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

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1.4.1 ECODS N-1 (NBN)

ECODS N-1 (Figure 3) is one of twenty-five ECODS which were identified during a review of early 1950s aerial photographs (Figure 4). Historically, ECODS were used during the construction and early operation of SRS for disposal of construction debris and other non-radioactive waste materials. Materials containing asbestos may have been placed in SRS ECODS. Some sections of these sites may have also been used as burn pits for disposal of combustible waste.

ECODS N-1 is located within the Pen Branch Watershed (Figure 7 within Appendix A) and was used to dispose of materials associated with the construction and operation of N Area. Historical aerial photographs revealed that the area where the subunit is located was farmland prior to construction of the SRS and identified the ECODS N-1 as being in use from approximately August 1952 to June 1954. ECODS N-1 is located in a relatively flat area that gradually slopes to the south. It is approximately (~) 107-m long by 15-m wide (350-ft long by 50-ft wide). Waste disposed of in ECODS N-1 was buried in two trenches each ~ 46-m (150-ft) long and located end-to-end. ECODS N-1 was logged by the US Forestry Service in 2000 and is currently a wooded area containing mature pine trees providing a moderate habitat quality for ecological (ECO) receptors.

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-kilometers (km) [1.2-miles (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.

Soils in much of the general area 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). Surface soils consisted of a clayey silty sand which continued down into the shallow subsurface layer. The deep subsurface contained a relatively thick [~6.1-m (20-ft)] impermeable clay layer. The technical oversight field notes discuss complications due to the very stiff, high clay-content layer, which was typically encountered between 2.44-m and 3.66-m (8-ft and 12-ft) bgs and is

approximately 6-m (20-ft) thick. Soil boring reports from the 2019 characterization effort at this subunit are attached in Appendix B.

The nearest groundwater monitoring well is CBR 3D (Figure 9 within Appendix A). Based on the 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 within Appendix A) (WSRC 2001a).

1.4.2 CSSLP (631-2G)

The CSSLP (631-2G) (Figure 5) was cleared in 1951 and was used for equipment laydown and rubble storage, in addition to a burning area which remained active up until the mid-2000s. Prior to 1951, the area was used as farmland. A surface water impoundment area was created between 1992 and 1994 within the CSSLP (631-2G) subunit to capture surface water run-off from the upgradient disturbed soils. The subunit lies in a southwestern sloping plain adjacent to the CSBRP (631-1G and 631-3G) (Figure 5). The CSSLP (631-2G) subunit measures 91.4 m by 91.4 m (300-ft by 300-ft) and covers ~0.84 hectare (ha [2.07 acres {ac}]). Historically, the CSSLP (631-2G) has been used to burn various unknown types and quantities of wood which may have included treated lumber and creosote-treated wood. Since 1975, its operating procedures have called for the area to receive inert, nonhazardous materials such as nails, hinges, scrap lumber, poles, crates, pallets, and unsalvageable wood products. Several debris piles within the CSSLP (631-2G) were located in the wooded areas near an intermittent stream. The debris piles were up to 6-m (20-ft) in diameter at the base and were about 3-m (10-ft) high. In some of the piles, metal shavings and other debris were clearly evident under a thin cover of leaves. All of the debris (including construction debris, plastics, and metal shavings) was removed in 11 skid pans to a landfill or recycled (WSRC 1998b). Burning operations at the CSSLP (631-2G) were limited to untreated wood products, such as shipping pallets, some-time prior to 1998 and the ash was collected and hauled to the Burma Road Landfill at SRS.

The CSSLP (631-2G) is located within the Fourmile Branch watershed (Figure 7 within Appendix A). Ground surface elevation in the area is ~84-m (275-ft) above msl. Surface waters

The map indicates that the unconfined groundwater in the vicinity of the Ford Building (690-N) flows from northeast to southwest (Figure 8 within Appendix A) with the water table in the area at ~13- to 16-m (43- to 53-ft) bgs (WSRC 1997).

2.0 PRELIMINARY UNIT EVALUATION

The purpose of this section is to describe and summarize the existing information available for the ECODS N-1, CSSLP, and Ford Building OU. The *Sampling and Analysis Plan for Pre-Work Plan Characterization at the ECODS N-1 (NBN), CSSLP (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (Ford Building) Operable Unit,* is included as Appendix A. The soil and concrete data collected under the pre-Work Plan characterization SAP was compared to risk-based and contaminant migration (CM) thresholds and used to identify potential problems warranting action and additional data gaps for nature and extent of contamination determinations. In addition, groundwater data collected under the pre-Work Plan characterization effort will be used in the combined RFI/RI/Baseline Risk Assessment (BRA)/Corrective Measures Study (CMS)/ Feasibility Study (FS) to support the uncertainty evaluation for any CM constituents of potential concern (COPC) identified during the contaminant migration analysis. A summary of the unit evaluations for the three subunits is discussed in more detail below.

2.1 Previous Investigations

2.1.1 ECODS N-1 (NBN)

In October 2000, a radiological control survey was performed to support the development of the Health and Safety Plan (HASP) and to ensure the protection of workers during soil sampling activities. This survey consisted of measuring background radiation levels, probing the surface for possible contamination, and collecting random soil samples 0- to 15.2-centimeters (cm) (0- to 6-inches (in.) bgs for analysis in a radiological counting facility. This area was designated as a "Clean Area" in accordance with Washington Savannah River Company (WSRC) Procedure SQ 1.2. For confirmation purposes, three of the radiological control survey samples were also sent to the SRS Analytical Laboratories Group for gross alpha and non-volatile beta

EcoRisk Database (2015) were used to obtain the no-effect screening levels used in data screening. Sb, Cr, copper (Cu), Pb, mercury (Hg), nickel (Ni), selenium (Se), V, bis(2-ethylhexyl)phthalate, cyanide, PCB 1254, and PCB 1260 were identified as ECO COPCs for terrestrial receptors. Maximum detected concentrations of Cu, cyanide, Pb, Ni, V and bis(2-ethylhexyl)phthalate are greater than lowest observed adverse effects level (LOAEL) – based refinement screening values (RSVs) for ECO receptors.

The preliminary contaminant migration constituent of potential concern (CMCOPC) screen by vadose zone contaminant migration model-multi-layered software (VZCOMML) identified Cr^{+6} as a preliminary CMCOPC at the ECODS N-1 subunit.

2.2.2 CSSLP (631-2G)

Due to the robust data set from the 2019 pre-Work Plan characterization effort, screening was performed for the CSSLP (631-2G) subunit by comparing the soil data to SRS soils background data, the USEPA RSLs (May 2019), and the USEPA PRG website (2019) for radionuclides. Appendix D includes details of the preliminary risk screening associated with the unit. A more detailed screening at this stage allowed for better identification of problems that may warrant action and potential data gaps. No soil samples for the CSSLP (631-2G) subunit exceeded the nonvolatile beta trigger limit (50 pCi/g) for additional beta-emitting radionuclide analyses (i.e., maximum nonvolatile beta result was 16.5 pCi/g). However, one sample exceeded the gross alpha screening limit of 20 pCi/g. The sample from location CSSLP-19 (1- to 2-ft interval) had a gross alpha result of 23.7 pCi/g; therefore that sample was further analyzed for the suite of alpha spectroscopy constituents.

Preliminary PTSM screening for the CSSLP (631-2G) subunit was performed using the maximum detected concentration from all soil depth intervals. The USEPA RSL table (dated May 2019) and USEPA PRG website (2019) were used to obtain the thresholds for the default industrial worker scenario used in the evaluation. The data screening indicated that there is no PTSM (HI = 0.6, risk = 1.9E-04) at the CSSLP subunit.

Receptor

Potential HH receptors identified at the Ford Building (690-N) subunit were the industrial worker and resident receptors. Potential ECO receptors only included terrestrial receptors.

3.1.2 State the Problem

3.1.2.1 ECODS N-1

Additional data are needed to determine if metals, including Cr^{+6}, are unit-related or are naturally occurring. Metals, including Cr^{+6}, may be present in soils at levels that may leach to groundwater above their respective MCLs. Additional soil samples are needed within the ECODS N-1 subunit at several depth intervals for metals, including Cr^{+6}, analyses. Samples will be biased based on the 2001 Site Evaluation characterization data and the 2019 pre-Work Plan characterization data. Background soil samples will also be needed at nearby locations at the same depth intervals for metals analyses, including Cr^{+6}, to compare against the ECODS N-1 subunit data. Background locations will be co-located with the 2001 Site Evaluation background locations.

Due to the absence of asbestos characterization, if no other problem warranting action is found at the subunit, an asbestos investigation is needed at the ECODS N-1 to determine if asbestos constitutes a HH problem warranting action.

3.1.2.2 CSSLP (631-2G)

Additional data are needed to determine if metals, including Cr^{+6}, are unit-related or are naturally occurring. Metals, including Cr^{+6}, may be present in soils at levels that may leach to groundwater above their respective MCLs. Additional soil samples are needed within the CSSLP (631-2G) subunit at several depth intervals for metals, including Cr^{+6}, analyses. These samples will be biased sample locations based on the 2019 pre-Work Plan characterization data, and aerial photos of historic burn pile locations. Three of these locations will also determine the extent of the previous elevated arsenic result. Soil samples will also be needed at background locations, which will be co-located with previous CSBRP (631-1G and 631-3G) background locations, and at the same depth intervals to compare against the CSSLP (631-2G) subunit data.

Additional data to determine the extent of the elevated arsenic "hot spot" found in surface soil at location CSSLP-08 may be needed to support the final remedy selection.

In the CSSLP (631-2G) surface water impoundment area, characterization data were collected in 1997 and 1999, however burning operations continued until the mid-2000's. A new set of characterization data are needed to determine present day conditions within the CSSLP (631-2G) surface water impoundment area. Additional sediment and surface water samples are needed within the CSSLP (631-2G) surface water impoundment area for TAL/TCL constituents and radiological indicator parameters. These samples will be biased sample locations based on the 1997 and 1999 CSBRP (631-1G and 631-3G) OU characterization data. Sediment and surface water samples will also be needed at background locations~~, which will be at a unnamed Carolina Bay with little or no impact from SRS operations,~~ to compare against the CSSLP (631-2G) surface water impoundment area data. Due to the similarities in the environments, samples from Carolina Bay #125 will be taken to identify background concentrations for the surface water impoundment area. Because the surface elevation of Carolina Bay #125 is approximately 82-m (269-ft) msl and groundwater is about 73-m (240-ft) msl at this location, the bay is not fed by groundwater discharge. Surface water run-off from Central Shops drains into another bay identified as Carolina Bay #126 located to the east of Carolina Bay #125. Therefore, Carolina Bay #125 is identified as an unimpacted bay south of N Area (Figure 2).

3.1.2.3 Ford Building (690-N)

The 2019 pre-Work Plan characterization data precedes the D&D of the Ford Building (690-N), and it is possible that the D&D of the Ford Building (690-N) could spread contamination to the surrounding environment. A radiological survey will be conducted before and after D&D activities, if the radiological surveys establish that contamination is present outside of the Ford Building (690-N) then additional surface soil samples will be collected around the building to determine the nature and extent of that contamination.

Metals may be present in soils at levels that may leach to groundwater above their respective MCLs. Sufficient metals data was collected as part of the 2019 pre-Work Plan characterization,

and these data will be used to evaluate the potential for contaminant migration to groundwater at the Ford Building (690-N) subunit.

3.1.3 Identify the Decisions

The following decisions are to be addressed during characterization within each of the subunits:

3.1.3.1 ECODS N-1 (NBN)

Determine whether elevated metals (including Cr^{+6}) results are due to native soil conditions or related to unit operations. Soils data are needed within the subunit and at background locations to determine if metal constituents, including Cr^{+6}, are unit-related or background. These data are needed for the HH and ECO risk assessments, and CM analysis for the ECODS N-1 subunit.

Due to the absence of asbestos characterization, if no other problem warranting action is found at the subunit, an asbestos investigation is needed at ECODS N-1 to determine if asbestos constitutes a HH problem warranting action.

3.1.3.2 CSSLP (631-2G)

Determine whether elevated metals (including Cr^{+6}) results are due to native soil conditions or related to unit operations. Soils data are needed within the subunit and at background locations to determine if metal constituents, including Cr^{+6}, are unit-related or background. These data are needed for the HH and ECO risk assessments, and CM analysis.

Determine the extent of the elevated As "hot spot" found in surface soil at location CSSLP-08. Surface soil metals data may be needed to determine the extent of the As "hot spot". These data may be needed for the CSSLP (631-2G) to support remedy selection.

Determine current conditions within the CSSLP (631-2G) surface water impoundment area. New TAL, TCL and radiological data are needed within the CSSLP (631-2G) surface water impoundment area for the HH and ECO risk assessments, and CM analysis.

Determine whether metals (including Cr^{+6}) results are due to native sediment conditions or related to unit operations. Sediment and surface water data are needed from within the CSSLP (631-2G)

be sampled and evaluated through ECO risk assessment screening. All soil intervals, including the deep subsurface soils (2.4- to 3.0-m [8- to 10-ft] and 3.0- to 3.6-m [10- to 12-ft]), will be sampled and evaluated through CM and PTSM screening. Continuous core will be collected at each location and described in detail to a depth of 9-m (30-ft) to evaluate the extent of the clay layer below the ECODS N-1 subunit.

4.4.2 CSSLP (631-2G)

Surface soils (0.0- to 0.3-m [0- to 1-ft]) will be sampled at the CSSLP (631-2G) and evaluated through HH and ECO risk assessment screening. Shallow subsurface soils (0.3- to 1.2-m [1- to 4-ft]) will be sampled and evaluated through ECO risk assessment screening. All soil intervals, including the deep subsurface soils (2.4- to 3.0-m [8- to 10-ft] and 3.0- to 3.6-m [10- to 12-ft]), will be sampled and evaluated through CM and PTSM screening.

Surface sediment (0.0- to 0.3-m [0- to 1-ft]) will be sampled at the CSSLP (631-2G) surface water impoundment area as well as background locations at ~~a~~ Carolina Bay #125 and evaluated through HH and ECO risk assessment screening, CM and PTSM. Subsurface sediment (0.3- to 1.2-m [1- to 4-ft]) will be sampled and evaluated for nature and extent of contamination, CM and PTSM.

Surface water will be sampled at the CSSLP (631-2G) surface water impoundment area as well as background locations at ~~a~~ Carolina Bay #125 and evaluated through HH and ECO risk assessment screening.

4.4.3 Ford Building (690-N)

Currently no additional samples are planned to be taken at the Ford Building (690-N) unless contamination is found during the final radiation survey. Radiological surveys around the Ford Building (690-N) will take place before and after D&D to verify no contamination occurred outside the building during the D&D process. If contamination from D&D activities is observed, then additional surface soil samples around the Ford Building (690-N) will be taken for PCBs, gross alpha, non-volatile beta, and gamma spectroscopy analyses. These data will be evaluated through HH and ECO risk assessment, PTSM evaluation, and CM screening.

Thirty (30) soil samples will be collected from the CSSLP (631-2G) subunit. Six (6) sample locations within the CSSLP (631-2G) subunit will target previously identified locations of elevated metal concentrations. Additionally, there will be three (3) background locations outside of the CSSLP (631-2G) subunit boundary (Figure 11). The following four (4) soil intervals will be sampled at four (4) of the six (6) locations inside the CSSLP (631-2G) subunit and at all three (3) background stations: surface samples (0.0- to 0.3-m [0- to 1-ft]), shallow subsurface samples (0.3- to 1.2-m [1- to 4-ft]), and deep subsurface samples (2.4- to 3.0-m [8- to 10-ft] and 3.0- to 3.6-m [10- to 12-ft]). The two (2) additional sample locations inside the CSSLP (631-2G) subunit boundary will have surface (0.0- to 0.3-m [0- to 1-ft]) samples collected to bound an arsenic hotspot. All soil samples will be analyzed for TAL metals analyses (including Cr+6) (Table 7). All soil samples are planned to be collected by hand auger down to 1.2-m (4-ft) and deeper samples (below 1.2-m [4-ft]) will be collected by a Rotosonic drill rig.

~~Thirty (30) soil samples will be collected from the CSSLP (631-2G) subunit. Sample locations within the subunit will target previously identified locations of elevated metal concentrations. At six (6) locations inside the CSSLP (631-2G) subunit and three (3) background locations outside of the unit boundary (Figure 11). The following four soil intervals will be sampled: surface samples (0.0- to 0.3-m [0- to 1-ft]), shallow subsurface samples (0.3- to 1.2-m [1- to 4-ft]), and deep subsurface samples (2.4- to 3.0-m [8- to 10-ft] and 3.0- to 3.6-m [10- to 12-ft]). All soil samples will be analyzed for TAL metals analyses (including Cr^{+6}) (Table 7). All soil samples are planned to be collected by hand auger down to 1.2-m (4-ft) and deeper samples (below 1.2-m [4-ft]) will be collected by a Rotosonic drill rig~~.

A surface water impoundment area was created between 1992 and 1994 within the CSSLP (631-2G) subunit to capture surface water run-off from the surrounding area. The CSSLP (631-2G) surface water impoundment area has been sampled in the past but before operations ceased at the CSSLP (631-2G); therefore, characterization of the unit will occur during this Work Plan characterization and is described below. Due to the similarities in the environments, samples from ~~an unnamed~~ Carolina Bay #125 will be taken to identify background concentrations for the surface water impoundment area. ~~The~~ Carolina Bay #125 is an unimpacted bay located south of the N Area (Figure 2) (SREL 1989).

Fourteen (14) sediment samples will be collected for the CSSLP (631-2G) surface water impoundment area. Sample locations within the CSSLP (631-2G) surface water impoundment area will target previously identified locations. At four (4) locations inside the CSSLP (631-2G) surface water impoundment area and at three (3) background locations from ~~a~~ Carolina Bay #125 the following two sediment intervals will be sampled (Figures 11 and 12): 0.0- to 0.3-m (0- to 1-ft) and 0.3- to 1.2-m (1- to 4-ft).

All sediment samples will be analyzed for TAL metals (including Cr^{+6}), TCL (Table 7) and radiological indicators (gross alpha and nonvolatile beta) (Table 9). If the gross alpha result exceeds 20 pCi/g for a sediment sample, then the alpha spectroscopy radionuclides will also be analyzed for that sample (Table 9). If the nonvolatile beta result exceeds 50 pCi/g for a sediment sample, then the gamma spectroscopy radionuclides and individual beta analyses will also be analyzed for that sample (Table 9). All sediment samples are planned to be collected by hand auger, push/hammer core or vibracore.

Fourteen (14) surface water samples will be collected for the CSSLP (631-2G) surface water impoundment area. Surface water samples will be collected at four (4) locations within the CSSLP (631-2G) surface water impoundment area and three (3) background locations from ~~a~~ Carolina Bay #125 (Figures 11 and 12). All surface water samples will be analyzed for TAL metals (including Cr^{+6}), TCL (Table 8) and radiological indicators (gross alpha and nonvolatile beta) (Table 9). Two surface water samples will be collected at all seven locations: one sample filtered and the second sample unfiltered. If the gross alpha result exceeds 15 pCi/liter (L) for a water sample, then the alpha spectroscopy radionuclides will also be analyzed for that sample (Table 9). If the nonvolatile beta result 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 9). Surface water samples will be collected by a grab sample.

5.3 Ford Building (690-N)

The Ford Building (690-N) was mainly used a heat exchanger repair facility, but also for construction operations and a storage facility. D&D activities at the Ford Building (690-N) are

10.0 REFERENCES

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Table 1. Data Quality Objectives for the ECODS N-1 (NBN) 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 if elevated metals (including Cr^{+6}) are unit related. If no other problem warranting action is found at the subunit, determine if asbestos is present at ECODS N-1 that constitutes a HH problem warranting action. 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 and 10 to 12 ft. If asbestos characterization is required, characterization will be determined by asbestos SME.	Data validated to SRS electronic verified and validated (VV) level, with 10% of the sampling batches validated to the SRS definitive level. Full TAL suite including Cr^{+6}.	No Action. Land Use Controls. Excavation of contaminated soils. Cover System.

Table 2. 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 pits. 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 if elevated metals are unit related. Determine the concentration of Cr^{+6} at the unit. Determine the extent of the elevated As "hot spot" found at location CSSLP-08. 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 and 10 to 12 ft.	Data validated to SRS electronic VV level, with 10% of the sampling batches validated to the SRS definitive level. Full TAL suite including Cr^{+6}.	No Action. Institutional Controls. Excavation of contaminated gravel and/or soils. Cover System.

Table 5. Data Quality Objectives for the Ford Building (690-N) 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	Radiological contamination of surface soil from spills from primary sources. Contamination of surface soil from cutting oil used in machinery. Infiltration/ percolation of contamination through surface soils into subsurface soils.	Ingestion, inhalation, absorption, and/or direct exposure with soils.	Determine if any impacts to the subunit arise from the D&D of the Ford Building (690-N). Determine any HH and ECO COCs and surficial risk due to direct exposure with contaminated soil. Determine any PTSM locations from identified COCs. Determine if there is any contaminant migration potential through contaminant migration evaluation.	Collection of surface soils from 0- to 1-ft interval.	Data validated to SRS electronic VV level, with 10% of the sampling batches validated to the SRS definitive level. TCL-PCBs. Alpha/beta radiological indicators and gamma spectroscopy. Radionuclide specific analyses if trigger levels are exceeded for radiological indicators.	No Action. Institutional Controls. Excavation of contaminated soils. Cover System.

PRELIMINARY PTSM SCREENING FOR FORD BUILDING 690-N (Soil – All Depths)

Analyte	Maximum Concentration[1]	Noncarcinogenic Hazard Estimate		Carcinogenic Risk Estimate	
		Industrial RSL[2]	Industrial HQ Estimate[3]	Industrial RSL[2]	Industrial Risk Estimate[4]
	(mg/kg)	*(mg/kg)*		*(mg/kg)*	
Chrysene	0.114	--	--	2.1E+03	5.4E-11
Di-N-Butyl Phthalate	0.0338	8.2E+04	4.1E-07	--	--
Fluoranthene	0.421	3.0E+04	1.4E-05	--	--
Indeno[1,2,3-Cd]Pyrene	0.0767	--	--	2.1E+01	3.7E-09
N-Dioctyl Phthalate	0.0146	8.2E+03	1.8E-06		--
Pentachlorophenol	0.229	--	--	4.0E+00	5.7E-08
Phenanthrene	0.238	NA[7]	--	NA[7]	--
Pyrene	0.309	2.3E+04	1.3E-05	--	--
TPH (Diesel Range Organics)[8]	159	4.2E+02	3.8E-01	--	--
Pesticides/PCBS					
Aroclor 1254	0.199	--	--	9.7E-01	2.1E-07
Aroclor 1260	0.0713	--	--	9.9E-01	7.2E-08
Radionuclides					
Cesium-137	0.153			6.9E-02	2.2E-06
Thorium-232[9]	3.97	--	--	1.53E-02	2.6E-04
Th-228	3.33	--	--	na[11]	na[11]
Uranium-238[10]	2.57	--	--	2.00E-02	1.3E-04
U-233/234	1.89	--	--	na[11]	na[11]
Th-230	2.6	--	--	na[11]	na[11]
		Hazard Index	**5.2E+00**	**Cumulative Risk**	**~~3.9~~4.0E-04**
		PTSM?[12]	**NO**	**PTSM?[13]**	**NO**

1. Maximum detected concentration from all depth intervals (samples FBFA-1 through FBFA-38).
2. Nonradiological RSLs are default industrial worker soil values from the *EPA Regional Screening Levels Table*, dated May 2019. Radiological PRGs are default industrial worker values from the *EPA Preliminary Remediation Goals* website, dated January 2019.
3. Risk Estimate = (maximum concentration / RSL or PRG concentration) x 1E-06
4. EN = essential nutrient, RSL not available for this constituent.
5. Chemical analysis for total chromium. A total chromium RSL is not available; trivalent chromium RSL used for screening.
6. NA = not available; RSL for this constituent is not available.
7. TPH by GC/FID Diesel Range Organics: used most conservative (lowest) PRG for TPHs, i.e. aromatic low
8. Th-228 is a daughter product of Th-232 and can be used to estimate its activity since these constituents are in secular equilibrium. The highest detected activity in the entire decay chain was used in this assessment. The daughter products are not screened separately since they are considered in the Th-232 secular equilibrium PRG.
9. U-234 and Th-230 are daughter products of U-238 and can be used to estimate its activity since these constituents are in secular equilibrium. The highest detected activity in the entire decay chain was used in this assessment. The daughter products are not screened separately since they are considered in the U-238 secular equilibrium PRG.
10. Not applicable per footnotes 9 and 10 above.
11. Subunit potentially has PTSM if HI ≥10 for noncarcinogenic constituents.
12. Subunit potentially has PTSM if cumulative risk ≥1E-03 for carcinogenic constituents.

PRELIMINARY HUMAN HEALTH COPC SCREENING FOR FORD BUILDING 690-N (Soil – 0 to 1 Feet)

Analyte	Max. Conc[1] (mg/kg)	Qual.	Human Health Screeng Value (mg/kg)	Human Health Screeng Value Source[2]	Exceeds Human Health Screeng Value?	2X Average Bckgrnd Conc.[3] (mg/kg)	Exceeds 2X Average Bckgrnd?[4]	COPC?[5]
Carbazole	0.0173	J	NA[8]	NA[8]	NO	--	--	NO
Chrysene	0.114	J	1.1E+02	RSL	NO	--	--	NO
Di-N-Butyl Phthalate	0.0338	J	6.3E+02	0.1xRSL	NO	--	--	NO
Fluoranthene	0.421	J	2.4E+02	0.1xRSL	NO	--	--	NO
Indeno[1,2,3-Cd]Pyrene	0.0767	J	1.1E+00	RSL	NO	--	--	NO
Pentachlorophenol	0.229	J	1.0E+00	RSL	NO	--	--	NO
Phenanthrene	0.238	J	NA[8]	NA[8]	NO	--	--	NO
Pyrene	0.309	J	1.8E+02	0.1xRSL	NO	--	--	NO
Pesticides/PCBS--								
Aroclor 1254	0.119		2.4E-01	RSL	NO	--	--	NO
Aroclor 1260	0.0713		2.4E-01	RSL	NO	--	--	NO
Radionuclides								
Cesium-137	0.153		4.6E-02	PRG	YES	0.28	NO	NO
Thorium-232[9]	1.64		9.9E-03	~~RSL~~PRG	YES	1.80	NO	NO
Th-228	1.58	J	na[11]		na[11]			
Uranium-238[10]	2.6		1.2E-02	~~RSL~~PRG	YES	1.01	YES	YES
U-233/234	1.22		na[11]		na[11]			
Th-230	2.6		na[11]		na[11]			

1. Maximum detected concentration 0- to 1-ft depth interval (samples FBFA-1 through FBFA-38).
2. Nonradiological RSLS are default residential soil values from the *EPA Regional Screening Levels Table*, dated May 2019. Radiological PRGS are residential values from the *EPA Preliminary Remediation Goals* website calculator, dated January 2019.
3. Background screening values obtained from *Background Soils Statistical Summary Report for Savannah River Site*, ERD-EN-2005,0223, Rev. 1, 10/06.
4. For screening purposes, maximum concentration of only the naturally-occurring (nonanthropogenic) constituents are compared to 2x average background concentration.
5. Constituents are identified as COPCS if the maximum detected concentration exceeds the human health screening value and the 2x average background concentration.
6. EN = essential nutrient, RSL not available for this constituent.
7. Chemical analysis for total chromium. A total chromium RSL is not available; hexavalent chromium RSL used as a conservative screen.
8. NA = not available, RSL for this constituent is not available.
9. Th-228 is a daughter product of Th-232 and can be used to estimate its activity since these constituents are in secular equilibrium. The highest detected activity in the entire decay chain was used in this assessment. The daughter products are not screened separately since they are considered in the th-232 secular equilibrium PRG.
10. U-234 and Th-230 are daughter products of U-238 and can be used to estimate its activity since these constituents are in secular equilibrium. The highest detected activity in the entire decay chain was used in this assessment. The daughter products are not screened separately since they are considered in the U-238 secular equilibrium PRG.
11. Not applicable per footnotes 9 and 10 above.

Bckgrd = background COPC = constituents of potential concern Screeng = screening
Conc. = concentration Qual. = qualification