A	EPA8082A	0.22
AROCLOR 1242	53469-21-9	3540C,3541,3545A	EPA8082A	0.22
AROCLOR 1248	12672-29-6	3540C,3541,3545A	EPA8082A	0.22
AROCLOR 1254	11097-69-1	3540C,3541,3545A	EPA8082A	0.22
AROCLOR 1260	11096-82-5	3540C,3541,3545A	EPA8082A	0.22
Pesticides				
Aldrin	309-00-2	3540C,3541,3545A,3550C	EPA8081B	0.029
alpha-Benzene hexachloride	319-84-6	3540C,3541,3545A,3550C	EPA8081B	0.066
alpha-Chlordane	5103-71-9	3540C,3541,3545A,3550C	EPA8081B	0.021
beta-Benzene hexachloride	319-85-7	3540C,3541,3545A,3550C	EPA8081B	0.32
DDD	72-54-8	3540C,3541,3545A,3550C	EPA8081B	2.4
DDE	72-55-9	3540C,3541,3545A,3550C	EPA8081B	1.7
DDT	50-29-3	3540C,3541,3545A,3550C	EPA8081B	1.01
delta-Benzene hexachloride	319-86-8	3540C,3541,3545A,3550C	EPA8081B	0.066
Dieldrin	60-57-1	3540C,3541,3545A,3550C	EPA8081B	0.03
Endosulfan I	959-98-8	3540C,3541,3545A,3550C	EPA8081B	0.066
Endosulfan II	33213-65-9	3540C,3541,3545A,3550C	EPA8081B	0.13
Endosulfan sulfate	1031-07-8	3540C,3541,3545A,3550C	EPA8081B	0.13
Endrin	72-20-8	3540C,3541,3545A,3550C	EPA8081B	0.13

Table 8. Laboratory Analytical Specifications Table TAL/TCL Analytes for Soil and Sediment Media (Continued)

Analyte	Analyte ID	Preparation ^B Method	USEPA ^B Method	CRDL ^A (µg/kg)
Target Compound List (continued)				
Pesticides (continued)				
Endrin aldehyde	7421-93-4	3540C,3541,3545A,3550C	EPA8081B	0.13
Endrin ketone	53494-70-5	3540C,3541,3545A,3550C	EPA8081B	0.34
gamma-Chlordane	5103-74-2	3540C,3541,3545A,3550C	EPA8081B	C
Heptachlor	76-44-8	3540C,3541,3545A,3550C	EPA8081B	0.44
Heptachlor epoxide	1024-57-3	3540C,3541,3545A,3550C	EPA8081B	0.59
Lindane	58-89-9	3540C,3541,3545A,3550C	EPA8081B	0.066
Methoxychlor	72-43-5	3540C,3541,3545A,3550C	EPA8081B	1.13
Toxaphene	8001-35-2	3540C,3541,3545A,3550C	EPA8081B	18.7
Semi-volatiles				
2,4,5-Trichlorophenol	95-95-4	3540C,3541,3545A,3550C	EPA8270D	7.4
2,4,6-Trichlorophenol	88-06-2	3540C,3541,3545A,3550C	EPA8270D	7.4
2,4-Dichlorophenol	120-83-2	3540C,3541,3545A,3550C	EPA8270D	14
2,4-Dimethylphenol	105-67-9	3540C,3541,3545A,3550C	EPA8270D	14
2,4-Dinitrophenol	51-28-5	3540C,3541,3545A,3550C	EPA8270D	120
2-Chlorophenol	95-57-8	3540C,3541,3545A,3550C	EPA8270D	5.7
2-Methyl-4,6-dinitrophenol	534-52-1	3540C,3541,3545A,3550C	EPA8270D	7.8
2-Nitrophenol	88-75-5	3540C,3541,3545A,3550C	EPA8270D	13
4-Chloro-m-cresol	59-50-7	3540C,3541,3545A,3550C	EPA8270D	55.5
4-Nitrophenol	100-02-7	3540C,3541,3545A,3550C	EPA8270D	156
m/p-Cresol	1319-77-3	3540C,3541,3545A,3550C	EPA8270D	96
o-Cresol (2-Methylphenol)	95-48-7	3540C,3541,3545A,3550C	EPA8270D	5.6
Pentachlorophenol	87-86-5	3540C,3541,3545A,3550C	EPA8270D	3
Phenol	108-95-2	3540C,3541,3545A,3550C	EPA8270D	6.2
1,2,4,5-Tetrachlorobenzene	95-94-3	3540C,3541,3545A,3550C	EPA8270D	170
2,3,4,6-Tetrachlorophenol	58-90-2	3540C,3541,3545A,3550C	EPA8270D	170
1,1'-Biphenyl	92-52-4	3540C,3541,3545A,3550C	EPA8270D	350
2,4-Dinitrotoluene	121-14-2	3540C,3541,3545A,3550C	EPA8270D	44.6
2,6-Dinitrotoluene	606-20-2	3540C,3541,3545A,3550C	EPA8270D	28
2-Chloronaphthalene	91-58-7	3540C,3541,3545A,3550C	EPA8270D	5.6
2-Methylnaphthalene	91-57-6	3540C,3541,3545A,3550C	EPA8270D	50
2-Nitroaniline	88-74-4	3540C,3541,3545A,3550C	EPA8270D	3.5
3,3'-Dichlorobenzidine	91-94-1	3540C,3541,3545A,3550C	EPA8270D	143
4-Bromophenyl phenyl ether	101-55-3	3540C,3541,3545A,3550C	EPA8270D	15
4-Chloroaniline	106-47-8	3540C,3541,3545A,3550C	EPA8270D	16
4-Chlorophenyl phenyl ether	7005-72-3	3540C,3541,3545A,3550C	EPA8270D	40.9
Acenaphthene	83-32-9	3540C,3541,3545A,3550C	EPA8270D	35.2
Acenaphthylene	208-96-8	3540C,3541,3545A,3550C	EPA8270D	35
Acetophenone	98-86-2	3540C,3541,3545A,3550C	EPA8270D	0.49
Anthracene	120-12-7	3540C,3541,3545A,3550C	EPA8270D	44.5
Atrazine	1912-24-9	3540C,3541,3545A,3550C	EPA8270D	2.2
Benzaldehyde	100-52-7	3540C,3541,3545A,3550C	EPA8270D	6100
Benzo[a]anthracene	56-55-3	3540C,3541,3545A,3550C	EPA8270D	29.4
Benzo[a]pyrene	50-32-8	3540C,3541,3545A,3550C	EPA8270D	25.5
Benzo[b]fluoranthene	205-99-2	3540C,3541,3545A,3550C	EPA8270D	55.3
Benzo[g,h,i]perylene	191-24-2	3540C,3541,3545A,3550C	EPA8270D	29.6
Benzo[k]fluoranthene	207-08-9	3540C,3541,3545A,3550C	EPA8270D	58.8

Table 8. Laboratory Analytical Specifications Table TAL/TCL Analytes for Soil and Sediment Media (Continued)

Analyte	Analyte ID	Preparation ^B Method	USEPA ^B Method	CRDL ^A (µg/kg)
Target Compound List (continued)				
Semi-volatiles (continued)				
Bis(2-chloro-1-methylethyl)ether	108-60-1	3540C,3541,3545A,3550C	EPA8270D	54.1
Bis(2-chloroethoxy) methane	111-91-1	3540C,3541,3545A,3550C	EPA8270D	7.2
Bis(2-chloroethyl) ether	111-44-4	3540C,3541,3545A,3550C	EPA8270D	69.5
Bis(2-ethylhexyl) phthalate	117-81-7	3540C,3541,3545A,3550C	EPA8270D	35
Butylbenzyl phthalate	85-68-7	3540C,3541,3545A,3550C	EPA8270D	28
Caprolactam	105-60-2	3540C,3541,3545A,3550C	EPA8270D	46.3
Carbazole	86-74-8	3540C,3541,3545A,3550C	EPA8270D	24
Chrysene	218-01-9	3540C,3541,3545A,3550C	EPA8270D	32.9
Dibenz[a,h]anthracene	53-70-3	3540C,3541,3545A,3550C	EPA8270D	33.2
Dibenzofuran	132-64-9	3540C,3541,3545A,3550C	EPA8270D	38.9
Dibutyl phthalate	84-74-2	3540C,3541,3545A,3550C	EPA8270D	28
Diethyl phthalate	84-66-2	3540C,3541,3545A,3550C	EPA8270D	28
Dimethyl phthalate	131-11-3	3540C,3541,3545A,3550C	EPA8270D	28
Di-n-octyl phthalate	117-84-0	3540C,3541,3545A,3550C	EPA8270D	28
Fluoranthene	206-44-0	3540C,3541,3545A,3550C	EPA8270D	3.4
Fluorene	86-73-7	3540C,3541,3545A,3550C	EPA8270D	37.9
Hexachlorobenzene	118-74-1	3540C,3541,3545A,3550C	EPA8270D	32.2
Hexachlorobutadiene	87-68-3	3540C,3541,3545A,3550C	EPA8270D	5.6
Hexachlorocyclopentadiene	77-47-4	3540C,3541,3545A,3550C	EPA8270D	2.4
Hexachloroethane	67-72-1	3540C,3541,3545A,3550C	EPA8270D	30
Indeno[1,2,3-c,d]pyrene	193-39-5	3540C,3541,3545A,3550C	EPA8270D	30
Isophorone	78-59-1	3540C,3541,3545A,3550C	EPA8270D	44
m-Nitroaniline	99-09-2	3540C,3541,3545A,3550C	EPA8270D	164
Naphthalene	91-20-3	3540C,3541,3545A,3550C	EPA8270D	5.6
Nitrobenzene	98-95-3	3540C,3541,3545A,3550C	EPA8270D	14
N-Nitrosodiphenylamine	86-30-6	3540C,3541,3545A,3550C	EPA8270D	13
N-Nitrosodipropylamine	621-64-7	3540C,3541,3545A,3550C	EPA8270D	55.9
Phenanthrene	85-01-8	3540C,3541,3545A,3550C	EPA8270D	33.5
p-Nitroaniline	100-01-6	3540C,3541,3545A,3550C	EPA8270D	28
Pyrene	129-00-0	3540C,3541,3545A,3550C	EPA8270D	8.2
Volatiles				
1,1,1-Trichloroethane	71-55-6	5035A	EPA8260B	1.18
1,1,2,2-Tetrachloroethane	79-34-5	5035A	EPA8260B	1.33
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5035A	EPA8260B	C
1,1,2-Trichloroethane	79-00-5	5035A	EPA8260B	0.85
1,1-Dichloroethane	75-34-3	5035A	EPA8260B	1.15
1,1-Dichloroethylene	75-35-4	5035A	EPA8260B	0.054
1,2,4-Trichlorobenzene	120-82-1	5035A	EPA8260B	0.423
1,2-Dibromo-3-chloropropane	96-12-8	5035A	EPA8260B	0.45
1,2-Dibromoethane	106-93-4	5035A	EPA8260B	0.0069
1,2-Dichlorobenzene	95-50-1	5035A	EPA8260B	C
1,2-Dichloroethane (EDC)	107-06-2	5035A	EPA8260B	0.35
1,2-Dichloropropane	78-87-5	5035A	EPA8260B	0.35
1,3-Dichlorobenzene	541-73-1	5035A	EPA8260B	C
1,4-Dichlorobenzene	106-46-7	5035A	EPA8260B	C
2-Hexanone	591-78-6	5035A	EPA8260B	2.86

Table 8. Laboratory Analytical Specifications Table TAL/TCL Analytes for Soil and Sediment Media (Continued/End)

Analyte	Analyte ID	Preparation ^B Method	USEPA ^B Method	CRDL ^A ($\mu\text{g}/\text{kg}$)
Target Compound List (continued)				
Volatiles (continued)				
Acetone	67-64-1	5035A	EPA8260B	7.03
Benzene	71-43-2	5035A	EPA8260B	0.823
Bromodichloromethane	75-27-4	5035A	EPA8260B	1
Bromoform (Tribromomethane)	75-25-2	5035A	EPA8260B	1.15
Bromomethane (Methyl bromide)	74-83-9	5035A	EPA8260B	2.56
Carbon disulfide	75-15-0	5035A	EPA8260B	0.988
Carbon tetrachloride	56-23-5	5035A	EPA8260B	1.22
Chlorobenzene	108-90-7	5035A	EPA8260B	0.987
Chloroethane	75-00-3	5035A	EPA8260B	2.69
Chloroethene (Vinyl chloride)	75-01-4	5035A	EPA8260B	0.15
Chloroform	67-66-3	5035A	EPA8260B	1.42
Chloromethane (Methyl chloride)	74-87-3	5035A	EPA8260B	1.2
cis-1,2-Dichloroethylene	156-59-2	5035A	EPA8260B	C
cis-1,3-Dichloropropene	10061-01-5	5035A	EPA8260B	1.31
Cyclohexane	110-82-7	5035A	EPA8260B	0.08
Dibromochloromethane	124-48-1	5035A	EPA8260B	1.03
Dichlorodifluoromethane	75-71-8	5035A	EPA8260B	4
Dichloromethane (Methylene chloride)	75-09-2	5035A	EPA8260B	1.65
Ethylbenzene	100-41-4	5035A	EPA8260B	1.07
Cumene (Isopropylbenzene)	98-82-8	5035A	EPA8260B	0.254
Methyl acetate	79-20-9	5035A	EPA8260B	22,000
Methyl ethyl ketone	78-93-3	5035A	EPA8260B	4.68
Methyl isobutyl ketone	108-10-1	5035A	EPA8260B	2.62
Methyl tertiary butyl ether (MTBE)	1634-04-4	5035A	EPA8260B	0.107
Methylcyclohexane	108-87-2	5035A	EPA8260B	2,600
Styrene	100-42-5	5035A	EPA8260B	0.72
Tetrachloroethylene (PCE)	127-18-4	5035A	EPA8260B	1.42
Toluene	108-88-3	5035A	EPA8260B	1.07
trans-1,2-Dichloroethylene	156-60-5	5035A	EPA8260B	2
trans-1,3-Dichloropropene	10061-02-6	5035A	EPA8260B	1.13
Trichloroethylene (TCE)	79-01-6	5035A	EPA8260B	1.37
Trichlorofluoromethane	75-69-4	5035A	EPA8260B	2
o-Xylene	95-47-6	5035A	EPA8260B	3.11
m,p-Xylene	MPXYL	5035A	EPA8260B	5
Bromochloromethane	74-97-5	5035A	EPA8260B	5
1,4-Dioxane	123-91-1	5035A	EPA8260B	100
1,2-Dichlorobenzene	95-50-1	5035A	EPA8260B	5
1,2,3-Trichlorobenzene	87-61-6	5035A	EPA8260B	5

- A) CRDL is the Contract Required Detection Limit and is not always attainable.
 B) Extraction and preparation methods differ depending upon media, concentration, instrument, laboratory, and analytical method. Preparation methods will also influence detection limits.
 C) Laboratory instructed to obtain the lowest possible method detection limit.

Table 9. Laboratory Analytical Specifications Table TAL/TCL Analytes for Surface Water and Groundwater Media

Analyte	Analyte ID	Preparation ^B Method	Analytical ^B Method	CRDL ^A (µg/L)
Target Analyte List				
Metals				
Aluminum	7429-90-5	3005A,3015A	EPA6010C	2.0
Antimony	7440-36-0	3005A,3015A	EPA6010C	2.0
Arsenic	7440-38-2	3005A,3015A	EPA6010C	2.0
Barium	7440-39-3	3005A,3015A	EPA6010C	1.0
Beryllium	7440-41-7	3005A,3015A	EPA6010C	2.0
Cadmium	7440-43-9	3005A,3015A	EPA6010C	2.0
Calcium	7440-70-2	3005A,3015A	EPA6010C	2.0
Chromium	7440-47-3	3005A,3015A	EPA6010C	2.0
Cobalt	7440-48-4	3005A,3015A	EPA6010C	2.0
Copper	7440-50-8	3005A,3015A	EPA6010C	2.0
Iron	7439-89-6	3005A,3015A	EPA6010C	13.0
Lead	7439-92-1	3005A,3015A	EPA6010C	3.4
Magnesium	7439-95-4	3005A,3015A	EPA6010C	2.0
Manganese	7439-96-5	3005A,3015A	EPA6010C	2.0
Mercury	7439-97-6	3005A,3015A	EPA7471B	2.0
Nickel	7440-02-0	3005A,3015A	EPA6010C	2.0
Potassium	7440-09-7	3005A,3015A	EPA6010C	2.0
Selenium	7782-49-2	3005A,3015A	EPA6010C	10.0
Silver	7440-22-4	3005A,3015A	EPA6010C	2.0
Sodium	7440-23-5	3005A,3015A	EPA6010C	2.0
Thallium	7440-28-0	3005A,3015A	EPA6010C	2.0
Vanadium	7440-62-2	3005A,3015A	EPA6010C	10.0
Zinc	7440-66-6	3005A,3015A	EPA6010C	2.0
Target Compound List				
PCBs				
Aroclor 1016	12674-11-2	3510C,3520C,3535A	EPA8082A	0.01
Aroclor 1221	11104-28-2	3510C,3520C,3535A	EPA8082A	0.5
Aroclor 1232	11141-16-5	3510C,3520C,3535A	EPA8082A	0.5
Aroclor 1242	53469-21-9	3510C,3520C,3535A	EPA8082A	5.7
Aroclor 1248	12672-29-6	3510C,3520C,3535A	EPA8082A	0.056
Aroclor 1254	11097-69-1	3510C,3520C,3535A	EPA8082A	C
Aroclor 1260	11096-82-5	3510C,3520C,3535A	EPA8082A	4.0
Pesticides				
Aldrin	309-00-2	3510C,3520C,3535A	EPA8081B	2.0
alpha-Benzene hexachloride	319-84-6	3510C,3520C,3535A	EPA8081B	10.0
alpha-Chlordane	5103-71-9	3510C,3520C,3535A	EPA8081B	1.0
beta-Benzene hexachloride	319-85-7	3510C,3520C,3535A	EPA8081B	2.0
delta-Benzene hexachloride	319-86-8	3510C,3520C,3535A	EPA8081B	4.0
Dieldrin	60-57-1	3510C,3520C,3535A	EPA8081B	2.0
Endosulfan I	959-98-8	3510C,3520C,3535A	EPA8081B	1.0
Endosulfan II	33213-65-9	3510C,3520C,3535A	EPA8081B	10.0
Endosulfan sulfate	1031-07-8	3510C,3520C,3535A	EPA8081B	14.0
Endrin	72-20-8	3510C,3520C,3535A	EPA8081B	2.0
Endrin aldehyde	7421-93-4	3510C,3520C,3535A	EPA8081B	2.0
Endrin ketone	53494-70-5	3510C,3520C,3535A	EPA8081B	2.0
gamma-Chlordane	5103-74-2	3510C,3520C,3535A	EPA8081B	2.0
Heptachlor	76-44-8	3510C,3520C,3535A	EPA8081B	1.0
Heptachlor epoxide	1024-57-3	3510C,3520C,3535A	EPA8081B	14.0

Table 9. Laboratory Analytical Specifications Table TAL/TCL Analytes for Surface Water and Groundwater Media (Continued)

Analyte	Analyte ID	Preparation ^B Method	Analytical ^B Method	CRDL ^A (µg/L)
Target Analyte List (continued)				
Pesticides (continued)				
Lindane	58-89-9	3510C,3520C,3535A	EPA8081B	2.0
Methoxychlor	72-43-5	3510C,3520C,3535A	EPA8081B	2.0
DDD	72-54-8	3510C,3520C,3535A	EPA8081B	2.0
DDE	72-55-9	3510C,3520C,3535A	EPA8081B	2.0
DDT	50-29-3	3510C,3520C,3535A	EPA8081B	2.0
Toxaphene	8001-35-2	3510C,3520C,3535A	EPA8081B	1.0
Semi-volatiles				
2,4,5-Trichlorophenol	95-95-4	3510C, 3520C	EPA8270D	1.0
2,4,6-Trichlorophenol	88-06-2	3510C, 3520C	EPA8270D	1.0
2,4-Dichlorophenol	120-83-2	3510C, 3520C	EPA8270D	0.12
2,4-Dimethylphenol	105-67-9	3510C, 3520C	EPA8270D	4.0
2,4-Dinitrophenol	51-28-5	3510C, 3520C	EPA8270D	5.0
2-Chlorophenol	95-57-8	3510C, 3520C	EPA8270D	1.0
2-Methyl-4,6-dinitrophenol	534-52-1	3510C, 3520C	EPA8270D	5.0
2-Nitrophenol	88-75-5	3510C, 3520C	EPA8270D	1.0
4-Chloro-m-cresol	59-50-7	3510C, 3520C	EPA8270D	2.0
4-Nitrophenol	100-02-7	3510C, 3520C	EPA8270D	20.0
m/p-Cresol	1319-77-3	3510C, 3520C	EPA8270D	0.062
o-Cresol (2-Methylphenol)	95-48-7	3510C, 3520C	EPA8270D	1.0
Pentachlorophenol	87-86-5	3510C, 3520C	EPA8270D	1.0
Phenol	108-95-2	3510C, 3520C	EPA8270D	1.0
1,2,4,5-Tetrachlorobenzene	95-94-3	3510C, 3520C	EPA8270D	1.0
2,3,4,6-Tetrachlorophenol	58-90-2	3510C, 3520C	EPA8270D	4.0
1,1'-Biphenyl	92-52-4	3510C, 3520C	EPA8270D	10.0
2,4-Dinitrotoluene	121-14-2	3510C, 3520C	EPA8270D	0.14
2,6-Dinitrotoluene	606-20-2	3510C, 3520C	EPA8270D	2.0
2-Chloronaphthalene	91-58-7	3510C, 3520C	EPA8270D	10.0
2-Methylnaphthalene	91-57-6	3510C, 3520C	EPA8270D	20.0
2-Nitroaniline	88-74-4	3510C, 3520C	EPA8270D	1.0
3,3'-Dichlorobenzidine	91-94-1	3510C, 3520C	EPA8270D	10.0
4-Bromophenyl phenyl ether	101-55-3	3510C, 3520C	EPA8270D	10.0
4-Chloroaniline	106-47-8	3510C, 3520C	EPA8270D	2.0
4-Chlorophenyl phenyl ether	7005-72-3	3510C, 3520C	EPA8270D	0.2
Acenaphthene	83-32-9	3510C, 3520C	EPA8270D	1.0
Acenaphthylene	208-96-8	3510C, 3520C	EPA8270D	2.0
Acetophenone	98-86-2	3510C, 3520C	EPA8270D	100.0
Anthracene	120-12-7	3510C, 3520C	EPA8270D	2.0
Atrazine	1912-24-9	3510C, 3520C	EPA8270D	2.0
Benzaldehyde	100-52-7	3510C, 3520C	EPA8270D	4.0
Benzo[a]anthracene	56-55-3	3510C, 3520C	EPA8270D	10.0
Benzo[a]pyrene	50-32-8	3510C, 3520C	EPA8270D	2.0
Benzo[b]fluoranthene	205-99-2	3510C, 3520C	EPA8270D	2.0
Benzo[g,h,i]perylene	191-24-2	3510C, 3520C	EPA8270D	0.055
Benzo[k]fluoranthene	207-08-9	3510C, 3520C	EPA8270D	2.0
Bis(2-chloro-1-methylethyl)ether	108-60-1	3510C, 3520C	EPA8270D	87.0
Bis(2-chloroethoxy) methane	111-91-1	3510C, 3520C	EPA8270D	0.5
Bis(2-chloroethyl) ether	111-44-4	3510C, 3520C	EPA8270D	0.5
Bis(2-ethylhexyl) phthalate	117-81-7	3510C, 3520C	EPA8270D	0.5

Table 9. Laboratory Analytical Specifications Table TAL/TCL Analytes for Surface Water and Groundwater Media (Continued)

Analyte	Analyte ID	Preparation ^B Method	Analytical ^B Method	CRDL ^A (µg/L)
Target Analyte List (continued)				
Semi-volatiles (continued)				
Butylbenzyl phthalate	85-68-7	3510C, 3520C	EPA8270D	1.0
Caprolactam	105-60-2	3510C, 3520C	EPA8270D	12.0
Carbazole	86-74-8	3510C, 3520C	EPA8270D	1.0
Chrysene	218-01-9	3510C, 3520C	EPA8270D	10.0
Dibenz[<i>a,h</i>]anthracene	53-70-3	3510C, 3520C	EPA8270D	2.0
Dibenzofuran	132-64-9	3510C, 3520C	EPA8270D	0.064
Dibutyl phthalate	84-74-2	3510C, 3520C	EPA8270D	2.0
Diethyl phthalate	84-66-2	3510C, 3520C	EPA8270D	1.0
Dimethyl phthalate	131-11-3	3510C, 3520C	EPA8270D	2.0
Di-n-octyl phthalate	117-84-0	3510C, 3520C	EPA8270D	0.5
Fluoranthene	206-44-0	3510C, 3520C	EPA8270D	2.0
Fluorene	86-73-7	3510C, 3520C	EPA8270D	1.0
Hexachlorobenzene	118-74-1	3510C, 3520C	EPA8270D	0.5
Hexachlorobutadiene	87-68-3	3510C, 3520C	EPA8270D	1.0
Hexachlorocyclopentadiene	77-47-4	3510C, 3520C	EPA8270D	1.0
Hexachloroethane	67-72-1	3510C, 3520C	EPA8270D	2.0
Indeno[1,2,3- <i>c,d</i>]pyrene	193-39-5	3510C, 3520C	EPA8270D	2.0
Isophorone	78-59-1	3510C, 3520C	EPA8270D	10.0
m-Nitroaniline	99-09-2	3510C, 3520C	EPA8270D	1.0
Naphthalene	91-20-3	3510C, 3520C	EPA8270D	10.0
Nitrobenzene	98-95-3	3510C, 3520C	EPA8270D	1.0
N-Nitrosodiphenylamine	86-30-6	3510C, 3520C	EPA8270D	1.5
N-Nitrosodipropylamine	621-64-7	3510C, 3520C	EPA8270D	2.0
Phenanthrene	85-01-8	3510C, 3520C	EPA8270D	2.0
p-Nitroaniline	100-01-6	3510C, 3520C	EPA8270D	8.0
Pyrene	129-00-0	3510C, 3520C	EPA8270D	2.0
Volatiles				
1,1,1-Trichloroethane	71-55-6	5021A,5030C,5031,5032	EPA8260B	1
1,1,2,2-Tetrachloroethane	79-34-5	5021A,5030C,5031,5032	EPA8260B	1
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5021A,5030C,5031,5032	EPA8260B	C
1,1,2-Trichloroethane	79-00-5	5021A,5030C,5031,5032	EPA8260B	1
1,1-Dichloroethane	75-34-3	5021A,5030C,5031,5032	EPA8260B	1
1,1-Dichloroethylene	75-35-4	5021A,5030C,5031,5032	EPA8260B	1
1,2,4-Trichlorobenzene	120-82-1	5021A,5030C,5031,5032	EPA8260B	19.4
1,2-Dibromo-3-chloropropane	96-12-8	5021A,5030C,5031,5032	EPA8260B	0.2
1,2-Dibromoethane	106-93-4	5021A,5030C,5031,5032	EPA8260B	0.00075
1,2-Dichlorobenzene	95-50-1	5021A,5030C,5031,5032	EPA8260B	1.0
1,2-Dichloroethane (EDC)	107-06-2	5021A,5030C,5031,5032	EPA8260B	0.4
1,2-Dichloropropane	78-87-5	5021A,5030C,5031,5032	EPA8260B	10.0
1,3-Dichlorobenzene	541-73-1	5021A,5030C,5031,5032	EPA8260B	2.0
1,4-Dichlorobenzene	106-46-7	5021A,5030C,5031,5032	EPA8260B	8.0
2-Hexanone	591-78-6	5021A,5030C,5031,5032	EPA8260B	2.0
Acetone	67-64-1	5021A,5030C,5031,5032	EPA8260B	2.0
Benzene	71-43-2	5021A,5030C,5031,5032	EPA8260B	2.0
Bromodichloromethane	75-27-4	5021A,5030C,5031,5032	EPA8260B	1.0
Bromoform (Tribromomethane)	75-25-2	5021A,5030C,5031,5032	EPA8260B	1.0
Bromomethane (Methyl bromide)	74-83-9	5021A,5030C,5031,5032	EPA8260B	0.0096

Table 9. Laboratory Analytical Specifications Table TAL/TCL Analytes for Surface Water and Groundwater Media (Continued)

Analyte	Analyte ID	Preparation ^B Method	Analytical ^B Method	CRDL ^A (µg/L)
Target Analyte List (continued)				
Volatiles (continued)				
Carbon disulfide	75-15-0	5021A,5030C,5031,5032	EPA8260B	C
Carbon tetrachloride	56-23-5	5021A,5030C,5031,5032	EPA8260B	2.0
Chlorobenzene	108-90-7	5021A,5030C,5031,5032	EPA8260B	10.0
Chloroethane	75-00-3	5021A,5030C,5031,5032	EPA8260B	2.0
Chloroethene (Vinyl chloride)	75-01-4	5021A,5030C,5031,5032	EPA8260B	1.0
Chloroform	67-66-3	5021A,5030C,5031,5032	EPA8260B	6.5
Chloromethane (Methyl chloride)	74-87-3	5021A,5030C,5031,5032	EPA8260B	2.0
cis-1,2-Dichloroethylene	156-59-2	5021A,5030C,5031,5032	EPA8260B	0.2
cis-1,3-Dichloropropene	10061-01-5	5021A,5030C,5031,5032	EPA8260B	0.6
Cumene (Isopropylbenzene)	98-82-8	5021A,5030C,5031,5032	EPA8260B	1.0
Cyclohexane	110-82-7	5021A,5030C,5031,5032	EPA8260B	15.0
Dibromochloromethane	124-48-1	5021A,5030C,5031,5032	EPA8260B	2.0
Dichlorodifluoromethane	75-71-8	5021A,5030C,5031,5032	EPA8260B	0.00075
Dichloromethane (Methylene chloride)	75-09-2	5021A,5030C,5031,5032	EPA8260B	1.0
Ethylbenzene	100-41-4	5021A,5030C,5031,5032	EPA8260B	6.0
Methyl acetate	79-20-9	5021A,5030C,5031,5032	EPA8260B	1.0
Methyl ethyl ketone	78-93-3	5021A,5030C,5031,5032	EPA8260B	20.0
Methyl isobutyl ketone	108-10-1	5021A,5030C,5031,5032	EPA8260B	10.0
Methyl tertiary butyl ether (MTBE)	1634-04-4	5021A,5030C,5031,5032	EPA8260B	2.0
Methylcyclohexane	108-87-2	5021A,5030C,5031,5032	EPA8260B	150.0
Styrene	100-42-5	5021A,5030C,5031,5032	EPA8260B	50.0
Tetrachloroethylene (PCE)	127-18-4	5021A,5030C,5031,5032	EPA8260B	2.0
Toluene	108-88-3	5021A,5030C,5031,5032	EPA8260B	10.0
trans-1,2-Dichloroethylene	156-60-5	5021A,5030C,5031,5032	EPA8260B	0.2
trans-1,3-Dichloropropene	10061-02-6	5021A,5030C,5031,5032	EPA8260B	8.0
Trichloroethylene (TCE)	79-01-6	5021A,5030C,5031,5032	EPA8260B	1
Trichlorofluoromethane	75-69-4	5021A,5030C,5031,5032	EPA8260B	0.2
o-Xylenes	95-47-6	5021A,5030C,5031,5032	EPA8260B	1.0
m,p-Xylene	MPXYL	5021A,5030C,5031,5032	EPA8260B	0.4
Bromochloromethane	74-97-5	5021A,5030C,5031,5032	EPA8260B	10.0
1,4-Dioxane	123-91-1	5021A,5030C,5031,5032	EPA8260B	6.0
1,2-Dichlorobenzene	95-50-1	5021A,5030C,5031,5032	EPA8260B	1.0
1,2,3-Trichlorobenzene	87-61-6	5021A,5030C,5031,5032	EPA8260B	0.88

- A) CRDL is the Contract Required Detection Limit and is not always attainable.
 B) Extraction and preparation methods differ depending upon media, concentration, instrument, laboratory, and analytical method. Preparation methods will also influence detection limits.
 C) Laboratory instructed to obtain the lowest possible method detection limit

Table 10. Laboratory Analytical Specifications Table for Radiological Analytes in Soil, Sediment, Surface, and Groundwater Media

Radionuclides	Typical Soil MDAs^A (pCi/g)	Typical Water MDAs^A (pCi/L)	Analytical Method^B
Alpha Spectroscopy			
Americium-241	0.50	0.40	NNS
Americium-243	0.50	0.462	NNS
Curium-243/244	0.351	0.503	NNS
Curium-245/246	0.416	0.458	NNS
Neptunium-237	0.07	0.771	NNS
Plutonium-238	0.50	0.35	NNS
Plutonium-239/240	0.50	0.353	NNS
Plutonium-242	0.50	0.372	NNS
Thorium-228	0.50	0.445	NNS
Thorium-230	0.50	0.523	NNS
Thorium-232	0.50	0.45	NNS
Uranium-233/234	0.50	0.663	NNS
Uranium-235	0.206	0.684	NNS
Uranium 238	0.50	0.744	NNS
Gamma Spectroscopy Analyses			
Actinium-228	0.30	25.00	NNS
Cesium-137	0.15	5.0	NNS
Cobalt-60	0.03	10.00	NNS
Europium-154	0.25	25.0	NNS
Lead-214	0.25	20.00	NNS
Potassium-40	1.00	75.00	NNS
Radionuclide Indicators			
Gross Alpha	3.000	3.00	EPA900.0MOD
Nonvolatile beta	4.000	4.00	EPA900.0MOD
Individual Beta Analyses			
Carbon-14	2.00	10.00	NNS
Iodine-129	2.00	1.00	NNS
Nickel-59	3.38	20.00	NNS
Nickel-63	4.00	10.00	NNS
Promethium-147	10.00	10.00	NNS
Radium-226	0.895	0.30	EPA903.0MOD
Radium-228	1.29	0.50	EPA903.0MOD
Strontium-90	2.00	0.852	NNS
Technetium-99	5.00	17.3	NNS
Tritium	6.00	0.50	EPA906.0MOD

NNS = No National Standard

- A) All MDAs are sample-specific. The MDAs represented above are typical MDAs as reported by the subcontract laboratories but are not always achievable.
- B) Extraction and preparation methods differ depending upon media, concentration, instrument, laboratory, and analytical method. Preparation methods will also influence detection limits. Laboratory instructed to obtain the lowest possible method detection limit

Table 11. Preservatives, Holding Times, and Sample Containers

Parameter	Preservatives		Holding Time		Containers	
	Aqueous	Solid	Aqueous	Solid	Aqueous	Solid
Volatile Organic Compounds (VOCs) Including: 8260 – VOCs	No Residual Chlorine Adjust pH to <2 with H ₂ SO ₄ , HCL, or solid sodium bisulfate (NaHSO ₄). Cool to 4 °C	Low-level soil Add ~5 g soil to 40 mL VOA vial preserved with 1 g of NaHSO ₄ /5 mL water	14 days	Low/High Level 14 days	3x40 mL glass VOC vial, PTFE septa cap	3x40 (or 60) mL glass VOA vial (with stir bar for low-level soil), PTFE septa cap
Extractable Organics Including: 8270 – Semivolatile Organics	No Residual Chlorine Cool to 4 °C	Cool to 4 °C	7 days until extraction/ analyzed within 40 days after extraction	14 days until extraction/ analyzed within 40 days after extraction	2 x 1 L amber glass bottle per chemical parameter	250 mL CWM
8081 – Organochlorine Pesticides 8082 – Polychlorinated Biphenyls 8310 – Polycyclic Aromatic Hydrocarbons	Extracts must be stored at 4 °C and in the dark until analysis Extracts must be stored at 4 °C and in the dark until analysis	Cool to 4 °C	7 days until extraction/ analyzed within 40 days after extraction	14 days until extraction/ analyzed within 40 days after extraction	2 x 1 L amber glass bottle per chemical parameter	250 mL CWM
Metals (except Chromium (VI) & Mercury)	HNO ₃ to pH <2	Cool to 4 °C	6 months	6 months	1 L HDPE	250 mL CWM (metals and cyanide may be collected in the same container for soils)
Mercury	HNO ₃ to pH <2	Cool to 4 °C	28 days	28 days	250 mL HDPE or glass	250 mL CWM
Chromium (VI)	Cool to 4 °C	Cool to 4 °C	24 hours	24 hours	250 mL HDPE	250 mL CWM
Miscellaneous Radiological Test Gross Alpha	HNO ₃ to pH <2	Cool to 4 °C	6 months	6 months	2 L HDPE	250 mL HDPE
Radiological Test Nonvolatile Beta	HNO ₃ to pH <2	Cool to 4 °C	6 months	6 months	2 L HDPE	250 mL HDPE
Tritium	None Cool 0 to 6 °C	None Cool 0 to 6 °C	180 days	180 days	250 Amber Glass	250 HDPE or 4 oz Amber Glass

Abbreviations used in Table:

g = gram	HCL = Hydrochloric acid	AG = Amber Glass Jar
L = liter	NaHSO ₄ = Sodium bisulfate	HNO ₃ = Nitric acid
mL = milliliter	PTFE = Teflon lined seals	HDPE = High-Density Polyethylene plastic bottle
VOA = volatile organic analysis	Na ₂ S ₂ O ₃ = Sodium Thiosulfate	BR = Boston Round bottle
H ₂ SO ₄ = Sulfuric acid	CWM = Clear Wide-Mouth Glass Jar	

Table 12. ECODS N-1, 631-2G, and 690-N OU Sampling Matrix

Sample Type ²	ECODS N-1, 631-2G, and 690-N OU Subunit	Station	Top Depth	Bottom Depth	Media	Sample Method	Analyses	Comments
			(ft)					
REG	631-2G	CSSLP-1	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-1	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-1	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-2	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-2	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-2	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-3	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-3	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-3	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-4	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-4	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-4	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-5	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-5	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-5	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-6	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-6	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-6	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-7	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-7	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-7	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-8	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-8	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-8	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	

Table 12. ECODS N-1, 631-2G, and 690-N OU Sampling Matrix (Continued)

Sample Type ²	ECODS N-1, 631-2G, and 690-N OU Subunit	Station	Top Depth	Bottom Depth	Media	Sample Method	Analyses	Comments
			(ft)					
REG	631-2G	CSSLP-9	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-9	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-9	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-10	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-10	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-10	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-11	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-11	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-11	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-12	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-12	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-12	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-13	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-13	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-13	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-14	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-14	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-14	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-15	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-15	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-15	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-16	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-16	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-16	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	

Table 12. ECODS N-1, 631-2G, and 690-N OU Sampling Matrix (Continued)

Sample Type ²	ECODS N-1, 631-2G, and 690-N OU Subunit	Station	Top Depth	Bottom Depth	Media	Sample Method	Analyses	Comments
			(ft)					
REG	631-2G	CSSLP-17	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-17	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-17	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-18	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-18	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-18	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-19	0	1	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-19	1	4	Soil	Hand Auger	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSSLP-19	8	10	Soil	DPT	TAL, TCL, Alpha/Beta ¹	
REG	631-2G	CSR 1	5	35	Groundwater	Pump	TAL, TCL, Alpha/Beta ¹	Existing Well
REG	631-2G	CSR 4	15	45	Groundwater	Pump	TAL, TCL, Alpha/Beta ¹	Existing Well
REG	631-2G	CSR 5D	18	38	Groundwater	Pump	TAL, TCL, Alpha/Beta ¹	Existing Well
REG	ECODS N-1	ECN1-28	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-28	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-28	8	10	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-28	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-28	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-29	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-29	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-29	8	10	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-29	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-29	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-30	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-30	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-30	8	10	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-30	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-30	18	20	Soil	DPT	TAL	

Table 12. ECODS N-1, 631-2G, and 690-N OU Sampling Matrix (Continued)

Sample Type ²	ECODS N-1, 631-2G, and 690-N OU Subunit	Station	Top Depth	Bottom Depth	Media	Sample Method	Analyses	Comments
			(ft)					
REG	ECODS N-1	ECN1-31	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-31	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-31	8	10	Soil	DPT	TAL, Hexavalent Chromium	
REG	ECODS N-1	ECN1-31	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-31	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-32	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-32	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-32	8	10	Soil	DPT	TAL, Hexavalent Chromium	
REG	ECODS N-1	ECN1-32	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-32	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-33	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-33	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-33	8	10	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-33	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-33	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-34	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-34	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-34	8	10	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-34	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-34	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-35	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-35	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-35	8	10	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-35	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-35	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-35	45	55	Groundwater	DPT	TAL	

Table 12. ECODS N-1, 631-2G, and 690-N OU Sampling Matrix (Continued)

Sample Type ²	ECODS N-1, 631-2G, and 690-N OU Subunit	Station	Top Depth	Bottom Depth	Media	Sample Method	Analyses	Comments
			(ft)					
REG	ECODS N-1	ECN1-36	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-36	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-36	8	10	Soil	DPT	TAL, Hexavalent Chromium	
REG	ECODS N-1	ECN1-36	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-36	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-37	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-37	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-37	8	10	Soil	DPT	TAL, Hexavalent Chromium	
REG	ECODS N-1	ECN1-37	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-37	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-38	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-38	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-38	8	10	Soil	DPT	TAL, Hexavalent Chromium	
REG	ECODS N-1	ECN1-38	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-38	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-39	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-39	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-39	8	10	Soil	DPT	TAL, Hexavalent Chromium	
REG	ECODS N-1	ECN1-39	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-39	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-39	45	55	Groundwater	DPT	TAL	
REG	ECODS N-1	ECN1-40	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-40	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-40	8	10	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-40	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-40	18	20	Soil	DPT	TAL	

Table 12. ECODS N-1, 631-2G, and 690-N OU Sampling Matrix (Continued)

Sample Type ²	ECODS N-1, 631-2G, and 690-N OU Subunit	Station	Top Depth	Bottom Depth	Media	Sample Method	Analyses	Comments
			(ft)					
REG	ECODS N-1	ECN1-41	0	1	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-41	1	4	Soil	Hand Auger	TAL	
REG	ECODS N-1	ECN1-41	8	10	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-41	10	12	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-41	18	20	Soil	DPT	TAL	
REG	ECODS N-1	ECN1-41	45	55	Groundwater	DPT	TAL	
REG	ECODS N-1	CBR 3D	45.5	65.5	Groundwater	Pump	TAL	Existing Well
REG	690-N	FBFA-1	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-1	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-2	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-2	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-3	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-3	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-4	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-4	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-5	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-5	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-6	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-6	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-7	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-7	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-7	8	10	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-7	18	20	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-7	28	30	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	

Table 12. ECODS N-1, 631-2G, and 690-N OU Sampling Matrix (Continued)

Sample Type ²	ECODS N-1, 631-2G, and 690-N OU Subunit	Station	Top Depth	Bottom Depth	Media	Sample Method	Analyses	Comments
			(ft)					
REG	690-N	FBFA-7	46	56	Groundwater	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹ , Tritium	
REG	690-N	FBFA-8	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-8	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-9	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-9	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-10	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-10	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-11	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-11	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-12	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-12	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-13	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-13	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-14	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-14	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-15	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-15	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-16	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-16	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-17	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-17	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-17	8	10	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-17	18	20	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	

Table 12. ECODS N-1, 631-2G, and 690-N OU Sampling Matrix (Continued)

Sample Type ²	ECODS N-1, 631-2G, and 690-N OU Subunit	Station	Top Depth	Bottom Depth	Media	Sample Method	Analyses	Comments
			(ft)					
REG	690-N	FBFA-17	28	30	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-17	46	56	Groundwater	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹ , Tritium	
REG	690-N	FBFA-18	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-18	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-19	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-19	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-20	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-20	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-21	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-21	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-22	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-22	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-23	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-23	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-24	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-24	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-25	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-25	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-26	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-26	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-27	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-27	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	

Table 12. ECODS N-1, 631-2G, and 690-N OU Sampling Matrix (Continued)

Sample Type ²	ECODS N-1, 631-2G, and 690-N OU Subunit	Station	Top Depth	Bottom Depth	Media	Sample Method	Analyses	Comments
			(ft)					
REG	690-N	FBFA-28	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-28	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-29	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-29	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-30	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-30	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-31	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-31	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-32	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-32	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-33	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-33	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-34	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-34	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-35	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-35	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-36	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-36	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-36	8	10	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, TPH-DRO, Alpha/Beta ¹	
REG	690-N	FBFA-36	18	20	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, TPH-DRO, Alpha/Beta ¹	
REG	690-N	FBFA-36	28	30	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, TPH-DRO, Alpha/Beta ¹	

Table 12. ECODS N-1, 631-2G, and 690-N OU Sampling Matrix (Continued)

Sample Type ²	ECODS N-1, 631-2G, and 690-N OU Subunit	Station	Top Depth	Bottom Depth	Media	Sample Method	Analyses	Comments
			(ft)					
REG	690-N	FBFA-36	46	56	Groundwater	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, TPH-DRO, Alpha/Beta ¹ , Tritium	
REG	690-N	FBFA-37	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-37	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-37	8	10	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, TPH-DRO, Alpha/Beta ¹	
REG	690-N	FBFA-37	18	20	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, TPH-DRO, Alpha/Beta ¹	
REG	690-N	FBFA-37	28	30	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, TPH-DRO, Alpha/Beta ¹	
REG	690-N	FBFA-37	46	56	Groundwater	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, TPH-DRO, Alpha/Beta ¹ , Tritium	
REG	690-N	FBFA-38	0	1	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-38	1	4	Soil	Hand Auger	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-38	8	10	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-38	18	20	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-38	28	30	Soil	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹	
REG	690-N	FBFA-38	46	56	Groundwater	DPT	TAL, TCL-SVOC, TCL-VOC, TCL-PCB, Alpha/Beta ¹ , Tritium	

1. If the gross alpha result exceeds 20 pCi/g for a soil sample or exceeds 15 pCi/L for a water sample, then the Alpha spectroscopy radionuclides in Table 10 will also be analyzed for that sample. If the nonvolatile beta result exceeds 50 pCi/g for a soil sample or exceeds 50 pCi/L for a water sample, then the gamma spectroscopy radionuclides and individual beta analyses in Table 10 will also be analyzed for that sample.
2. Field Duplicates (FD), Equipment/Rinsate Blanks (RB) and Split Samples (SPL) are not shown but will be produced during work planning stage. Trip Blanks (TB) are not shown but will be sent with each shipment of VOCs. A total number of each are identified below.

NOTES: ECODS N-1, 631-2G, and 690-N OU Sample Count

Total Number of Samples = 273	Field Duplicates = 12	Trip Blanks = 25
Regular Samples = 230	Rinsate/Equipment Blanks = 6	Split Samples = 12

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ATTACHMENT 1

ECODS N-1 Data Review Summary

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ECODS N-1 DATA ISSUES/SUMMARY

Similar waste units = ECODS L-1, N-2, P-2, R-1A, -1B, -1C = Potential for friable asbestos at depth: therefore LUCs (No HH, ECO, PTSM or CM COCs)

- Prevent human exposure to contaminants including buried asbestos present in the subsurface soils that may present a risk to a future industrial worker or resident.
- Prevent contact, removal, or excavation of subsurface soils.
- Prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playground.

Nature and Extent

Al: ECN1-25 Bkgd, 1-4 ft, 1/72 result is 28600 (SRS max = 23700)

As: highest conc. 8-10 ft, none > SRS bkgd (22.9)

Cr: highest conc. 8-10 ft, 3/72 >SRS max (54.3) **Data gap Cr+6 data?**

Cu: ECN14, 1-4, max = 431, 2/72 > SRS max (74.2) **Data gap bound?**

Fe: highest conc. 8-10 ft, 2/72 > SRS max (44300)

Pb: ECN1-08, 0-1 ft result = 1470, 10/72 SRS max (26.6) **Data gap bound?**

Se: ECN1-11, 1-4 ft result = 294, 1/72 > SRS max (12.2) **bound?**

V: 6/72, all 8-10 ft > SRS max (104)

Zn: ECN1-14, 1-4 ft = 1280, 30/72 > SRS max (20.7) **Data gap bound?**

PTSM (all depths)

No PTSM (Industrial)

Used Cr+6 RSL

HHRA (0-1 ft)

COCs Based on 95% UCL:

As: Res risk = 5.3E-06, IW risk = 1.2E-06, max = 5.0, SRS max = 22.9, w/in bkgd

Recommend not identifying as RCOC in surface soil

Cr: Res risk = 6.6E-05, IW risk = 3.2E-06, max = 50.2, SRS max = 54.3, w/in bkgd

Used Cr+6 RSL (most conservative)

Recommend not identifying as RCOC in surface soil

Potential data gap: Cr+3/+6 data

ERA (0-1 and 1-4 ft)

Based on average concentration

COCs 0-1 ft: Pb (HQ = 2.7), V (HQ = 2.7), CN (HQ = 1.0)

COCs 1-4 ft: Se (HQ = 8.6), V (HQ = 3.6), bis(2-ethylhexyl)phthalate (HQ = 1.2), CN (HQ = 1.2)

Application of area use factors (home range) result all in HQs <1

ECODS Size = 350 ft x 50 ft = 17500 ft² = 0.163 ha

Recommend no RCOCs in surface or subsurface soil

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