REVISION 0

PRE-DESIGN INVESTIGATION SUMMARY REPORT AND FINAL STATUS SURVEY EVALUATION FOR JANA ELEMENTARY SCHOOL SOIL: COLDWATER CREEK (CWC)-FLOODPLAIN PROPERTIES CWC-365 AND CWC-386 (PARTIAL)

ST. LOUIS, MISSOURI

MAY 19, 2023

U.S. Army Corps of Engineers
St. Louis District Office
Formerly Utilized Sites Remedial Action Program

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prepared by
U.S. Army Corps of Engineers St. Louis District
Formerly Utilized Sites Remedial Action Program

with assistance from
Leidos, Inc.
under Contract No. W912P923P0003

ABSTRACT

Site Name	North St. Louis County Sites, Coldwater Creek (CWC) Properties. The included portion of Hazelwood School District property for the Jana Elementary School (HSD-JES) is all of CWC-365 and 97 percent of CWC-386. Although a small part of CWC-386 is not included in the report, these properties will be referred to as CWC-365 and CWC-386 in this report.
Location	Florissant, Missouri
Description	This report contains information related to soil at the Jana Elementary School, which is used for institutional (educational) and recreational purposes. The included portion of Jana Elementary School is as follows: • The area that is actively used, including the soil associated with school buildings, parking lots, sidewalks, playgrounds, and athletic fields. • The area that includes the sidewalk from the street called Marsielle Place to the school. The sidewalk crosses a CWC tributary (Lawnview Creek). • The area outside of the planned construction zone for excavation of soil from portions of the adjacent creek banks. • The area of CWC-365 and CWC-386 is approximately 66,701 m^2 (16.5 acres). The U.S. Army Corps of Engineers (USACE) expanded beyond the nominal area of the 10-year floodplain in response to community concerns about allegations of unacceptable levels of radioactivity associated with Manhattan Engineer District (MED) and U.S. Atomic Energy Commission (AEC) activities (Brustowicz, Thompson, and Kaltofen 2022). The *Final Status Survey Evaluation for Surfaces of Structures Associated with the Jana Elementary School, Hazelwood School District* (USACE 2023a) and the *Evaluation of Lead-210 Information for the Jana Elementary School, Hazelwood School District* (USACE 2023b) have been separately issued. Following completion of remediation of the soil in portions of the adjacent creek banks, another report will be issued for the balance of the soil on HSD-JES.
Conclusions	**Based on a comparison of the soil sampling analytical results, radiological surveys, and the risk and dose assessment to the remediation goals (RGs) in the *Record of Decision for the North St. Louis County Sites* (ROD) (USACE 2005a), the soil on CWC-365 and CWC-386 meets the criteria for unlimited use and unrestricted exposure (UUUE).** **The radionuclide soil sample data for CWC-365 and CWC-386 were compared to the reference area background soil sample data using the Wilcoxon-Mann-Whitney (WMW) Comparison Test. The results are that the soil sample data from CWC-365 and CWC-386 are consistent with the reference area background data.**
Regulatory Oversight	U.S. Environmental Protection Agency (USEPA), Region 7 Missouri Department of Natural Resources
Contractor Oversight	USACE St. Louis District
Pre-Design Contractor	HydroGeoLogic, Inc.
Verification Contractor	Leidos, Inc.

ABSTRACT (Continued)

<table>
<tr><td>Radionuclides of Interest</td><td>Per Table 2-2 of the ROD (USACE 2005a), the radiological contaminants of concern (COCs) for soil at the North St. Louis County Sites are actinium-227, lead-210, protactinium-231, radium-226, radium-228, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235, and uranium-238. Non-radiological COCs do not apply to CWC-365 and CWC-386, per the ROD (USACE 2005a).</td></tr>
<tr><td>Regulatory Requirements/ RGs</td><td>In summary, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations [CFR] 300.430) identify that protectiveness is achieved when the additional lifetime risk[a] to an individual is generally less than 1 in 10,000. The following example everyday risks of death are higher than 1 in 10,000 by the listed multiple (NSC 2022)
<table>
<tr><td>Vehicle Crash: 90 times</td><td>Falls: 80 times</td><td>Pedestrian Accident: 18 times</td></tr>
<tr><td>Drowning: 9 times</td><td>Fire/Smoke: 6 times</td><td>Choking on Food: 3 times</td></tr>
</table>
Because these COCs are naturally present in the soil, natural background levels of these COCs in the environment and in the soil are not required to be included in property-specific risk estimates. For soil, the averages of the reference area background soil data are subtracted from the soil results as part of certain calculations. The averages are imperfect but health-conservative representations of background levels because half of the background data exceed the average. Because instruments do not measure risk, the ROD provides for equivalent control numbers in the form of RGs for what they measure. See the ROD for regulatory requirements and RGs that provide protectiveness.</td></tr>
<tr><td>Possible Reason for Radionuclides of Interest to exceed RGs</td><td>Historical storage of MED/AEC uranium processing waste materials occurred 5 miles upstream of CWC-365 and CWC-386. The storage occurred from the 1940s through 1960s at the St. Louis Airport Site (SLAPS), the Hazelwood Interim Storage Site (HISS), and the Futura Coatings Company (Futura). Rain washed soil from these sites into CWC. CWC transported the soil downstream until the soil was deposited in and along the stream. Soil deposits from CWC were not uniform. Remediation of accessible soil was completed at the SLAPS, HISS, and Futura in 2006, 2011, and 2013, respectively.</td></tr>
<tr><td>Data Collection Method and Dates</td><td>A total of 507 soil samples, with 4,563 analytical results, were collected from 57 systematic and 21 biased locations to provide datasets that meet the statistical requirements of the data quality objectives and the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (DoD 2000) to be representative of the soil at CWC-365 and CWC-386. These samples were collected in August through October 2018, June 2019, July 2021, and October through November 2022. Changes in conditions are not expected over extended time periods because the COCs are impeded from migration by attachment to the clayey soil and data show no evidence of fresh deposits of contaminated sediment. The biased locations were based on data gathered from gamma walkover surveys, Light Detection and Ranging topography analysis, historical aerial photographs, historical topographic maps, and field observations.</td></tr>
<tr><td>Remediation Method and Date</td><td>CERCLA response actions may include removal actions and remedial actions (RAs). No removal actions or RAs were required for CWC-365 and CWC-386 to meet the ROD RGs.</td></tr>
</table>

ABSTRACT (Continued)

Results	The soil on CWC-365 and CWC-386 meet the protectiveness requirements for UUUE and are less than or equal to reference area background data based on the WMW Comparison Test. The radionuclides in the soil on CWC-365 and CWC-386 do not present a health hazard. The following risk health assessments are designed to not underestimate risk or hazard. • The lifetime radiological risk estimate for students is less than 1/100th of the protectiveness level. The everyday risk of dying from dog attacks is 10 times higher and from storms is 20 times higher (NSC 2022). • The lifetime radiological risk estimate for school staff is less than 1/28th of the protectiveness level. The everyday risk of dying from dog attacks is 2.7 times higher and from storms is 5 times higher (NSC 2022). • The lifetime radiological risk estimate for a suburban resident is less than 1/10th of the protectiveness level. The everyday risk of dying from storms is 5 times higher and from sunstroke is 32 times higher (NSC 2022). This is the UUUE scenario. • The additional risk from natural background radiation, excluding radon, from living in Colorado instead of Missouri is 70 times higher than any estimated risk for CWC-365 and CWC-386. Based on a comparison of the soil sampling analytical results, radiological surveys, and the risk and dose assessment to the ROD RGs, the soil on CWC-365 and CWC-386 meets the criteria for UUUE. • The additional dose to an individual from all of the evaluated scenarios is estimated to be 1/15th of the dose protectiveness RG. This estimate is designed to be health conservative so dose is not underestimated. • The greatest soil sample result was 1/5th of the RG control number and the results passed the Wilcoxon Rank Sum test. • No areas on CWC-365 and CWC-386 have inaccessible contamination in soil underlying or supporting structures.

ABSTRACT (Continued)

Summary for Each Address					
Address	**Property ID**	**Figure Number**	**Sample Data Tables**	**Survey Unit (SU) ID**	**Average of SU Samples as a Fraction of the Net Sum of Ratios (SOR_N) RG**
320 Jana Drive	CWC-365	Figure 5	G-13, G-14	SU-7	0.03
405 Jana Drive	CWC-386 (partial)	Figure 5	G-1, G-2	SU-1	0.01
			G-3, G-4	SU-2	0.02
			G-5, G-6	SU-3	0.01
			G-7, G-8	SU-4	0.01
			G-9, G-10	SU-5	0.03
			G-11, G-12	SU-6	0.03
			G-13, G-14	SU-7	0.03

The SOR_N equations are provided in a footnote to Appendix F of this report. The SOR_N equations are applied to analytical results for each soil sample. The average of the SOR_N calculations for all samples for the SU are presented in the right table column.

As a conservative measure, any net value within the SOR_N equation that is less than zero is set to zero. The average SOR_N value for all the CWC-365 and CWC-386 samples using this conservatism is 0.02. However, allowing negative net values yields an average SOR_N value of -0.01 for all these samples, which indicates the dataset is consistent with the reference area background data.

[a] When estimating cancer risk, predictions indicate a lifetime risk level for an exposed individual and how many additional cancer cases might occur in a population of exposed people (i.e., 1×10^{-6} is equal to one additional case in a population of one million). These cancers may or may not occur, but should they occur, they would be in addition to cancers from other causes, such as smoking tobacco or obesity.

[b] Dose is a quantity that expresses all radiations on a common scale for calculating the effective absorbed dose and is measured in mrem.

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BACK COVER

The primary distribution format for this document is electronic files. If printed copies are distributed, the following portions will be included on a CD-ROM on the back cover of the report instead of being printed: Appendix D; Appendix G; Appendix I; Attachment J-1, EPC Calculations File and ProUCL Output Files; Attachment J-2, RESRAD-ONSITE Output Summary Reports; and Appendix K.

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ACRONYMS AND ABBREVIATIONS

σ_{eff}	effective standard deviation
Δ/σ	relative shift
σ	standard deviation
2011 EFH	*Exposure Factors Handbook: 2011 Edition*
2017 EFH	*Update for Chapter 5 of the Exposure Factors Handbook: Soil and Dust Ingestion*
Ac	actinium
AEC	U.S. Atomic Energy Commission
Am	americium
amsl	above mean sea level
ANL	Argonne National Laboratory
ANSI	American National Standards Institute
ARAR	applicable or relevant and appropriate requirement
bcm	below cover material
bgs	below ground surface
BRA	*Baseline Risk Assessment for Exposure to Contaminants at the St. Louis Site, St. Louis, Missouri*
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
COC	contaminant of concern
Cs	cesium
CWC	Coldwater Creek
DCGL	derived concentration guideline level
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DQA	data quality assessment
DQO	data quality objective
ELAP	Environmental Laboratory Accreditation Program
EPC	exposure point concentration
FGR-15	*Federal Guidance Report No. 15: External Exposure to Radionuclides in Air, Water and Soil*
FS	*Feasibility Study for the St. Louis North County Site*
FSS	final status survey
FSSE	final status survey evaluation
FSSP	*Final Status Survey Plan for Soils, Structures, and Sediments at the St. Louis FUSRAP Sites*
FUSRAP	Formerly Utilized Sites Remedial Action Program
Futura	Futura Coatings Company
GIS	geographic information system
GPS	global positioning system
GWS	gamma walkover survey
HGL	HydroGeoLogic, Inc.
HISS	Hazelwood Interim Storage Site

ACRONYMS AND ABBREVIATIONS (Continued)

HSD-JES	Hazelwood School District property for the Jana Elementary School
ICRP	International Commission on Radiological Protection
K	potassium
LBGR	lower bound of the gray region
LCS	laboratory control sample
Leidos	Leidos, Inc.
LiDAR	Light Detection and Ranging
MARSSIM	*Multi-Agency Radiation Survey and Site Investigation Manual*
MDC	minimum detectable concentration
MDHSS	Missouri Department of Health and Senior Services
MDL	method detection limit
MDNR	Missouri Department of Natural Resources
MED	Manhattan Engineer District
NAD	normalized absolute difference (unitless)
NaI	sodium iodide
NCP	National Oil and Hazardous Substances Contingency Plan
NRC	U.S. Nuclear Regulatory Commission
NUREG	U.S. Nuclear Regulatory Commission (technical report designation)
OSWER	Office of Solid Waste and Emergency Response
Pa	protactinium
Pb	lead
PDI	pre-design investigation
PDI WD	*Pre-Design Investigation Work Description, FUSRAP North St. Louis County Sites, St. Louis, Missouri*
PDI WP	*Pre-Design Investigation Work Plan for Coldwater Creek (CWC) North of St. Denis Bridge*
PDI WPA	*Addendum to the Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge: St. Ferdinand Park to Jana School*
PDI WS	*Final Status Survey and Pre-Design Investigation Sample Work Scope for Jana Elementary School, FUSRAP North St. Louis County Sites, St. Louis, Missouri*
PDIR	pre-design investigation report
PDIR/JS	*Pre-Design Investigation Summary Report Coldwater Creek – Group 24: Jana Elementary School (West Portion), FUSRAP North St. Louis County Sites, St. Louis, Missouri*
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
QCSR	quality control summary report
Ra	radium
RA	remedial action
RAGS Part A	*Risk Assessment Guidance for Superfund: Volume 1 – Human Health Evaluation Manual (Part A)*
RAO	remedial action objective

ACRONYMS AND ABBREVIATIONS (Continued)

RD	remedial design
RESRAD	RESidual RADioactivity (computer model)
RG	remediation goal
RME	reasonably maximally exposed
ROD	*Record of Decision for the North St. Louis County Sites*
RPD	relative percent difference
SAG	*Sampling and Analysis Guide for the St. Louis Sites*
SLAPS	St. Louis Airport Site
SOR_G	gross sum of ratios (unitless)
SOR_N	net sum of ratios (unitless)
SRNL	Savannah River National Laboratory
SU	survey unit
TEDE	total effective dose equivalent
Th	thorium
U	uranium
UCL_{95}	95 percent upper confidence limit
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UUUE	unlimited use and unrestricted exposure
VQ	validation qualifier
WMW	Wilcoxon-Mann-Whitney
WRS	Wilcoxon Rank Sum

UNIT ABBREVIATIONS

Both English and metric units are used in this report. The units used in a specific situation are based on common unit usage or regulatory language (e.g., depths are given in feet, and areas are given in square meters). Units included in the following list are not defined at first use in this report.

µR	microRoentgen(s)
cpm	counts per minute
ft	foot/feet
g	gram(s)
kg	kilogram(s)
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
mg	milligram(s)
mrem	millirem
pCi/g	picocurie(s) per gram

1.0 INTRODUCTION

The *Record of Decision for the North St. Louis County Sites* (ROD)[1] (USACE 2005a) includes Coldwater Creek (CWC) in its requirements for investigation of potential contamination[2]. The potential for contamination results from the storage and hauling from the 1940s through the 1960s of residues generated by uranium processing activities conducted by the Manhattan Engineer District (MED) and the U.S. Atomic Energy Commission (AEC). The historical MED/AEC storage areas are the St. Louis Airport Site (SLAPS) and the Hazelwood Interim Storage Site/Futura Coatings Company (HISS/Futura); both are adjacent to CWC. The SLAPs is located adjacent to Banshee Road, and the HISS/Futura is located approximately 0.7 mile downstream of the SLAPS (Figure 1). As part of the Formerly Utilized Sites Remedial Action Program (FUSRAP), the U.S. Army Corps of Engineers (USACE) St. Louis District implements the ROD. The USACE has remediated accessible soil at the SLAPS, HISS, and Futura as of 2006, 2011, and 2013, respectively, removing the primary sources of MED/AEC contamination entering CWC.

Surface water transport of contaminated soil from these historical storage areas adjacent to CWC is the predominant mechanism for contamination in the CWC corridor[3]. Because of past CWC flooding events, the potential exists for frequently flooded areas adjacent to CWC to be impacted[4] as well. The primary COCs for soil are radium (Ra)-226, thorium (Th)-230, and uranium (U)-238; the complete list of COCs is included in the Abstract of this pre-design investigation report (PDIR) and final status survey evaluation (FSSE).

Two properties, CWC-365 and 97 percent of CWC-386, are the subject area of this report and are shown on Figures 1 and 2. CWC-365 and CWC-386 are part of the Hazelwood School District property for the Jana Elementary School (HSD-JES) and are located approximately 5 miles downstream of the SLAPS (Figure 1). After the initial pre-design investigation (PDI) activities were conducted on soil within the 10-year floodplain, community concerns occurred regarding allegations of radioactivity associated with MED/AEC activities (Brustowicz, Thompson, and Kaltofen 2022). Information related to the referenced report is provided by the Savannah River National Laboratory (SRNL) in Appendix A, "SRNL Technical Review of the Kaltofen 'Radioactive Contamination at the Jana Elementary School' Document" (SRNL 2023). Because of community concerns, the PDI activities were expanded to include soil in the remaining upgradient portions of the school property.

The USACE has conducted PDI activities on CWC-365 and CWC-386 in accordance with the following:

- *Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge* (PDI WP) (USACE 2019a),
- *Addendum to the Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge: St. Ferdinand Park to Jana School* (PDI WPA) (USACE 2019b),

[1] Includes non-significant changes (USACE 2021a, 2021b).

[2] For the purposes of this report, the term "contamination" refers to the presence of contaminants of concern (COCs) in concentrations that exceed the ROD remediation goals (RGs).

[3] The CWC corridor is generally defined as the area of CWC from the top of one bank to the top of the opposite bank.

[4] For the purposes of this report, the term "impacted" refers to having reasonable potential for contamination, and "non-impacted" refers to having no reasonable possibility of contamination.

- *Pre-Design Investigation Work Description, FUSRAP North St. Louis County Sites, St. Louis, Missouri* (PDI WD) (HGL 2021), and
- *Final Status Survey and Pre-Design Investigation Sample Work Scope for Jana Elementary School, FUSRAP North St. Louis County Sites, St. Louis, Missouri* (PDI WS) (HGL 2022).

The purposes of the PDI activities are (1) to obtain data to determine if radioactivity exceeding the ROD RGs is present and (2) to provide analytical data needed to support remedial design (RD) (if required) for a remedial action (RA) and/or to support the FSSE, as applicable. PDI activities primarily involved sampling surface[5] and subsurface soil and performing radiological scans with sensitive instruments. The *Pre-Design Investigation Summary Report Coldwater Creek – Group 24: Jana Elementary School (West Portion), FUSRAP North St. Louis County Sites, St. Louis, Missouri* (PDIR/JS) (HGL 2023a) in Appendix B contains the description of this investigation and its results. Based on the PDI results, radiological contamination was not identified within the subject area.

The results of the PDI allow for completion of an FSSE in accordance with the *Final Status Survey Plan for Soils, Structures, and Sediments at the St. Louis FUSRAP Sites* (FSSP) (USACE 2015). The purpose of the FSSE is to evaluate the information regarding potential contamination against the ROD requirements for unlimited use and unrestricted exposure (UUUE).

The *Final Status Survey Evaluation for Surfaces of Structures Associated with the Jana Elementary School, Hazelwood School District* (USACE 2023a) and the *Evaluation of Lead-210 Information for the Jana Elementary School, Hazelwood School District* (USACE 2023b) have been separately issued. Following completion of remediation of the soil in portions of the adjacent creek banks, another report will be issued for the balance of the soil on property owned by the Hazelwood School District that is associated with the Jana Elementary School.

[5] For the purposes of this report, the term "surface" associated with soil refers to a 0.5-ft-thick layer of soil encountered when sampling down from ground level.

2.0 PROPERTY DESCRIPTION

The two parcels[6] included in this PDIR-FSSE for soil are located in close proximity to CWC in Florissant, Missouri. The plan for PDI activities started with investigation in the 10-year floodplain, with adjustment as necessary as information is gathered. Hydrological data (i.e., stream profiles, stream flow and flood data, etc.) from the *Coldwater Creek, Missouri, Feasibility Report and Environmental Impact Statement* (USACE 1987a), the *Feasibility Report for Flood Control and Related Purposes* (USACE 1987b), and the *Flood Insurance Study: St. Louis County, Missouri, and Incorporated Areas* (FEMA 2000) were used in hydrologic modeling of CWC to compute and show the horizontal surface of the water during 10-year flood events. This information was useful for estimating the potential horizontal extent of these flood events onto the surrounding CWC floodplain. A review of the sampling results collected from upstream properties adjacent to CWC between James S McDonnell Boulevard and Pershall Road indicated that the 10-year floodplain encompasses the locations where MED/AEC-related impacts from flood sedimentation have been identified. The 10-year floodplain is also flooded more frequently (i.e., 50 times more frequently than the 500-year floodplain), providing more opportunity for sediment to be deposited.

The initial PDI activities were planned for and conducted within the 10-year floodplain (USACE 2019a, 2019b). The initial planned PDI activities were substantially more than traditional scoping and characterization surveys described in *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM) guidance (DoD 2000). Based on the results of those initial PDI activities and information available to the USACE, the impacted area requiring investigation did not require expansion beyond the 10-year floodplain to upgradient portions of the school property. Based on community concerns regarding the Brustowicz, Thompson, and Kaltofen report, the USACE expanded the PDI activities beyond the 10-year floodplain to collect additional data on the remaining upgradient school property (HGL 2021, 2022). The SRNL report notes, "None of the Jana Elementary School sample data reported by Eberline Analytical in the Kaltofen Report exceeded the criteria set forth in 40 *[Code of Federal Regulations] CFR* 192." Soil would have to exceed the criteria set forth in 40 *CFR* 192 to be considered contaminated.

This report contains information related to soil at the Jana Elementary School, which is used for institutional (educational) and recreational purposes. The initial school buildings were constructed in the early 1970s. The included portion of Jana Elementary School is as follows.

- The area that is actively used, including the soil associated with school buildings, parking lots, sidewalks, playgrounds, and athletic fields.
- The area that includes the sidewalk from the street called Marsielle Place to the school. The sidewalk crosses a CWC tributary (Lawnview Creek).
- The area outside of the planned construction zone for excavation of soil from portions of the adjacent creek banks.
- The area of CWC-365 and CWC-386 is approximately 66,701 m^2 (16.5 acres).

The locations of CWC-365 and CWC-386 are shown on Figure 2. The borders for CWC-365 and CWC-386 often do not match parcel borders established by St. Louis County. Differences are explained as follows.

[6] The term "parcel" refers to an area of land with unique ownership, as established by St. Louis County as of 2012. The borders of CWC properties may or may not match parcel borders.

- As a practical matter because of differences in water controls, the USACE is addressing the CWC corridor separately from the CWC floodplain.
- Parcels with borders that extend beyond the top of the creek bank and into the creek itself will be addressed separately – one part with CWC-floodplain properties and another part with the CWC corridor.
- In some areas, the CWC land area that is not included in any St. Louis County parcel extends beyond the top-of-bank and into the floodplain. The portion of this non-parcel area that is outside the top-of-bank is included with a CWC-floodplain property.
- The CWC-floodplain border farthest from CWC is initially based on the outer edge of the 10-year floodplain. Information obtained during the PDI activities may cause the USACE to move the border farther away from CWC.
- St. Louis County may change the parcel borders, but the CWC-floodplain property borders need to be static for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documentation purposes. Therefore, the CWC-floodplain "side" borders are based on the parcels as they were defined by St. Louis County in 2012.
- In some cases, the 10-year floodplain extends far enough to cross the parcel closest to CWC and enter a second parcel. In that case, two CWC-floodplain properties are created: (1) from the top-of-bank to the shared border with the second property, and (2) from the shared border with the first property to the outer edge of the 10-year floodplain.

The residential addresses, St. Louis County parcel ID numbers, and years of initial construction associated with CWC-365 and CWC-386 were identified using the St. Louis County GIS Service Center (STLCO 2022) and are listed in Table 1.

Table 1. Parcel Information Associated with CWC-365 and CWC-386

Property ID	Address	Parcel	Owner	Year Developed[a]	Acres[a]	Longitude Latitude[b]
CWC-365	320 Jana Drive	06J211371	Hazelwood School District	1970	0.49	-90.191450 38.485122
CWC-386[c] (97 percent)	405 Jana Drive	06J220632	Hazelwood School District	1972	16.58	-90.190563 38.485764

[a] The "Year Developed" and "Acres" columns are based on property assessment data available from St. Louis County (STLCO 2022) for each parcel, except for CWC-365, which are based on St. Louis County aerial photographs (STLCO 2022).

[b] Coordinates for a representative center point of the property are provided in decimal degrees.

[c] The portion of the parcel that is not in the planned construction zone is addressed in this PDIR-FSSE. The parcel border extends beyond the top of the creek bank and into the creek itself. The planned construction zone part of the parcel will be separately addressed.

3.0 FINAL STATUS SURVEY PROCESS

The FSSP (USACE 2015) uses the data quality objectives (DQOs) and data quality assessment (DQA) processes from *Guidance on Systematic Planning Using the Data Quality Objectives Process* (USEPA 2006a), *Data Quality Assessment: A Reviewer's Guide* (USEPA 2006b), and MARSSIM Chapter 8 and Appendix E (DoD 2000). These processes involve scientific and statistical planning and evaluations to ensure the analytical data are of the right type, quality, and quantity to provide the necessary basis for deciding whether CWC-365 and CWC-386 meet the criteria for UUUE.

The PDI survey was designed so the data available at the end of the PDI would meet MARSSIM guidance (DoD 2000), thus allowing the PDI data to be used for the final status survey (FSS). The PDI samples were collected in August through October 2018, June 2019, July 2021, and October through November 2022. In 2022, many new locations were added and existing locations sampled deeper to provide extra assuredness that the soil data would be definitive and comprehensive relative to the concerns being addressed.

Changes in conditions are not expected over extended time periods because of the following information.

- As identified in the *Feasibility Study for the St. Louis North County Site* (FS) (USACE 2003) and the *Site Suitability Study for the St. Louis Airport Site* (DOE 1994), COC migration is naturally impeded by the clayey soil present in North St. Louis County. Experience with investigating and remediating ditches along haul roads has shown that the COCs had remained in soil near the surface for decades.
- The potential for newer CWC deposits of contaminated sediment is investigated as part of the environmental monitoring program, documented in *Annual Environmental Monitoring Data and Analysis Reports*. In addition, the USACE conducted comprehensive sampling of CWC and its floodplain for deposits following the July 26, 2022, flooding event in the St. Louis area. A separate report has been issued with those results, and no evidence of fresh deposits of contaminated sediment were identified (HGL 2023b).

3.1 FINAL STATUS SURVEY PROCESS FOR SOIL

MARSSIM (DoD 2000) contains guidance for using site information and analytical data to assign land areas to one of three classifications. The classifications are based on the potential for radioactive contamination in soil. Class 1 areas have the greatest potential for contamination, while Class 3 areas have the least potential. The USACE combines MARSSIM scoping and characterization surveys with gathering data to design an excavation when contamination is identified. A design includes layback or sidewall shoring, water management, excavation and transport methods, hazard controls, and restoration. Because the PDI is based on MARSSIM guidelines for scoping surveys and characterization surveys, PDI results are used in classifying the survey units (SUs) (i.e., MARSSIM Figure 2.4). The PDI data support a Class 3 classification. The maximum net sum of the ratios (SOR_N) value in the PDI data is 0.18, and the FSSP (USACE 2015) states that a Class 3 SU can have SOR_N values up to 0.3. However, the due diligence employed by the USACE for these PDI activities exceeded the level of a Class 3 SU. Thus, the SUs were designated as Class 2. The MARSSIM guidance for Class 1 SUs is not met because no PDI soil sample analytical result exceeded the 10 *CFR* 192 criteria for contaminated soil (also see quoted text from the SRNL report in Section 1.0 of this PDIR-FSSE). Per MARRSIM guidance, Class 2 SUs typically have an area of 10,000 m^2 or less.

MARSSIM guidance recommends that Class 1 SUs receive a gamma walkover survey (GWS) over 100 percent of the area, that Class 2 SUs receive a GWS over 10 to 100 percent of the area (proportional to the potential for finding areas of elevated radioactivity), and that Class 3 SUs receive a GWS over areas where professional judgment expects the highest potential for contamination. Although the PDI data supports a GWS for Class 3 SUs, the GWS that was performed covered 100 percent of the SU soil that did not have brush, trees, pavement, or other coverings. This percentage is closer to the guidance for Class 1 SUs than for Class 2 or 3 SUs.

The MARSSIM systematic sample is the sample collected at a systematic station from the ground surface or from soil immediately below cover material (bcm). Subsurface soil samples are generally collected from the same stations as systematic soil samples to confirm no unexpected subsurface radioactive contamination is present. The subsurface samples collected at the same station are not systematic samples for the purposes of MARSSIM-based investigation. Based on more than 20 years of experience, the approach for investigating subsurface soil described in Appendix B and this section of this PDIR-FSSE and in the FSSP (USACE 2015) provides sufficient data to evaluate that soil against the RGs. Table 2 contains SU information including the number of soil samples.

Table 2. Information on Soil Sample Stations and Samples for Survey Units

SU	Class	Area (m^2)	Required Number of MARSSIM Systematic Stations	Actual Number of Systematic Stations	Number of Systematic Samples	Number of Biased Samples	Number of Subsurface Samples	Sample Station Figure Number	GWS Figure Number
1	2	9,953	5	7	7	6	60	5	3
2	2	9,510	5	9	9	1	86	5	3
3	2	9,841	5	7	7	2	57	5	3
4	2	9,794	5	10	10	1	75	5	3
5	2	9,563	5	8	8	1	47	5	3
6	2	9,846	5	8	8	7	60	5	3
7	2	8,194	5	8	8	3	44	5	3

3.1.1 Biased Sample Stations Based on Gamma Walkover Survey

Image 1. Gamma Walkover Survey



The GWS results are shown on Figure 3 using 263,879 GWS data points with coordinates logged by a global positioning system (GPS). The gamma emissions from the ground surface were measured using a 2-inch-by-2-inch sodium iodide (NaI) gamma scintillation detector coupled to a scaler/rate meter (Image 1). Additional information on the GWS is presented in Appendix C, and the associated GWS data file is contained in Appendix D (distributed as a separate electronic file). An area represented by red on Figure 3 would indicate an area requiring additional investigation. The red area shown on Figure 3 near the southern corner of the building on CWC-386 was determined to be caused by the presence of fire brick, which has higher levels of naturally occurring radioactivity, resulting in

higher count rates. Based on count rates that were higher than normal background, 3 stations (3 samples) were sampled. Appendix C contains additional information on the investigation of higher GWS count rates.

Image 2. Soil Sampling



3.1.2 Biased Sample Stations Based on Topographically Low-Lying Areas

Present day low-lying areas were identified through a site visit and through geospatial analysis using Light Detection and Ranging (LiDAR)-based elevation data (Figure 4) to measure the height of the ground surface. Current low-lying areas, including Lawnview Creek, were sampled at 11 stations (29 samples): SVP190125, SVP190139, SVP190143, SVP190145, SVP190159, SVP190163, SVP190309, SVP190337, SVP190353, SVP190365, and SVP201660.

Historical low-lying areas were identified through review of historical aerial photographs and topographic maps. Historical low-lying areas were sampled at 7 stations (60 samples): SVP207127, SVP207129, and SVP207131, SVP263680, SVP263730, SVP263743, and SVP263756. Soil sampling at depth using a drill rig is shown on Image 2. Sample collection from a resulting soil coring from the drill rig is shown on Image 3.

3.1.3 Biased Sample Stations Based on Frequently Used Areas

The following 6 biased sample stations (12 samples) were added at the playgrounds because of their frequent use: SVP263984, SVP264145, SVP264147, SVP264149, SVP264151, and SVP264289 (Figure 5).

Image 3. Sample Collection



3.1.4 Systematic Stations Based on MARSSIM

MARSSIM guidance (DoD 2000) was used to apply a systematic sampling grid to CWC-365 and CWC-386. Appendix E contains a description of the process for ensuring samples are collected from a sufficient number of systematic stations. As discussed in Appendix E, MARSSIM guidance provides for a 20 percent increase in sampling stations to ensure sufficient data to meet objectives in the event of unusable or unavailable data. Systematic grid stations that could not be reached because an obstruction prevented access were generally relocated to a nearby location. A total of 57 systematic stations were identified, with 421 samples collected from the seven SUs (Figure 5).

3.1.5 Subsurface Soil

Subsurface soil was investigated for possible subsurface contamination, including extensions of the investigated depth to more than twice the normal depths for PDI and FSS. Of the systematic stations, 84 percent reached at least 6 ft below ground surface (bgs), with 43 percent reaching at least 16 ft bgs. At biased locations involving historical low-lying areas, the depth reached 24 ft bgs to sample the targeted soil.

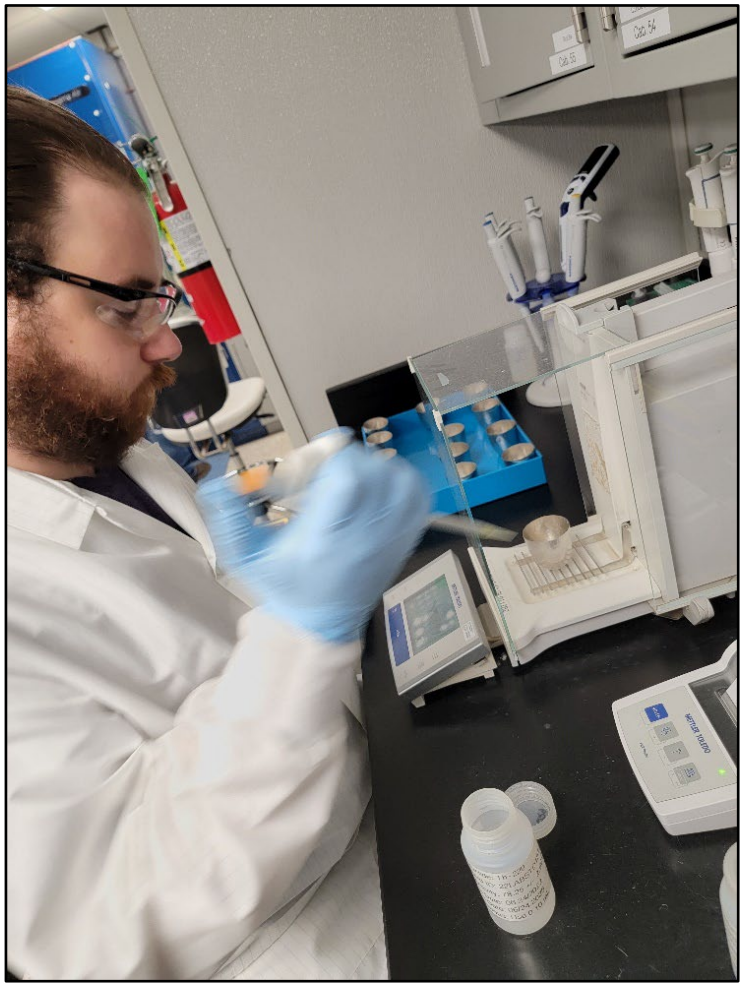
At least one sample from a 0.5-ft-thick layer of soil was collected from each 2-ft subsurface interval. The 0.5-ft-thick layer of soil with the greatest radiological count rate was selected unless all count rates were relatively uniform. In that case, the deepest 0.5-ft-thick layer of soil was selected. A total of 429 subsurface samples were collected.

As discussed in Section 3 of Appendix B, these sampled depths were deeper than any historical ground surface level. No evidence of fill was identified in the soil on the hill plateau where the structures are built. Fill material with a maximum thickness of 5 ft was identified in the southeastern area of the athletic fields and was presumably added to level the fields.

3.2 LABORATORY ANALYSIS OF FINAL STATUS SURVEY SOIL SAMPLES

Laboratory analysis of the FSS soil samples is the primary method used to verify attainment of the remedial action objectives (RAOs) (Image 4). All soil samples are collected, shipped, tracked, analyzed, and validated as specified in the FSSP (USACE 2015) and the *Sampling and Analysis Guide for the St. Louis Sites* (SAG) (USACE 2000).

Image 4. Laboratory Analysis



The samples were analyzed by chemical separation and alpha spectroscopy for Th-228, Th-230, and Th-232, and by gamma spectroscopy for actinium (Ac)-227, protactinium (Pa)-231, Ra-226, Ra-228, U-235, and U-238 at the FUSRAP St. Louis Radioanalytical Laboratory. Split samples for interlaboratory comparison were analyzed by the Eurofins St. Louis laboratory in Earth City using similar processes. Concentrations of lead (Pb)-210 and U-234 for the risk and dose analyses are calculated based on numerical relationships to Ra-226 and U-238 established in the *Baseline Risk Assessment for Exposure to Contaminants at the St. Louis Site, St. Louis, Missouri* (BRA) (DOE 1993) and the FS (USACE 2003).

3.2.1 Influence of Background Radioactivity on Measurements

The performance of the surveys associated with soil involved four different categories of background radiation that are described in the following bulleted list.

- General Area Background Radiation (Field). Prior to beginning a GWS of the ground, count rates are taken at waist height. These count rates are not subtracted from the GWS data.
- General Area Background Radiation (Laboratory). General area background radiation within the counting equipment is measured at the laboratory by taking readings without any samples loaded into the equipment. The equipment is shielded to lower general area background inside the equipment to help achieve the desired minimum detectable concentrations (MDCs). The equipment general area background count rate is subtracted from the count rates associated with a sample. This subtraction is the reason some sample results are reported as negative values.
- Material Background Radiation. The materials at the ground surface can have different amounts of natural radioactivity. Examples of materials with higher levels of natural radioactivity are bricks, stone, ceramic tiles, granite, concrete (from certain sands or coal ash), asphalt, and gypsum. When the GWS instrument is near such materials, the instrument detects the radiation coming from the material itself, in addition to the soil. The surveyor can move the instrument to isolate higher GWS count rates from such materials from the soil count rates. Such materials are noted by the surveyor.
- Soil Background Radioactivity. Radioactive elements were part of the formation of the earth. Some of those radioactive elements have very long decay rates, so a portion of the original radioactivity remains present in the earth's crust. These elements are from the uranium-238 decay chain, the uranium-235 decay chain, the thorium-232 decay chain, and potassium-40. Because the concentration of these radioactive elements varies with different soils, unimpacted local soil is sampled to determine the reference area background concentrations. The soil sample results for CWC-365 and CWC-386 are compared against reference area background soil concentrations. The description of certain calculations in this PDIR-FSSE will identify when average background concentrations are subtracted from sample results. The averages are imperfect but health-conservative representations of background levels because half of the background data exceed the average.

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4.0 ASSESSMENT OF FINAL STATUS SURVEY RESULTS

4.1 ASSESSMENT OF SOIL SAMPLE RESULTS

The radiological soil sample analytical data for the FSS are reported in Appendix F as gross results with no subtraction for background soil concentrations. Copies of the completed boring log forms and field logbook entries for these soil samples are contained in Appendix G. Appendix H contains summaries of the soil sample analytical data for each SU, including the SOR_N results. The surface and subsurface SOR_N RG equations in the footnotes to Table F-1 of Appendix F are applied as follows to calculate the SOR_N.

- The surface RG equation is applied to the analytical results for soil samples collected within the uppermost 0.5 ft bgs.
- The subsurface RG equation is applied to the analytical results for soil samples collected from deeper than 0.5 ft bgs.

The primary goal of the FSS is to establish whether the null hypothesis, which is that the "radioactivity in the survey unit exceeds the release criterion," (DOD 2000) is accepted or rejected for each SU. In this case, the release criterion, which is an RG, is not exceeding an average SOR_N value of 1.0 for any 6-inch soil layer within any 100-m^2 area. Several evaluations of the soil sample results for each SU were conducted as follows.

- Comparing the average SOR_N value for an SU to 1.0. The average systematic soil sample SOR_N values for SU-1 through SU-7 are 0.01, 0.06, 0.03, 0.04, 0.08, 0.08, and 0.08, respectively, meeting the RG.
- Collecting additional samples to define small areas with SOR_N values exceeding 1.0 and comparing the average SOR_N value to 1.0 for any 6-inch soil layer within any 100-m^2 area where one or more soil sample(s) have an SOR_N value(s) exceeding 1.0 (USACE 2005a). The highest SOR_N value of all of the samples is 0.18, so no 100-m^2 areas require averaging. In addition, the SOR_N results for CWC-365 and CWC-386 are too low to represent the edge of more significant contamination; for Class 2 SUs, the investigation level is an SOR_N of 1.0 per the FSSP (USACE 2015).
- Determining if the MARSSIM null hypothesis is accepted or rejected for the SU. To test the null hypothesis, the statistical Wilcoxon Rank Sum (WRS) Test is used because the radiological COCs are present in background (DoD 2000). The test outcome must exceed the "critical value" to reject the null hypothesis that the SU is contaminated.
    - Data from biased and subsurface soil samples are not included in the statistical test per MARSSIM guidance: "Judgment measurements are not included in the statistical evaluation of the survey unit because they violate the assumption of randomly selected, independent measurements. Instead, judgment measurements are individually compared to the [derived concentration guideline level] DCGL" (DoD 2000). Therefore, only the surface systematic soil sample results are included in the WRS Test.
    - MARSSIM guidance also states, "If the difference between the largest survey unit measurement and the smallest reference area measurement is less than the DCGL [i.e., $SOR_G^{\max sys\ or\ rand} - SOR_G^{\min ref} < 1.0$], the WRS Test will always show the survey unit meets the release criterion" (DoD 2000). Background values are not subtracted in the gross sum of ratios (SOR_G) calculation. Table 3 contains the relevant SOR_G values for

determining whether each SU requires a WRS Test. The soil sample analytical results meet the RG for the WRS Test.

- Evaluating if the radiological risk and dose for the soil on the property are less than the requirements for UUUE stated in the ROD (USACE 2005a). See Section 4.2.

Table 3. Comparison of Largest Systematic SOR_G in Each Survey Unit to Smallest Reference SOR_G

SU	Surface/Subsurface SOR_G RG Applied	Largest Systematic SOR_G		Smallest Reference SOR_G		Difference	Automatically Pass[a] WRS Test
		Sample ID	SOR_G	Sample ID	SOR_G		
1	Surface	SVP264045	0.36	SLA04181	0.20	0.16	Yes, SU will pass
2	Surface	SVP190267	0.43	SLA04181	0.20	0.23	Yes, SU will pass
3	Surface	SVP263835	0.40	SLA04181	0.20	0.20	Yes, SU will pass
4	Surface	SVP190247	0.40	SLA04181	0.20	0.20	Yes, SU will pass
5	Surface	SVP190177	0.43	SLA04181	0.20	0.23	Yes, SU will pass
6	Surface	SVP190169	0.43	SLA04181	0.20	0.23	Yes, SU will pass
7	Surface	SVP190143	0.45	SLA04181	0.20	0.25	Yes, SU will pass

[a] "Automatically pass" means that the more complex calculation for the WRS Test does not need to be performed. For SUs that do not automatically pass, the more complex calculation for the WRS Test is performed to determine if the SU passes the WRS Test.

4.1.1 Soil under Structures

The soil adjacent to the structures located on CWC-365 and CWC-386 is used to infer the condition of the soil beneath the structures. Construction activities would have moved soil, including moving soil outside the eventual structure footprint, where it would be subject to sampling and GWSs. Because the results for the soil adjacent to structures and 60 samples collected under pavement meet the SOR_N RG, the soil under the structures also meets the SOR_N RG.

4.1.2 Comparison of Subject Area Soil Sample Results to Reference Area Background Soil Sample Results

The Wilcoxon-Mann-Whitney (WMW) Comparison Test is used for comparing statistical distributions, averages, and medians for two sets of data. The WMW Comparison Test was applied to the subject area soil sample results in Table F-1 and to the combined reference area background soil sample results in Tables F-2 and F-3 for each of the following COCs: Ac-227, Pa-231, Ra-226, Ra-228, Th-228, Th-230, Th-232, U-235, and U-238. The conclusions of the WMW Comparison Tests for each COC, with a 95 percent confidence interval, are that the soil sample results from CWC-365 and CWC-386 are less than or equal to the reference area background data. Appendix I contains the ProUCL output files for these WMW Comparison Tests.

As a conservative measure, any net value within the SOR_N equation that is less than zero is set to zero. The average SOR_N value for all the CWC-365 and CWC-386 samples using this conservatism is 0.02. However, allowing negative net values yields an average SOR_N value of -0.01 for all these samples, which indicates the dataset is consistent with the reference area background data.

4.2 RISK AND DOSE ASSESSMENT

The impacts of radiation on human health have been part of development of nuclear science from the beginning. Parameters for how radioactivity enters a body have been identified and measured. Equations and conversion factors for quantifying the impact to human health were established. Regulatory guidance was issued to assist in selecting the appropriate parameters for different

scenarios of human activity (e.g., workers and residents). Computer models were developed to efficiently perform calculations for site-specific parameters for these scenarios.

Appendix J contains a risk and dose assessment for CWC-365 and CWC-386 that numerically estimates values of risk and dose for comparison to ROD (USACE 2005a) values that are protective of human health and the environment. The receptor scenarios, including the reasonably maximally exposed (RME) receptor scenario, and their associated parameters are explained in Appendix J. The ROD identifies that protectiveness is achieved when the additional risk to an individual's entire lifetime is generally less than 1 in 10,000 (i.e., 10^{-4}) based on the CERCLA and the National Oil and Hazardous Substances Contingency Plan (NCP) risk criteria specified in 40 *CFR* 300.430(e)(2)(i)(A)(*1*). The ROD also identifies the benchmark dose limit of 19 mrem per year as the dose RG.

Exposure factors used in this risk and dose assessment are either consistent with or more health-conservative than those published in the U.S. Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response (OSWER) Directive 9200.1-120, *Human Health Evaluation Manual, Supplemental Guidance, Update of Standard Default Exposure Factors* (USEPA 2014), which are designed to not underestimate the risk and dose to the receptor. This means that the actual risk and dose received by an individual from soil at CWC-365 and CWC-386 will be lower than the estimates in this assessment. Protection provided by pavement or clean surface soil, which is not reflected in the estimates, is another example of how the actual MED/AEC-related risk and dose will be lower than the estimates provided in this assessment.

The risk and dose estimates for the receptor scenarios for CWC-365 and CWC-386 are summarized in Table 4. The radiological risk and dose for a 1,000-year period for the receptor scenarios at CWC-365 and CWC-386 are shown on Figures J-1 and J-2 of Appendix J. When compared to the CERCLA risk range and benchmark dose criteria, the results of this risk and dose assessment show that soil on CWC-365 and CWC-386 is protective of human health and the environment and meets the criteria for UUUE. As discussed in Section 4.1.2 of this report, the conclusions of the WMW Comparison Tests for the COCs are that the soil sample results from CWC-365 and CWC-386 are less than or equal to the reference area background data. Thus, the risk and dose estimates are essentially estimates for variation in natural background radioactivity. More information detailing the calculation of these values is provided in Appendix J.

Table 4. Risk and Dose Estimate

Scenario	Year of Highest Estimate	Highest Risk[a]	Highest Dose (mrem/year)
Student	0	9.4×10^{-7}	0.3
Staff		3.5×10^{-6}	0.2
Suburban Resident (UUUE)[b]		9.1×10^{-6}	0.7
Hypothetical Residential Gardener (Informational)		1.1×10^{-5}	1.2
Recreational User		5.4×10^{-8}	0.01

[a] Maximum risk assumes the worst-case scenario such that receptors would be in direct contact with soil, without regard to any clean cover. When estimating cancer risk, predictions indicate a lifetime risk level for an exposed individual and how many additional cancer cases might occur in a population of exposed people (i.e., 1×10^{-6} is equal to one additional case in a population of one million). These cancers may or may not occur, but should they occur, they would be in addition to cancers from other causes, such as smoking tobacco or obesity.

[b] Scenario established in the ROD for determining whether risk and dose meet the criteria for UUUE for the North St. Louis County Sites.

The maximum lifetime risk estimate for all scenarios is 1.1×10^{-5}, which is less than 1/9th of the CERCLA risk standard of 10^{-4} for the protection of human health. Copies of the

RESRAD-ONSITE output files are contained in Appendix C. These everyday risks of death are higher by the listed multiple in Table 5 (NSC 2022).

Table 5. Number of Times Higher Everyday Risk is Compared to Radiological Risk

Everyday Risk	Student	Staff	Suburban Resident	Hypothetical Residential Gardener	Recreational User
Vehicle Crash	10,180	2,730	1,050	870	177,200
Falls	9,470	2,540	970	800	164,850
Pedestrian Accident	1,900	510	190	160	33,130
Drowning	960	250	99	83	16,810
Fire/Smoke	710	190	73	61	12,450
Choking on Food	370	100	38	32	6,560
Bicycling Accident	270	73	28	23	4,740
Sunstroke	120	32	12	10	2,120
Storm	20	5.4	2.1	1.7	350
Hot Items	19	5.3	2.0	1.7	340
Dog Attack	10	2.7	Approximately Equivalent	Approximately Equivalent	170
Earthquake and Other Earth Movements	7.6	2			130

Background radiation from natural sources other than radon varies widely in the United States. Terrestrial radiation is from natural radioactivity in the Earth's crust. Excluding radon, terrestrial background radiation varies from 14 mrem per year in Florida to 29 mrem per year in Missouri to 43 mrem per year in Colorado (Mauro et al. 2005). Cosmic radiation is from space, primarily the sun, that interacts with the atmosphere to produce secondary radiation that reaches the Earth's surface. Cosmic radiation generally varies by elevation because higher elevations have less atmosphere to provide shielding. Cosmic background radiation varies from 26 mrem per year in Florida to 28 mrem per year in Missouri to 47 mrem per year in Colorado (Mauro et al. 2005). Combining these terrestrial and cosmic background radiation doses, Colorado residents receive 33 mrem per year more than Missouri residents. Using the USEPA generalized radiation dose to risk conversion of 12 mrem per year to 3×10^{-4} (USEPA 2014), this additional 33 mrem per year equates to an additional risk of 8×10^{-4}. The estimates for lead-210 at the HSD-JES are significantly lower (i.e., 1/70) than these terrestrial and cosmic variations in natural background radioactivity.

4.3 DATA QUALITY

4.3.1 Analytical

Quality assurance (QA) and quality control (QC) measures for FSS analytical data are summarized in the FSSP (USACE 2015) and are presented in the QA and QC sections of the SAG (USACE 2000). These measures are described in detail for CWC-365 and CWC-386 in the quality control summary report (QCSR) contained in Appendix K. The FSS analytical data meet QA and QC requirements. Analytical data review, evaluation, and assignment of validation qualifiers are performed on 100 percent of the soil sample analytical results.

The analytical QC program enables the evaluation of the analytical results to determine if they are accurate and adequate, and to ensure satisfactory execution of the FSS. In support of analytical QC

protocols, FSS activities were documented on boring log forms and in field logbooks maintained by USACE contractors. Copies of these boring log forms and field logbooks are contained in Appendix G.

The overall quality of the project data meets the established project objectives. Analytical data integrity is documented through proper implementation of QA/QC measures. Project information was determined to be acceptable for use through proper implementation of the project data verification, validation, and assessment process. Soil sample analytical data, as presented, were qualified as usable but estimated when necessary. Analytical data that were estimated have concentrations/activities less than the quantitation limit or were indicative of accuracy, precision, or sensitivity being less than desired but adequate for interpretation.

As presented in the QCSR, the combined analyses for accuracy and precision included 576 total comparisons with four exceedances, resulting in a 0.7 exceedance rate. The results were well within the 90 percent completeness DQO, with 99.3 percent of the data being within acceptance limits for accuracy and precision. With respect to completeness, the project produced valid results for 99.9 percent of the soil sample analyses performed, achieving the DQO of 90 percent completeness.

The QCSR demonstrates that the evaluated project analytical data can withstand scientific scrutiny; are appropriate for their intended purpose; are technically defensible; and are of known and acceptable accuracy, precision, and sensitivity. Confidence in the presented environmental information has been established, allowing the information to be utilized for the project objectives and providing data for future needs.

4.3.2 Field Instruments

Instruments used to perform the GWS were previously described in Section 3.1.1 of this PDIR-FSSE. These instruments were maintained and calibrated to manufacturers' specifications to ensure QA requirements for traceability, accuracy, precision, and sensitivity criteria of the equipment/instrumentation were met (DoD 2000, USACE 2015).

Instruments were calibrated at least annually in accordance with American National Standards Institute (ANSI) N323A-1997 or ANSI N323AB-2013, *American National Standard Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments* (ANSI 1997, 2014). Current calibration and maintenance records for these instruments include, at a minimum, the following information:

- Name of the equipment,
- Equipment identification (model and serial number),
- Manufacturer,
- Date of calibration, and
- Next calibration due date.

To ensure the instrument continues to operate properly between calibrations, source and general area ambient background checks were performed prior to and after daily use, as follows.

- Selecting a reference location for performance of checks. The reference location is selected based on the low general area ambient background radiation and on being consistently available for the daily checks.
- Inspecting for physical damage and ensuring the calibration is current.

- Performing 1-minute integrated counts with the source positioned in a reproducible geometry at the reference location. For the survey instruments, a designated cesium (Cs)-137 source was used.
- Performing 1-minute integrated counts of general area ambient background radioactivity (with no designated source) at the reference location.
- Comparing the instruments' responses against the averages established at the post-calibration check-in. Performance criteria of $\pm$20 percent or within 3 standard deviations of the averages were used as investigation action levels for source and general area ambient background checks, respectively.

4.3.3 Laboratory Instruments

The FUSRAP St. Louis Radioanalytical Laboratory is certified and audited through the U.S. Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) to ensure quality results. The ELAP includes requirements and audits of calibrations, source checks, and general area ambient background checks similar to those discussed for field instruments.

Eurofins St. Louis undergoes similar reviews to be accredited by the following.

- The State of Louisiana Department of Environmental Quality as part of the National Environmental Laboratory Accreditation Program to the "2009 TNI Standard" established by the National Environmental Laboratories Accreditation Conference Institute.
- The ANSI National Accreditation Board to the "ISO/IEC 17025:2017" standard and the U.S. Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories (DoD QSM V5.4).

4.3.4 Minimum Detectable Concentration for Soil Samples

Soil samples were analyzed at the FUSRAP St. Louis Radioanalytical Laboratory to measure the radioactivity at very low levels. In general, the MDC represents the lowest level that the laboratory can achieve for each soil sample given a set of variables, including detection efficiencies and conversion factors due to influences such as individual soil sample aliquot, soil sample density, and variations in analyte background radioactivity at the laboratory The MDC is reported with each soil sample result in Appendix F.

MARSSIM guidance (DoD 2000) recommends that analytical techniques be capable of measuring levels of activity (i.e., MDCs) that are less than the established individual radionuclide concentrations in the SOR_N RG. MARSSIM identifies between 10 to 50 percent as the target (i.e., ratios of 0.1 to 0.5). The MDC values corresponding to ratios of 0.1 and 0.5 are provided in Table 6 for each of the individual radionuclide concentrations that are part of the SOR_N RG. The maximum actual MDCs meet the target fractions. Only one Ra-226 MDC and one U-238 MDC were not less than the 0.1 fraction.

Table 6. Minimum Detectable Concentrations for Soil Samples

Radionuclide	MDC for 0.5 Fraction		MDC for 0.1 Fraction		Ratio of Maximum Actual MDC/RG	
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil
	(pCi/g)					
Ra-226	2.5	7.5	0.5	1.5	0.15	0.01
Th-230	7.0	7.5	1.4	1.5	0.03	0.03
U-238	25	25	5.0	5.0	0.11	0.10

As described in MARSSIM guidance (DoD 2000), the reported radionuclide concentrations from the laboratory are used in this FSSE even if those analytical results are less than the MDC. These analytical data are used to complete the MARSSIM evaluation and assess the risk and dose for CWC-365 and CWC-386.

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5.0 CONCLUSIONS

The radionuclide soil sample data for CWC-365 and CWC-386 were compared the reference area background soil sample data using the WMW Comparison Test. The results, with a 95 percent confidence interval, are that the soil sample data from CWC-365 and CWC-386 are less than or equal to the reference area background data.

As a conservative measure, any net value within the SOR_N equation that is less than zero is set to zero. The average SOR_N value for all the CWC-365 and CWC-386 samples using this conservatism is 0.02. However, allowing negative net values yields an average SOR_N value of -0.01 for all these samples, which indicates the dataset is consistent with the reference area background data.

The conditions established in the ROD (USACE 2005a) for protecting human health and the environment are met for CWC-365 and CWC-386. This conclusion is the result of a comparison of ROD requirements and the current conditions, as presented in Table 7, and the statistical test rejection of the null hypothesis (i.e., the MED/AEC radioactivity in the SU exceeds the release criterion) by the MARSSIM process. The FSS analytical results and the risk and dose assessment demonstrate that the SUs for CWC-365 and CWC-386 meet the criteria for UUUE in accordance with the ROD.

Table 7. Comparison of Results to Remediation Goals

RG Type	Specification	Results
Soil Radionuclide SOR_N Note: Area-weighted average in a 0.5-ft-thick layer of soil over a 100-m^2 area.[a]	$SOR_N \leq 1.0$ when averaged over 100 m^2. $SOR_N \leq 1.0$ when systematic or random soil sample analytical results are averaged over an SU.	No Class 1 SUs. Average Systematic SOR_N Values: SU-1: 0.02 SU-5: 0.06 SU-2: 0.07 SU-6: 0.09 SU-3: 0.02 SU-7: 0.08 SU-4: 0.05
Soil Radionuclide WRS Test	Pass the MARSSIM WRS Test.	Passes the WRS Test.
Additional Lifetime Health Risk[b,c]	Generally less than 10^{-4}.	9.4×10^{-7} (Student) 3.5×10^{-6} (School Staff) 9.1×10^{-6} (Suburban Resident, UUUE) 1.1×10^{-5} (Hypothetical Residential Gardener) 5.4×10^{-8} (Recreational User)
Additional Dose[c]	Total effective dose equivalent (TEDE) is <19 mrem/year.	0.3 mrem/year (Student) 0.2 mrem/year (School Staff) 0.7 mrem/year (Suburban Resident, UUUE) 1.2 mrem/year (Hypothetical Residential Gardener) 0.01 mrem/year (Recreational User)
Groundwater	No RG. Environmental monitoring results are documented in annual Environmental Monitoring Data and Analysis Reports.	Because soil meets the ROD RGs, long-term groundwater monitoring is not required.
Surface Water	No RG. Environmental monitoring results are documented in annual Environmental Monitoring Data and Analysis Reports.	Because the CWC corridor is not included in the scope of this PDIR-FSSE, surface water and sediment are not applicable to CWC-365 and CWC-386.

Table 7. Comparison of Results to Remediation Goals (Continued)

RG Type	Specification	Results
Contaminated Soil under Structures	If soil under structures is contaminated, the average of net radiation measurements does not exceed the general area ambient background level by more than 20 μR/hour.	Soil under structures meets the criteria for UUUE.

[a] Based on 40 *CFR* 192, which is an applicable or relevant and appropriate requirement (ARAR).

[b] When estimating cancer risk, predictions indicate a lifetime risk level for an exposed individual and how many additional cancer cases might occur in a population of exposed people (i.e., 1×10^{-6} is equal to one additional case in a population of one million). These cancers may or may not occur, but should they occur, they would be in addition to cancers from other causes, such as smoking tobacco or obesity.

[c] Represents the highest radiological risk and dose in a 1,000-year period to the ROD-based and informational receptor scenarios from exposure to the radionuclides present at CWC-365 and CWC-386 (see Appendix J for additional information).

The main components of the ROD selected remedy are repeated in the following list, along with a brief summary of conclusions drawn from this PDIR-FSSE.

- *Excavate all accessible contaminated soils to … RGs that support … UUUE and dispose off-site at a permitted facility;*

  FSS analytical data have confirmed that soil at CWC-365 and CWC-386 meets RGs that support UUUE. No RA is required.

- *Impose use restrictions at areas under roads, active railroad lines, and other permanent structures where the residual condition is not consistent with UUUE;*

  The FSS analytical data demonstrate that soil associated with or beneath structures meets the RGs and the criteria for UUUE. Therefore, use restrictions are not necessary.

- *Dredge contaminated sediments from …* [CWC] *to RGs that support UUUE;*

  This selected remedy component is not applicable to CWC-365 and CWC-386.

- *Remove contaminated soils from the surfaces of buildings and structures as necessary to achieve RGs that support UUUE, or remove the contaminated structures themselves and dispose off-site at a permitted facility;*

  Structures on CWC-365 and CWC-386 were evaluated in a separate FSSE.

- *Monitor ground water,* [stormwater,] *and excavation water during the soil remediation period to ensure water quality is not adversely affected and identify any areas where ground water may be significantly degraded; and*

  No RA was conducted by the USACE; therefore, this selected remedy component is not applicable to CWC-365 and CWC-386.

- *Monitor ground water long-term in selected areas where soils contaminated above RGs are left in place or where contaminated ground water has the potential to degrade adjacent ground-water or surface-water systems.*

  FSS analytical data have confirmed that soil at CWC-365 and CWC-386 meets the RGs. Therefore, such groundwater monitoring is not applicable to CWC-365 and CWC-386.

Note: A draft of this report was reviewed by the USEPA, the Missouri Department of Natural Resources (MDNR), and the Missouri Department of Health and Senior Services (MDHSS). Their comments, if any, and USACE responses are contained in Appendix L.

6.0 CONTACT INFORMATION

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FIGURES

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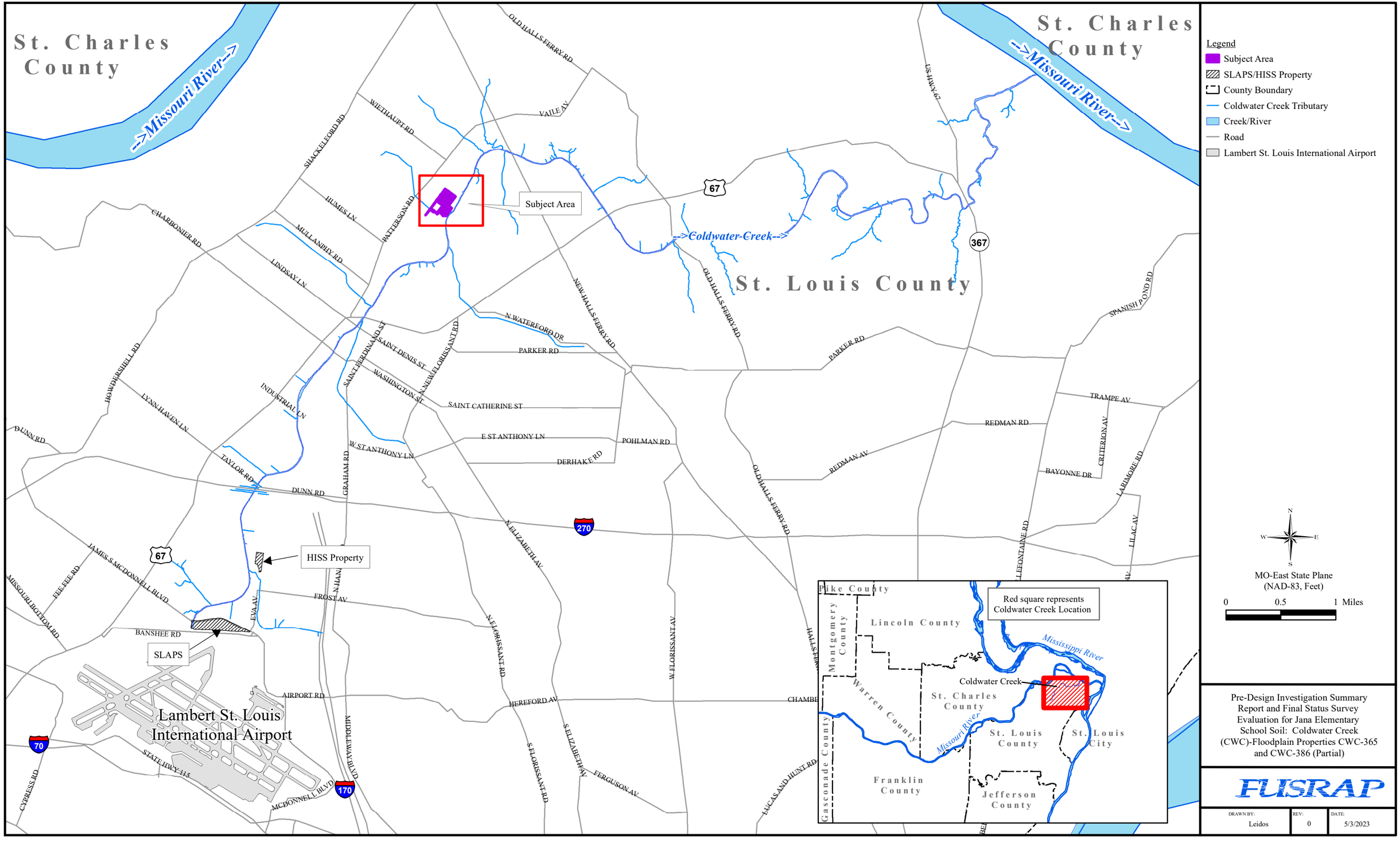

Pre-Design Investigation Summary Report and Final Status Survey Evaluation for Jana Elementary School Soil: Coldwater Creek (CWC)-Floodplain Properties CWC-365 and CWC-386 (Partial)

FUSRAP

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Figure 1. Location of North St. Louis County Sites

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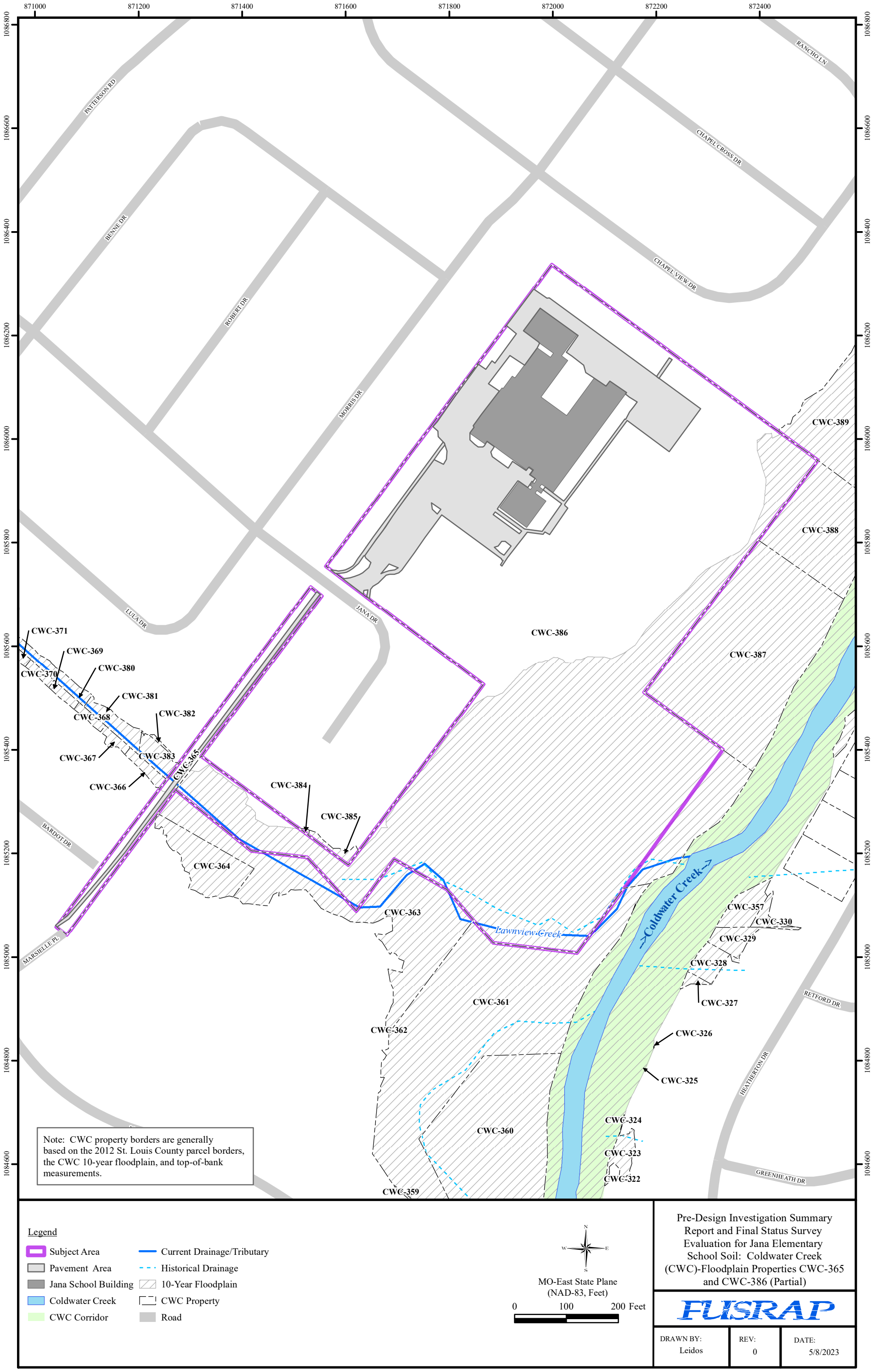

Figure 2. Location of CWC-365 and CWC-386

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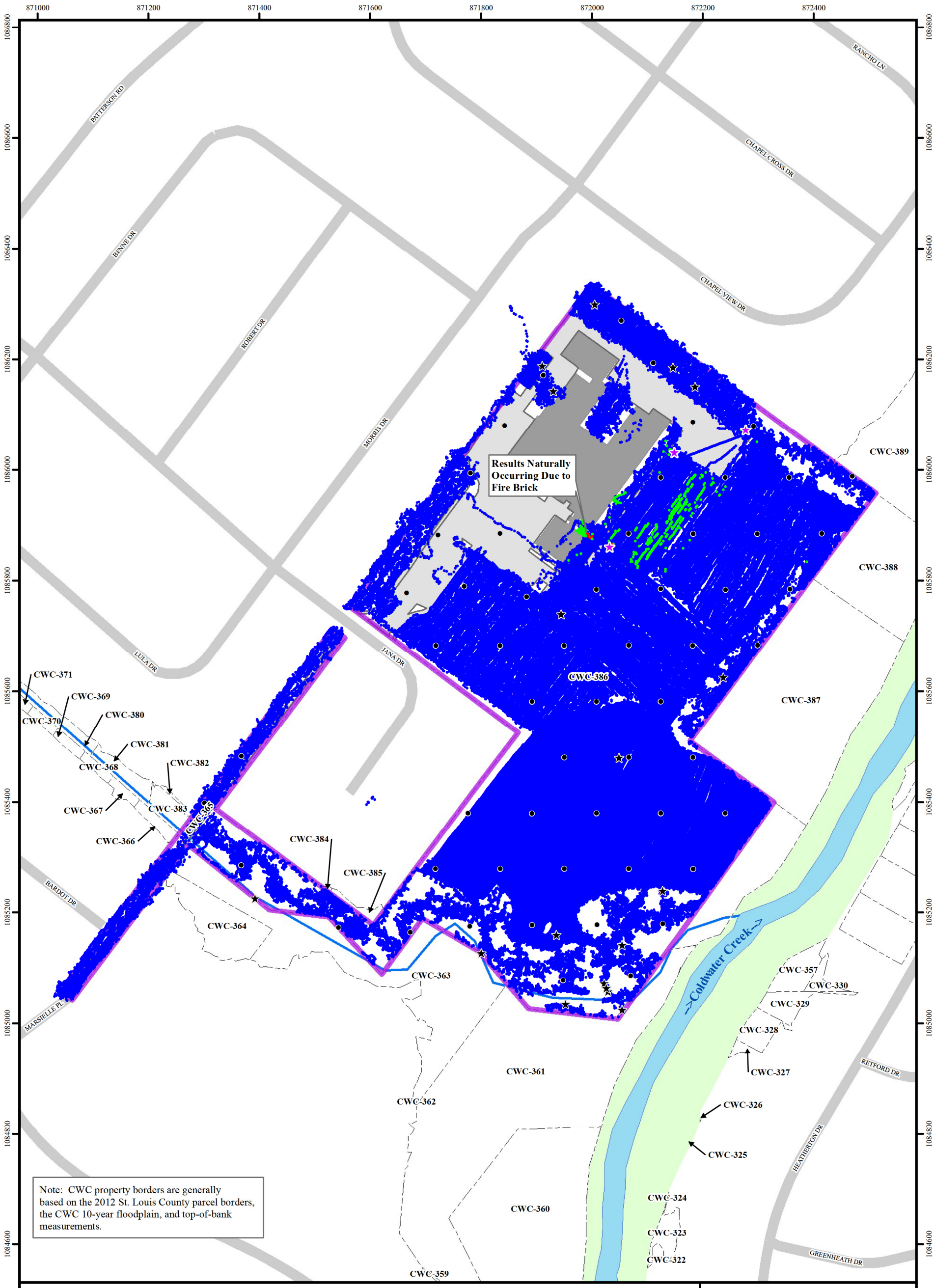

Pre-Design Investigation Summary Report and Final Status Survey Evaluation for Jana Elementary School Soil: Coldwater Creek (CWC)-Floodplain Properties CWC-365 and CWC-386 (Partial)

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Figure 3. Gamma Walkover Survey

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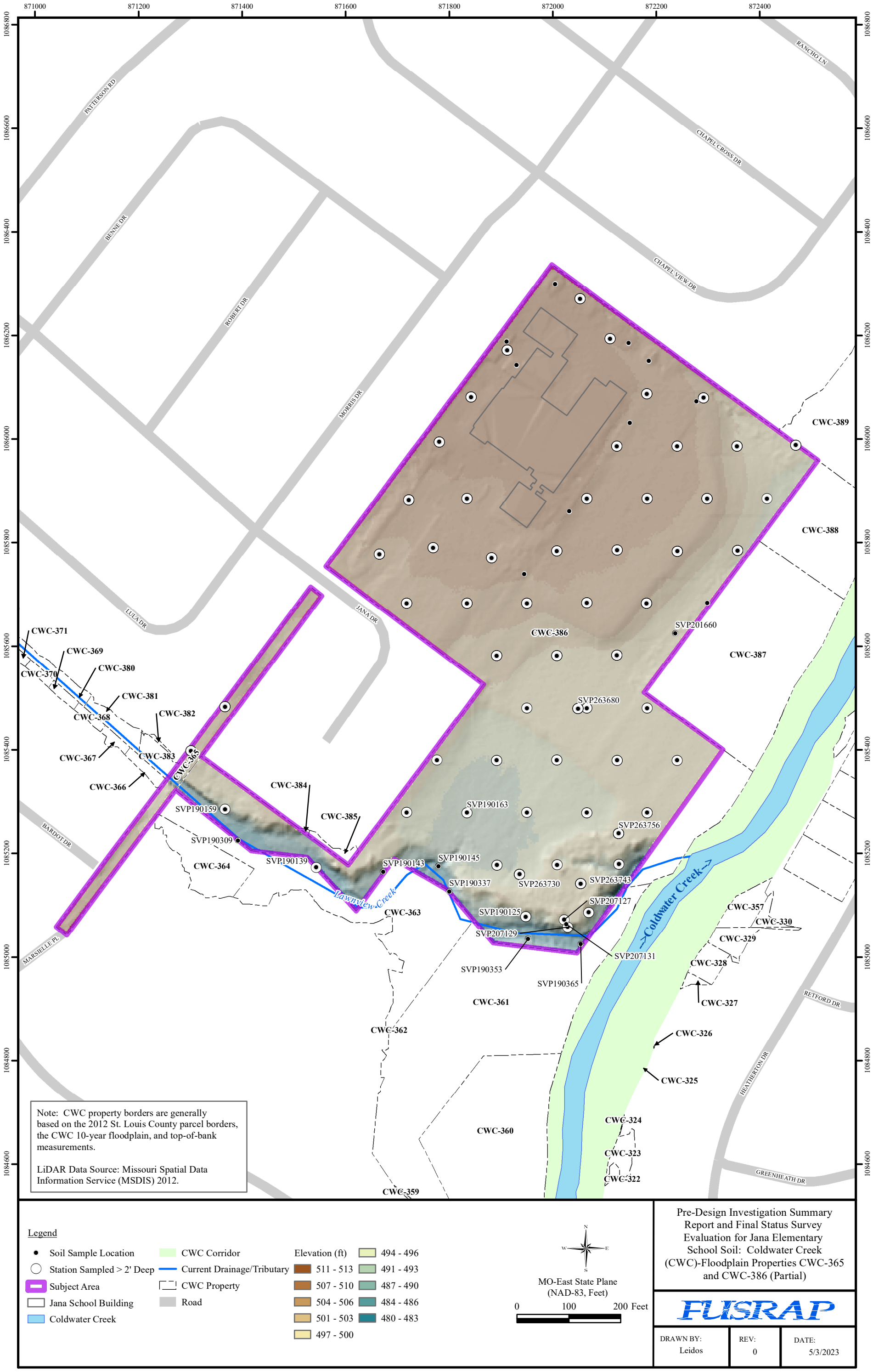

Figure 4. Light Detection and Ranging-Based Elevation Information

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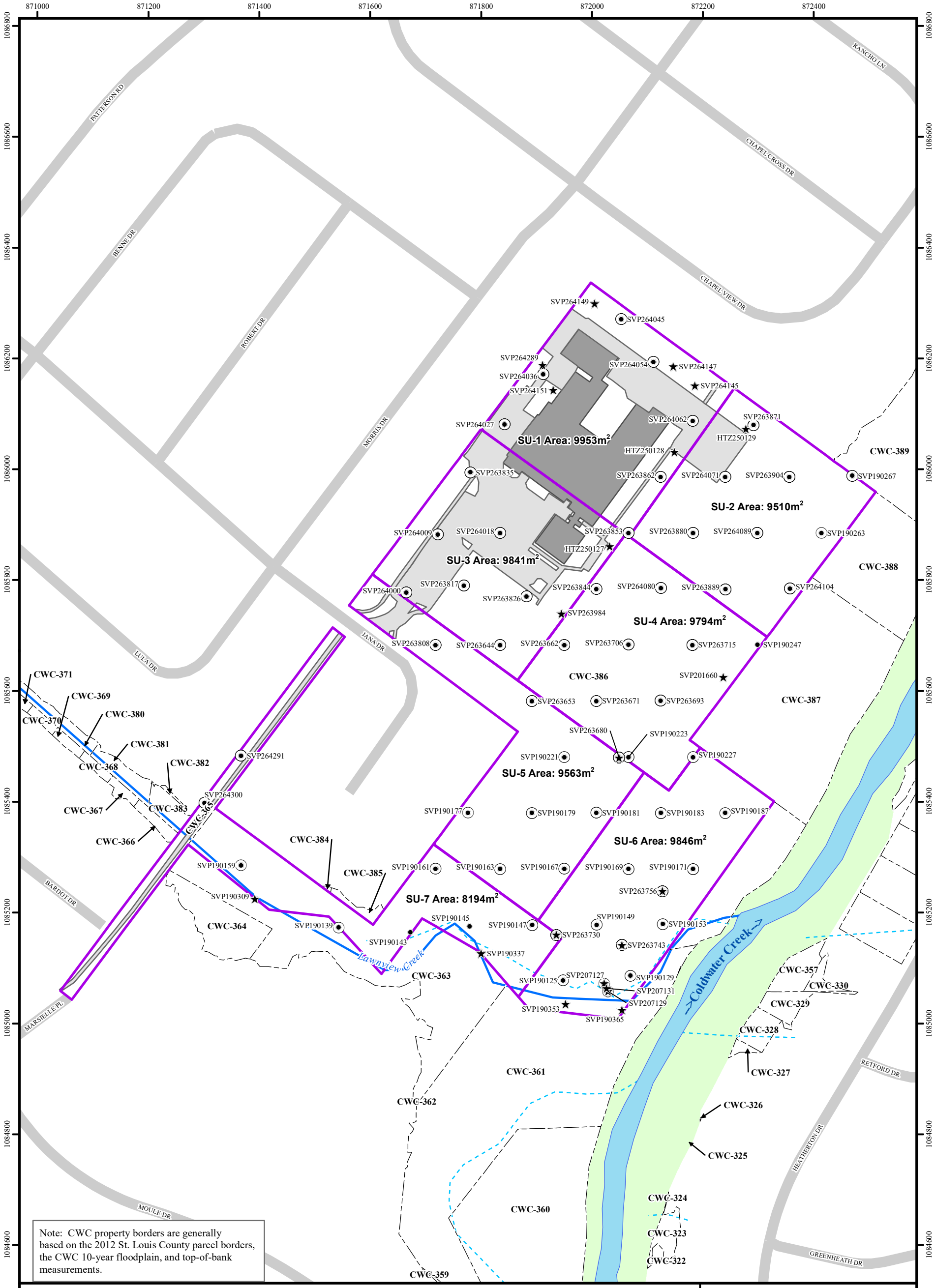

Pre-Design Investigation Summary Report and Final Status Survey Evaluation for Jana Elementary School Soil: Coldwater Creek (CWC)-Floodplain Properties CWC-365 and CWC-386 (Partial)

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Figure 5. Soil Sample Stations

APPENDIX A

"SRNL TECHNICAL REVIEW OF THE KALTOFEN 'RADIOACTIVE CONTAMINATION AT THE JANA ELEMENTARY SCHOOL' DOCUMENT"

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SAVANNAH RIVER NATIONAL LABORATORY

April 18, 2023 SRNL-L3000- 2022-00017, Rev. 1

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SRNL Technical Review of the Kaltofen "Radioactive Contamination at the Jana Elementary School" Document

The U.S. Army Corps of Engineers (USACE) St. Louis District (MVS) requested the services of the Department of Energy (DOE) Network of National Laboratories for Environmental Management and Stewardship (NNLEMS) to assist with USACE's Jana Elementary School response at the Formerly Utilized Sites Remedial Action Program (FUSRAP) St. Louis Airport Site Vicinity Properties (SLAPS VPs). The objective of the response is to evaluate the presence, nature, and/or extent of radiological contaminants of concern, if any, on the school property. Jana Elementary is located at 405 Jana Drive, Florissant, Missouri and is situated along the banks of Coldwater Creek. Coldwater Creek is a part of the SLAPS VPs FUSRAP site.

As part of this request, SRNL was called upon to review the October 10, 2022, report titled "Radioactive Contamination at the Jana Elementary School, Hazelwood, MO" issued to Brustowicz and Thompson by Kaltofen of the Boston Chemical Data Corporation. This report will be referred to as the Kaltofen Report hence forth in this review. Boston Chemical Data Corporation was contracted to sample areas in and around the Jana Elementary School to investigate concerns of contamination at this site, which borders Coldwater Creek, and radiochemical analyses were subcontracted to Eberline Analytical. Coldwater Creek is part of a designated FUSRAP Site including the SLAPS and the Hazelwood Interim Storage Site (HISS). The US Army Corps of Engineers is monitoring and remediating Coldwater Creek for contamination from the nation's early atomic energy program, conducted by Mallinckrodt Chemical Works.

Key observations from the limited review of the report include the following:

- None of the Jana Elementary School sample data reported by Eberline Analytical in the Kaltofen Report exceeded criteria set forth in 40 CFR Part 192.
- The Kaltofen Report claims the Jana School is never screened for radioactivity but was in fact screened by the Missouri Department of Health and Senior Services (MDHSS) and was found to be less than the EPA recommended 4 pCi/L concentration for the primary radiological dose hazard (radon) from naturally occurring uranium and thorium radiological material.
- The Kaltofen Report cites recommendations of a public health assessment from the Agency for Toxic Substances and Disease Registry (ATSDR) as justification for sampling of the school building, but the ATSDR only recommends sampling for areas flooded by the Coldwater Creek. Flooding from Coldwater Creek has never impacted the school building.
- The Kaltofen Report cites historic sample data with high levels of radioactivity attributed to Coldwater Creek, but the referenced sample data is actually from a contaminated site not physically connected to Coldwater Creek.
- The Kaltofen Report cites examples of levels of radioactivity elevated well above background levels measured at the Jana School by the USACE. These statements are misleading as the school property lines at one point actually extend into the Coldwater Creek FUSRAP Site, the high levels were limited to the creek bank, and these areas are recognized as needing remediation by the USACE.
- The Kaltofen Report cites a number of other radioisotopes sampled and measured in the school and surrounding area by Boston Chemical Data Corporation as concerning, but these isotopes (e.g. metallic thorium, Cs-137, etc.) are not attributable to the Mallinckrodt Chemical Work Processes that contaminated the Coldwater Creek FUSRAP Site.
- The Kaltofen Report highlights the presence of naturally-occurring radon (Rn-222) daughter radioisotopes Pb-210 and Po-210 levels measured by the Boston Chemical Data Corporation in the Jana School. There is no data available that points to Coldwater Creek

contamination causing excessive levels of Pb-210 and Po-210 to be present in the Jana School. Samples collected from the Coldwater Creek near Jana do not contain Ra-226 (the parent of Rn-222) levels above the EPA guidelines of 5 pCi/g. The Jana school was screened for elevated radon levels and elevated levels of radon were not detected.

- Details of the Boston Chemical Data Corporation sample collection and Eberline data analysis were not provided in the Kaltofen Report; therefore, only a limited evaluation of the sampling and analyses methods could be performed based on information provided in the Kaltofen Report.

Given the limited access to the supporting data and the sampling and analyses methods that team used to generate the report, a peer review of all of the Kaltofen Report documents, data, and methodology is recommended.

Boston Chemical Data Assessment: The Kaltofen Report states the results of the radiological analyses on surface sediment conducted by Eberline indicated the combined activities of radium and thorium on the Jana School Site exceed the level of "5 pCi/g above background". There is no indication that background levels of radium and thorium were subtracted from the concentrations reported in the Kaltofen Report "5 pCi/g above background" criteria.

Also, the Kaltofen Report misinterprets how the 5 pCi/g limit for the sum of Ra-226 and Ra-228 in surface soils provided in 40 CFR Part 192 applies. The Kaltofen Report cites "Use of Soil Cleanup Criteria in 40 CFR Part 192 As Remediation Goals for CERCLA Sites" (1988, p. 5) as justification for the Kaltofen Report "5 pCi/g above background" criteria. The EPA Directive # 9200.4-25 titled "Use of Soil Cleanup Criteria in 40 CFR Part 192 As Remediation Goals for CERCLA Sites" (a 1998 document, not a 1988 as cited in the Kaltofen Report) clarifies the requirements set forth in the federal regulation 40 CFR Part 192 for health and environmental protection standards for uranium and thorium mill tailings. It explains how thorium isotope remediation goals should also be part of developing "a relevant and appropriate requirement" (ARAR) remediation goal for CERCLA sites as the radium isotopes activity levels will rise to match the radiological parent thorium isotopes activity over tens of thousands of years when environmental transport conditions allow. Directive 9200.4-25 does not call for the sum of radium and thorium isotopes to be maintained below a 5 pCi/g limit for surface soils. Additionally, in Directive no. 9200.4-35P "Remediation Goals for Radioactively Contaminated CERCLA Sites Using the Benchmark Dose Cleanup Criteria in 10 CFR Part 40 Appendix A I, Criterion 6(6)" page 8, the example clearly defines the 5 pCi/g limit to apply to the sum of radium isotopes **or** to the sum of thorium isotopes in surface soils. The Kaltofen Report mistakenly applied the 5 pCi/g limit to the sum of both the radium **and** the thorium isotopes. Federal Regulation 40 CFR Part 192 does allow for the sum of fractions of radium and thorium isotopes when the ARAR remediation goals are factored in, which in this case would be 5 pCi/g for the radium isotopes and 14 pCi/g thorium isotopes for surface soils. Additionally, the Eberline Data in the Kaltofen Report from the Kaltofen Jana School samples did not exceed the 5 pCi/g combined sum of Th and Ra isotopes above background applied Kaltofen Report criteria.

The Kaltofen Report cites the EPA Region 7 Proposed Record of Decision for the nearby Westlake Landfill as setting limits for the sum of Ra-226 + Ra-228 activity to be less than 2.9 pCi/g, and the sum of Th-230 + Th-232 to be less than 2.9 pCi/g. However, these limits were listed in that document as preliminary remediation goals based on levels indistinguishable from normal environmental background levels of these isotopes and were established for a different region than the Coldwater Creek area. The EPA Region 7 Proposed Record of Decision also clearly states the final cleanup levels were to be determined in the amended Record of Decision. At the time of writing this memo, SRNL did not have access to the amended Record of Decision so these limits cannot be validated.

The Directive (9200.4-25) also clearly states these are guidelines, and applicable or relevant and appropriate requirements can be developed for the individual CERCLA Sites. The USACE has developed ARAR remediation goals (RGs) for soils, structures, and sediments at the North St. Louis County sites. For surface soils up to 6" depth, the Ra-226 RG is 5 pCi/g and the Th-230 RG is 14 pCi/g. The Kaltofen Report did not provide background levels, which would have to be subtracted from the analytical results to generate a value above background levels. The highest result for the gross sum of radium and thorium results above method detection limits provided by the Kaltofen Report was 6.99 pCi/g +/- 55.3% in a 95% confidence interval in the sample having Lab ID 22-08062-08. The USACE Coldwater Creek background levels for the sum of these same isotopes is 4.42 pCi/g. When this background is considered, the sample with the highest radium and thorium activity reported by the Kaltofen Report is substantially below even the "5 pCi/g above background" Kaltofen assumed limit used in the Kaltofen Report.

Boston Chemical Data was recently contracted to perform additional sampling in and around the Jana School. This sampling effort is consistent with the recommendations of the ATSDR 2019 report assuming the Jana School was flooded by Coldwater Creek. However, historic Coldwater Creek flooding data indicates the Jana School building has never been flooded by Coldwater Creek. Thirty-two samples of soil, dust, and plant materials were collected and sent to a contract radioanalytical laboratory, Eberline Analytical. The Kaltofen Report datasets are difficult to validate with the information provided in the Kaltofen Report. However, as reported, the results of these analyses indicate elevated levels of Pb-210 and its decay products above background levels, and elevated levels of Ra-226 above background levels. The levels of Pb-210 are significantly higher than what would be expected from the measured levels of its radiological parent, Ra-226. These samples are surface samples. Consequently, one would not expect to find Pb-210 in equilibrium with the Ra-226 parent, but rather would be deposited unevenly following the decay of Rn-222, a daughter of Ra-226. These isotopes are ubiquitous in nature.

Qualitative analysis results by scanning electron microscopy/ energy dispersive X-ray spectrometry (SEM/EDS) were also provided that identified particles high in elemental thorium. SEM/EDS is a qualitative elemental analysis useful for characterizing and visualizing particle morphology but is not considered an accurate method for determining quantities of the element. This SEM/EDS measurement identifying the presence of elemental thorium is not relevant as

trace Th-230 at levels cited throughout the Kaltofen Report for this area were likely well below the detection limits for an SEM/EDS analysis. Additionally, the data provided from Eberline in the Kaltofen Report indicated that by mass, thorium in these samples was overwhelmingly Th-232. The thorium present would be normal background Th-232, which is also ubiquitous in nature, and is not related to the Mallinckrodt processes, which were the source of the Coldwater Creek's designation as a FUSRAP Site. The Kaltofen Report analyses in fact found no statistically relevant evidence of elevated Th-230, which is the contaminant that is driving the remediation of various sites along Coldwater Creek. The highest level of Th-230 reported in the Kaltofen Report from the sampling executed by the Boston Chemical Data Corporation was 3.13 pCi/g with a 51% uncertainty in the 95% confidence interval, well below the remediation goals of this FUSRAP Site. Additionally, this datapoint was not in fact from the Jana Elementary School, but from a 2018 sampling of the Moule Drive property.

School Location and Geology Assessment: The Kaltofen Report details that the Jana School property is bordered on two sides by the Coldwater Creek. Based on Google Earth maps, the Jana School property appears to share one border with the Coldwater Creek and not two. An adjacent neighborhood is bordered by a Coldwater creek tributary. The Coldwater Creek is a recognized down gradient extension of a FUSRAP Site, and the creek is in the process of being remediated by the Army Corps of Engineers. Contaminant levels requiring remediation have not been documented for the tributary. The Kaltofen Report cites NUREG CR2722, Table 4 as detailing high Th-230 activity levels in Coldwater Creek (up to 178,000 pCi/g Th-230). The NUREG CR2722 Table 4 does indeed have a datapoint of 178,000 pCi/g Th-230, but this datapoint is from a sample taken from Area 1 of the West Lake Landfill Superfund Site, approximately 5 miles away, and not located near or on Coldwater Creek, or the tributary creek, so this datapoint and value cannot be validated. Drainage from West Lake landfill does not flow into Coldwater Creek; therefore, they should not be considered the same site.

The Kaltofen Report cites data from the reference 2018 US EPA Record of Decision, West Lake Landfill as contributing to the body of evidence of the levels of contamination in and around Coldwater Creek, but in fact, this EPA report specifically states that it only addresses the West Lake Landfill Superfund Site, and not the Coldwater Creek area. The West Lake Site is located approximately 5 miles from the Coldwater Creek area and is not a part of the SLAPS VP FUSRAP Site that includes Coldwater Creek. The Kaltofen Report also cites this EPA report for elevated Th-230 data from 84 locations and depths sampled at the Jana School, but again, as the EPA report does not address this Coldwater Creek area. The source of the data cited by the Kaltofen Report is also not clear for these 84 locations. The Kaltofen Report claims the average of these 84 samples had Th-230 levels averaging 6.18 ±1.46 pCi/g. However, these levels are not above the USACE RGs for this FUSRAP Site and consequently not over EPA guidelines for residual risk. The USACE provided SRNL with a dataset of 215 locations where samples were collected in 2018 and 2019 inside the Jana School property lines regions subjected to flooding by Coldwater Creek. It is assumed the 84 location data has been extracted from this dataset of 215 points. The Jana School property lines actually extend at a point into the FUSRAP Site

Coldwater Creek's banks and water. There are some locations in the creek bed and banks where residual contamination has been identified and remediation of those locations by the USACE is planned. A number of sampling points in the creek banks were measured over RG goals by the USACE and are marked as such in the data reports SRNL received. There are no data points in the Jana School grounds floodplain (again, above the actual banks of the creek) that are above the RG for Th-230. It would be a misrepresentation of risk to the Jana School population to average datapoints from the actual FUSRAP Site's creek banks and creek area that are scheduled for remediation with a subset of the 215 datapoints from the Jana School grounds floodplain. The report appears to further imply that the entire region exceeds the average Kaltofen Report "5 pCi/g above background" criteria . It should be noted that all of these 215 datapoints were well below RGs for radium isotopes alone.

The Kaltofen Report raises the scenario of potential contamination of the Jana School by flooding from Coldwater Creek. Examination of the topographic map of Jana School shows that the difference in elevation between the creek bed and the southeast corner of the Jana School is greater than 20 ft. The steep creek embankment bounds the edge of lower play field and is approximately 10 feet. The USGS has maintained a water level gauge upstream in Coldwater Creek for the last 20 years and the highest water level measured in the creek was only fourteen feet which would not impact the school building (https://waterdata.usgs.gov/nwis/uv: Coldwater Creek). The largest recorded flood at the Jana School area occurred in 1957 before the current school building was constructed. A map developed by the USACE shows the extent of flooding for the 1957 event (prior to the construction of the school), which shows the location of the lower fields was impacted but that the school building site was never impacted by flooding with water from the stream. This data shows that flooding from Coldwater has not impacted the Jana School.

Assessment of Army Corp Data and Sampling Plan: The Kaltofen Report cites Army Corps test results well in excess of 5 pCi/g, as high as 22.6 +/- 4.39 pCi/g at soil surfaces of Jana School, and as high as 34.30 +/- 6.61 pCi/g subsurface soils. The Kaltofen Report does not provide the reference for these datapoints so the validity of the assumptions, data corrections, and limits comparisons cannot be verified.

A review of the most recent "North St. Louis County Sites Annual Environmental Monitoring Data and Analysis Report for Calendar Year 2021" report showed all values of sediment samples taken from the Coldwater Creek were well below the remediation goals for Th-230 and Ra-226 of the record of decision for the North St. Louis County Sites. All the Ra-226 and Ra-228 measurements were below the EPA protective health-based level of 5 pCi/g above background for surface soils. NUREG CR2722 clearly indicated Ra-226 is not in radio-equilibrium with Th-230. Consequentially, Ra-226 and its chain of radiological daughters including Rn-222, are present at substantially lower levels than Th-230. Three of the 10 Coldwater Creek sampling site sediment samples exceeded the 5 pCi/g levels of Th-230 and Th-232 (C007 at 8.15pCi/g, C-009 at 5.44 pCi/g, C011 at 5.37 pCi/g) in the 1st sampling event. One of the 10 Coldwater Creek

samples exceeded the 5 pCi/g level of Th-230 and Th-232 (C011 at 13.17) in the second sampling event. But again, all of these values were below the applicable or relevant and appropriate requirement (ARAR) remediation goal of 14 pCi/g for surface and 43 pCi/g for deep sediments for thorium isotopes set by the record of decision for the North St. Louis County Sites. A review of the historical data available in the 2021 monitoring report for the period of 3/11 – 10/21 indicates no Coldwater Creek sediment sample has ever exceeded the EPA protective health-based level of 5 pCi/g for the sum of the Ra-226 and Ra-228 isotopes. No thorium values exceeded the remediation goals over that historical period, with the highest value being 8.32 pCi/g on 3/21 at station C007. However, the ATSDR 2019 Report supports ongoing efforts to identify and properly remediate radiological waste around Coldwater Creek. The basis for the ATSDR 2019 Reports conclusion were that Th-230 has been found above FUSRAP RGs in several areas of the Coldwater Creek floodplain and reducing Th-230 levels in accessible areas will reduce the risk of harmful exposure. For example, soil erosion on the banks of Coldwater Creek could expose deep sediments that pass the 43 pCi/g RG, but later fail the 14 pCi/g surface RG.

The Kaltofen Report stated that the current USACE sampling plan is inadequate to assess the presence or levels of radium and thorium contamination at the Jana Elementary School. The Kaltofen Report states the USACE only sampled at points that were located at least 300 feet from the school and cites numerous sampling points in and around the school that were not sampled. The Kaltofen Report also cites the risk of contamination of the surrounding area from flooding events in the past. However, because the creek is the source of the contamination, the USACE sampling points were closer to the source of contamination (Coldwater Creek) than the school itself, and intuitively, samples taken closer to the source of contamination should be more radioactive than points located closer to the school. The school building itself is significantly elevated above the 1000-year floodplain and has never been subjected to a flooding event. Some portions of the fields south of the school are located within the 1000-year floodplain. The school ground points in the Coldwater Creek floodplain sampled by the USACE in 2018 and 2019 were all measured to be below remediation goals for Ra-226. All points were also below remediation goals for Th-230 except for several points in the banks of the creek itself.

The Jana Elementary School was, in fact, screened for the primary radiological dose hazard (radon) from naturally occurring uranium and thorium radiological material by the Missouri Department of Health and Senior Services (MDHSS) and found to have radon concentrations below the EPA recommended 4 pCi/L concentration in air. Jana was screened for radon contamination by MDHSS along with the rest of the 31 schools in the Hazelwood School District. The set of test results showed Jana had on average the lowest level of radon concentration (tied with 12 other schools at 0.3 pCi/L). Of the 28 radon samples taken at Jana, the highest measurement of 1.5 pCi/L ranked #19 out of the 31 schools. All of the Jana radon test results showed radon levels well below EPA guidelines of 4 pCi/L.

The Kaltofen Report claims the contamination on Jana School grounds extends from surface to 6-foot depths below the surface but does not cite the reference for the information. A portion of the school grounds extends into the creek itself, and if this is the datapoint the Kaltofen Report refers to, the claim misrepresents the risk to the physical school population.

The Kaltofen Report cites the ATSDR public health assessment titled "Evaluation of Community Exposures Related to Coldwater Creek", issued April 30, 2019, as justification for sampling the Jana School building. The ATSDR report evaluated potential exposures to people who played or lived near Coldwater Creek in North St. Louis County, Missouri. The ATSDR report acknowledges the presence of radiological contamination in and around Coldwater Creek prior to remediation activities (prior to year 2000), that could have increased the risk of some types of cancer in people who played or lived there. The ATSDR report concluded that recent exposures after the completion of the 2000 remediation efforts would not likely result in detectable increased cancer rates in the community as a whole.

The ATSDR supported ongoing efforts to identify and properly remediate radiological waste around Coldwater Creek. The ATSDR recommended that the FUSRAP program continue to investigate and remediate Coldwater Creek sediments and floodplain soils to meet regulatory goals. To increase knowledge about contaminant distribution and allay community concerns relating to buildings adjacent to Coldwater Creek, the ATSDR recommended future activities include sampling of indoor dust and sediments and soils present in basements that were directly flooded by Coldwater Creek in the past. The Kaltofen Report accurately restates the conclusions of the ATSDR report regarding the need for sampling structures adjacent to Coldwater Creek that have been flooded by Coldwater Creek. However, the Jana Elementary School has never been flooded by Coldwater Creek, so the ATSDR recommendations do not apply to sampling of the Jana Elementary School.

Assessment of Additional Data Cited in Kaltofen Report: The Kaltofen Report cites testing data from a home on Moule Drive. The source of this data was not provided and cannot be verified. A number of the radioisotopes listed were decay products of U-238 (i.e., Th-230 and Pb-210) and could have originated from the Mallinckrodt processes if they are elevated above normal environmental background levels. A number of the radioisotopes listed were not used in the Mallinckrodt Chemical Works and so would not be attributable to that process. Mallinckrodt Chemical Works processed uranium ore, which was shipped to other DOE Sites (Y-12 at Oak Ridge, the Portsmouth Site in Ohio, the Paducah Site in Kentucky) for U-235 enrichment. From there, the uranium would be used in the weapons programs or used for fuel for nuclear reactors. Metallic thorium was not part of a Mallinckrodt process. Cs-137 is a fission product, which requires neutron irradiation of fissile material like U-235, which was also not part of the Mallinckrodt process. Cs-137 is also ubiquitous in the environment at trace levels from radioactive fall-out from past nuclear weapons testing.

Summary Assessment: In conclusion, portions of the Kaltofen Report attribute elevated radioactivity measurements (as high as 178,000 pCi/g) to the Coldwater Creek but our assessment indicates the data were from samples of the West Lake superfund site and should not be attributed to Coldwater Creek. Portions of the Kaltofen Report improperly average USACE datasets to imply Jana School grounds exceed EPA guidelines for the site. However, these high datapoints on school grounds are a result of the fact the school property actually extends into the Coldwater Creek FUSRAP Site, and the creek bank areas in question are known to the USACE and are slated for further remediation. In addition, analytes that were not attributable to the Mallinckrodt process have been included and are not relevant to this FUSRAP project. There is no evidence that the school has ever been contaminated by Coldwater Creek floodwaters; therefore, recommendations from the ATSDR public health assessment do not apply. The Eberline data from the school samples provided in the Kaltofen Report for the Th-230 and Ra-226 isotopes being remediated in Coldwater Creek were all within EPA guidelines. The Jana Elementary school was analyzed for the major radiological hazard (radon) from the decay of naturally occurring radiological material and has been found to be in the lowest radon concentration grouping of the 31 schools in the Hazelwood School district and was well within EPA guidelines of 4 pCi/L in air for acceptable radon levels in a public facility. However, to allay community concerns potentially created from the reported data, SRNL recommends a structured sampling and analyses of the Jana Elementary School and associated property using regulatory methods and protocols for the radioisotopes of concern. The follow-up analyses and the generated data should be compared to the appropriate federal and regulatory limits for protecting the health of the local community. Given the limited access to the supporting data and the sampling and analyses team, a peer review of all of the Kaltofen Report documents, data, and methodology is recommended.

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APPENDIX B

PRE-DESIGN INVESTIGATION SUMMARY REPORT COLDWATER CREEK – GROUP 24: JANA ELEMENTARY SCHOOL (WEST PORTION), FUSRAP NORTH ST. LOUIS COUNTY SITES, ST. LOUIS MISSOURI

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Revision 0

PRE-DESIGN INVESTIGATION SUMMARY REPORT
JANA ELEMENTARY SCHOOL SOIL

FUSRAP North St. Louis County Sites
St. Louis, Missouri

May 17, 2023

Prepared by:
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U.S. Army Corps of Engineers St. Louis District
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Single Award Task Order Contract
Contract Number W912P9-19-D-0011

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Acronyms and Abbreviations

>	greater than
AEC	U.S. Atomic Energy Commission
ASTM	ASTM International
bgs	below ground surface
COC(s)	contaminant(s) of concern
CWC	Coldwater Creek
DQO(s)	data quality objective(s)
EPA	U.S. Environmental Protection Agency
EWG	East-West Gateway Council of Governments
FSS	final status survey
FSSE	final status survey evaluation
FSSP	*Final Status Survey Plan for Soils, Structures, and Sediments at the St. Louis FUSRAP Sites, St. Louis, Missouri*
FUSRAP	Formerly Utilized Sites Remedial Action Program
Futura	Futura Coatings Company
GIS	Geographic Information System
HGL	HydroGeoLogic, Inc.
HISS	Hazelwood Interim Storage Site
HZ(s)	hydrostratigraphic zones
Mallinckrodt	Mallinckrodt LLC
MDNR	Missouri Department of Natural Resources
MED	Manhattan Engineer District
msl	mean sea level
pCi/g	picoCuries per gram
PDI(s)	pre-design investigation(s)
PDI WD	*Pre-Design Investigation Work Description, FUSRAP North St. Louis County Sites, St. Louis, Missouri*
PDI WP	*Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge, St. Louis, Missouri*
PDI WP Addendum	*Addendum to the Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge: St. Ferdinand Park to Jana School, St. Louis, Missouri*
PDI WS	*Final Status Survey and Pre-Design Investigation Sampling Work Scope for Jana Elementary School, FUSRAP North St. Louis County Sites, St. Louis, Missouri*
PDIR	Pre-Design Investigation Summary Report
Ra-226	radium-226
RG(s)	remediation goal(s)

Acronyms and Abbreviations (Continued)

ROD	*Record of Decision for the North St. Louis County Sites, St. Louis, Missouri*
SAG	Sampling and Analysis Guide
SLAPS	St. Louis Airport Site
SOR_N	net sum-of-ratios
Th-230	thorium-230
U-238	uranium-238
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
VP(s)	Vicinity Property(ies)

1.0 Introduction

This Pre-Design Investigation Summary Report (PDIR) documents the results of pre-design investigations (PDIs) completed in 2017 through 2022 by HydroGeoLogic, Inc. (HGL) and other U.S. Army Corps of Engineers (USACE) contractors. The PDI activities were performed in multiple phases at Jana Elementary School located at 320 Jana Drive and 405 Jana Drive in Florissant, Missouri. These Hazelwood School District properties, referred to collectively as Jana Elementary School, are situated to the west of Coldwater Creek (CWC) and are part of the St. Louis Airport Site (SLAPS) Vicinity Properties (VPs) Coldwater Creek Properties (CWC-365 and CWC-386, respectively), part of the Formerly Utilized Sites Remedial Action Program (FUSRAP) North St. Louis County Sites, St. Louis Missouri (see Figure B-1). For PDI designation purposes, these properties are part of CWC – Group 24. Henceforth, the portion of the property encompassed by the subject area boundary depicted on Figure B-1 will be referred to as "Jana Elementary School" or the "subject area" (see Figure B-1). Note that the PDI/final status survey evaluation (FSSE) activities herein will be referred to collectively as "PDI."

The PDI activities were completed in phases beginning in 2017 and concluded in 2022. Initial phases included a Class 2 sampling grid on portions of the property believed to be impacted by flood events up to an estimated limit of the 10-year floodplain. Due to allegations that portions of the property beyond the initial PDI area and the 10-year floodplain had unacceptable levels of radioactivity associated with Manhattan Engineer District (MED) and U.S. Atomic Energy Commission (AEC) activities (Brustowicz, et al., 2022), an extended Class 2 grid and various biased locations were planned and sampled to include the entire property and areas well beyond the estimated 10-year and 500-year flood levels.

The PDI activities were conducted within the subject area as directed by the USACE for the FUSRAP in accordance with the *Record of Decision for the North St. Louis County Sites, St. Louis, Missouri* (ROD) (USACE, 2005). The ROD was developed by the USACE in consultation with the U.S. Environmental Protection Agency (EPA) and the State of Missouri, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, to address MED/AEC contamination through implementation of the Selected Remedy. The Selected Remedy was deemed necessary to protect public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment.

The purpose of the PDI activities at the subject area was to obtain sufficient radiological data to evaluate the subject area for the presence of radiological contaminants of concern (COCs) and to determine whether concentrations of radiological COCs exceeded ROD remediation criteria. In the context of this PDIR, radiological contamination is defined as the presence of radiological COCs in an individual soil sample or group of samples at net concentrations (above background

concentration) that exceed the ROD remediation criteria. The PDI activities described in this PDIR, including its associated Figures B-1 through B-3, and Attachment A-1, will be used in support of FSSE and/or remedial design for the subject area.

The ROD remediation goals (RGs) are based on the average concentration of the SLAPS VPs COCs within the entire population of data above the site background distribution for a 100-square-meter area. The final demonstration that ROD RGs have been met is not within the scope of this PDIR but will be completed as part of the FSSE to be conducted in accordance with the *Final Status Survey Plan for Soils, Structures, and Sediments at the St. Louis FUSRAP Sites, St. Louis, Missouri* (FSSP) (USACE, 2015).

1.1 Subject Area Boundary

The subject area is bounded by parcels occupied by residences to the north and west, CWC to the east, and Lawnview Creek to the south (see Figure B-1). In general, the subject area boundary includes the following properties:

- 320 Jana Drive: Hazelwood School District (Parcel 06J211371) (CWC-365)
- 405 Jana Drive: Hazelwood School District (Parcel 06J220632) (CWC-386)

1.2 Subject Area Description

The subject area is located in Florissant, Missouri, west of CWC (see Figure B-1) within a residential area that was developed during the 1960s. Jana Elementary School was constructed in the late 1960s. The northwest corner of the subject area consists of a large brick and mortar school building, concrete sidewalks, and asphalt driveway and parking areas (see Figure B-2). Playground areas (including asphalt pavement, pea gravel, and mulch-covered soil surface areas) are located to the west and north of the building. Multiple utility lines, including water, sewer, storm sewer, underground electric, natural gas, and fiber optic, are present within the subject area. Undeveloped portions of the subject area include grass-covered open land to the east (CWC-387 and CWC-388), southeast (CWC-361), and south (CWC-361, CWC-363, and CWC-364) of the building (see Figure B-1). Tree and scrub-vegetated areas are located along the northeast, east, and south boundaries near CWC and Lawnview Creek. A narrow grassy strip of land within the subject area is improved with an asphalt and concrete sidewalk connecting Marseille Place and Jana Drive (see Figure B-2).

2.0 Pre-Design Investigation Method

The PDI activities completed by HGL and other USACE contractors documented in this PDIR were implemented at the direction of the USACE in accordance with the FSSP (USACE, 2015) and the following documents:

- *Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge, St. Louis, Missouri* (PDI WP) (USACE, 2019a),
- *Addendum to the Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge: St. Ferdinand Park to Jana School, St. Louis, Missouri* (PDI WP Addendum) (USACE, 2019b),
- *Pre-Design Investigation Work Description, FUSRAP North St. Louis County Sites, St. Louis, Missouri* (PDI WD) (HGL, 2021), and
- *Final Status Survey and Pre-Design Investigation Sampling Work Scope for Jana Elementary School, FUSRAP North St. Louis County Sites, St. Louis, Missouri* (PDI WS) (HGL, 2022).

The activities performed as part of this PDI consisted of the following actions:

- A review of the available historical and geological information,
- Identification of locations for biased (PDI) and systematic (final status survey [FSS]) sampling,
- Collection of PDI/FSS soil samples, and
- A subsequent data review.

2.1 Evaluation of Historical and Geological Information

As part of the PDI planning, a review of the following available historical and geological information sources was conducted to aid in the determination of PDI sample locations:

- Aerial photographs obtained from the St. Louis County Geographic Information System (GIS) Service Center (St. Louis County, 2022), Google Earth (Google, 2022), and East-West Gateway Council of Governments (EWG) (EWG, 2015).
- U.S. Geological Survey (USGS) 7.5-minute topographic maps of the Florissant, Missouri quadrangle (USGS, 1935, 1954, 1968, 1974, 1982, 1994, and 1998).
- Flood hazard areas and floodway data obtained from the St. Louis County GIS Service Center, as identified by the Federal Emergency Management Agency (St. Louis County, 2022).

- Information obtained from other USACE-directed FUSRAP PDI activities adjacent to the subject area documented in the *Pre-Design Investigation Summary Report and Final Status Survey Evaluation for Coldwater Creek (CWC) - Floodplain Properties CWC-307 through CWC-317, CWC-319 through CWC-324, CWC-327 through CWC-330, and CWC-357, St. Louis, Missouri* (USACE, 2023).
- Geologic data from the North St. Louis County sites and the PDI boring logs (see Attachment A-1 and Appendix G in the PDIR/FSSE.

The historical land development activities and/or drainage/erosional features identified during the PDI were compared with the time periods and locations that MED/AEC by-products (residues) were handled, transported, and disposed, as discussed in Attachment A-1, Historical and Geological Evaluation – Coldwater Creek – Jana Elementary School. A determination was then made as to whether radiological contamination may be present around, within, or beneath the historical features identified at the subject area.

2.2 Sample Collection and Borehole Restoration

Biased and systematic samples were collected at various locations within the subject area. At locations where both sample types coincided, the biased sample was used for a dual purpose, thereby reducing the total number of samples required.

Systematic sampling was conducted using an extended Class 2 grid system to ensure samples representative of the entire subject area were collected. Biased sampling focused on target areas identified as having a greater potential for contamination to be present at levels above the ROD RGs (USACE, 2005) and in areas where risk of human exposure would be increased. Target areas within the subject area included low-lying areas beyond the CWC corridor top of bank, but within the 10-year floodplain (see Figure B-3) and high-traffic areas close to the Jana School building.

The PDI sampling was completed using either the hand-sampling or drill rig methods described in the PDI WD, the PDI WP, and the PDI WP Addendum. The specific sampling equipment used for each boring is detailed on the boring logs in Appendix G of the PDIR/FSSE. For both hand-sampling and drill rig sampling methods, soil cores were retrieved and evaluated in 2-foot evaluation lengths, for lithologic description and field screening, until the proposed boring depth was achieved. Within each evaluation length, one or more contiguous, discrete soil samples (typically 0.5 feet long) were collected for laboratory analysis or archiving.

The recovered soil was evaluated by the field geologist to determine whether more than 33 percent of the soil in a given 2-foot evaluation length was unrecoverable. If the field geologist determined that the soil within the given evaluation length was not sufficiently recovered or was “slough” material originating from the upper intervals, a soil sample from the same depth at an adjacent location was collected. See Section 3.0 for details regarding specific recovery issues encountered while sampling.

The sampled material was field screened for radiological activity using a Ludlum Model 2221 scaler/ratemeter together with a Ludlum Model 44-10 (2x2 sodium iodide scintillation detector). During drilling activities, the breathing zone and soil cores were screened for volatile organic compounds using a photoionization detector. The field geologist identified and lithologically described the soil using ASTM International (ASTM) Method D2488-17e1, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)" (ASTM, 2017).

The lithology and screening results were recorded on the boring log at the time of boring advancement. If applicable, attention was paid to identifying the existence of remnant surface horizons, morphological elements (e.g., erosional and depositional features), or other historical indicators (e.g., debris zones). These features may help identify areas of contamination. The available boring logs for sample locations specific to this PDIR are included in Appendix G of the PDIR/FSSE.

Soil samples collected from each evaluation length were submitted under chain-of-custody to the St. Louis FUSRAP Laboratory for analysis of the SLAPS VPs radiological COCs by gamma and alpha spectroscopy, in accordance with the FSSP and the *Sampling and Analysis Guide for the St. Louis Sites, St. Louis, Missouri* (SAG) (USACE, 2000). Soil samples collected for archiving (as indicated on the boring logs in Appendix G of the PDIR/FSSE) were transported to the on-site storage under chain-of-custody in accordance with SAG procedures. Also, in accordance with the SAG, the sampling equipment used was cleaned and decontaminated prior to the collection of the respective soil samples.

Boreholes were abandoned in accordance with the SAG and Missouri Department of Natural Resources (MDNR) requirements (MDNR, 2019 [or previous versions]), described below. The abandoned boreholes were then capped with material consistent with the surrounding surface material.

In general, soil borings were abandoned as follows:

- Boreholes at depths of 9.9 feet below ground surface (bgs) and less were backfilled with bentonite chips.
- Boreholes deeper than 9.9 feet bgs were backfilled with a high-solids bentonite slurry grout.

2.3 Evaluation of Analytical Data

The subject area analytical data were used as the input for interpretation of the PDI results. The gross radiological analytical results (not corrected for the arithmetic mean site background concentrations) for each sample were imported into a working database and analytical data tables (see Appendix F of the PDIR/FSSE). These data tables contain the gross radiological analytical

results and associated net sum-of-ratios (SOR_N) value for each sample after correction for contribution from background. The SOR_N calculations for surface soil (upper 0.5 feet) and subsequent subsurface soil (0.5 feet and greater) are provided in the following expressions (USACE, 2005):

$$SOR_{N\text{-surface}} = \frac{\text{Ra-226}}{5\ \text{pCi/g}} + \frac{\text{Th-230}}{14\ \text{pCi/g}} + \frac{\text{U-238}}{50\ \text{pCi/g}}$$

$$SOR_{N\text{-subsurface}} = \frac{\text{Ra-226}}{15\ \text{pCi/g}} + \frac{\text{Th-230}}{15\ \text{pCi/g}} + \frac{\text{U-238}}{50\ \text{pCi/g}}$$

Where pCi/g = picoCuries per gram, Ra-226 = radium-226, Th-230 = thorium-230, and U-238 = uranium-238

The calculated SOR_N value for each sample was compared to the ROD remediation criteria to determine if radiological contamination was present. A sample with a SOR_N value greater than 1.0 ($SOR_N > 1.0$) was presumed to be contaminated. There were no samples in the study area with a $SOR_N > 1.0$.

2.4 Investigation-Derived Waste

Investigation-derived waste generated during the PDI activities was managed in accordance with applicable USACE contractor procedures and the waste minimization guidelines as specified in the PDI WD, the PDI WP, and the PDI WP Addendum. The waste included soil cuttings, decontamination water, disposable personal protective and sampling equipment, and analyzed soil samples.

2.5 Data Quality Assessment

Data quality objectives (DQOs) were established for the subject area as described in the PDI WD and the PDI WS, as well as the PDI WP and PDI WP Addendum. The DQOs were developed in accordance with the *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006) and provided qualitative and quantitative statements that clarified the analytical project objectives based on the end use of the data being collected. The data quality assessment results for the subject area PDI will be included as part of the associated FSSE.

3.0 Pre-Design Investigation Results and Evaluation

The PDI methods discussed in Section 2.0 did not yield any indication of radiological contamination within the Jana Elementary School subject area. A total of 83 boreholes were sampled to depths of up to 28 feet within or adjacent to the subject area. A total of 41 boreholes were sampled as part of an initial evaluation of the subject area beginning in 2017 (USACE, 2019b). The remaining 42 sample locations were added in 2022 (HGL, 2022) to evaluate the subject area beyond the standard 10-year floodplain conceptual model due to allegations that radiological contamination associated with MED/AEC activities was deposited in areas beyond the estimated 10-year floodplain of CWC (Brustowicz, et al., 2022). A description of these additional sample locations and their rationale can be found in Table B-1.

As discussed in Section 2.2, each interval was evaluated to ensure that a complete representation of the soil column was recorded. In cases where recovery was insufficient, an offset boring of the original sample location was performed to collect additional material. In total, five locations within the subject area required offset borings: SVP263715, SVP264000, SVP264054, SVP264080, and SVP264104. The boring logs for these locations can be found in Appendix G of the PDIR/FSSE.

The analytical results were evaluated in conjunction with the relevant historical and geological information to ensure sampling was performed to sufficient depth to intersect any historical floodplains present at Jana Elementary School. Systematic sample locations situated adjacent to the Jana Elementary School building were drilled to 16 feet bgs, thus projecting well below any historical ground surface level. All sample intervals were evaluated for evidence of fill material. Soils recovered from the entire length of each borehole were inspected in the field by the USACE and USACE-contracted geologists, and no indication of fill material was observed for the sample locations immediately surrounding the Jana Elementary School building. This determination, combined with analysis of historical aerial photos and topographic maps, indicates Jana Elementary School was built on native ground that was not built up with fill material.

Sampling performed to the south and east of the Jana Elementary School building did indicate that up to 5 feet of fill material may have been used to level the playing field behind the school. Fill material was initially suspected in this area due to the general appearance of the topographic contours, and additional evidence was noted including minor differences in the soil composition and color within distinct intervals. All boreholes intersected and surpassed the historical ground surface, which in most parts of the subject area matches the current surface. Sample locations generally increased in depth with proximity to the wooded parcels southeast of the school and CWC to include and exceed the elevation of known contamination within the northwest bank of CWC. Additional biased sampling was also completed near the woods to the south and southeast of Jana Elementary School to further evaluate areas with the highest probability of deposition of

radiologically contaminated soil. Analytical results for these samples did not indicate radiological contamination was present. A complete record of sample analytical data is presented in Appendix F of the PDIR/FSSE. Additionally, boring logs are included in Appendix G of the PDIR/FSSE.

3.1 Historical Study and Evaluation

Aerial photography from 1937, 1966, 1970, and 2008 was used to identify changes in various features and structures within the subject area (see Figures B-1-1 and B-1-2 in Attachment A-1). Features of interest identified include changes in the ground surface level, earthwork, changes in vegetation type and amount, and the demolition and construction of structures within the subject area including the Jana Elementary School building and associated parking lots. The Jana Elementary School was built between 1966 and 1970 on native ground outside of the 10-year floodplain of CWC. Prior to construction, the area was mostly farmland, with a single residential structure occupying the area behind the school to the southeast. At some point after 1970, the residential structure was demolished, and the ground level was raised to level with fill material. This level area now serves as a sports field and play area. The subject area has remained largely unchanged since the mid-1980s except for the addition of a walking path and bridge in the westernmost strip of land. See Attachment A-1 for detailed information regarding the historical and geological evaluation of the subject area.

4.0 Summary and Conclusions

Pre-design investigation activities were completed within the subject area, located in Florissant, Missouri, in 2017 through 2022. The subject area boundary encompasses portions of CWC – Group 24, specifically the Jana Elementary School property owned by the Hazelwood School District (see Figure B-1). The USACE directed HGL and other USACE contractors to perform PDI activities within the subject area to address potential radiological contamination due to flood events associated with CWC. In general, this PDIR documents the PDI activities conducted within the subject area.

Soil sampling beyond the standard 10-year floodplain conceptual model of radiological contamination for properties along CWC was completed due to allegations of MED/AEC-related radiological contamination outside of the estimated 10-year floodplain model area (Brustowicz, et al., 2022). Biased samples and an extended Class 2 grid covering the entire subject area were sampled including locations well beyond the estimated 10-year and 500-year floodplain levels.

The PDI samples collected from within the subject area were analyzed for radiological COCs as specified in the ROD (USACE, 2005). Radiological contamination was not identified within the subject area.

5.0 References

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TABLE

Table B-1
Jana Elementary School Soil PDI
Extended Sampling Rationale
Page 1 of 2

Station ID	Borehole Depth (feet bgs)	Purpose of Borehole
SVP263653	16	Extended Class 2 FSS grid, drilled and sampled to a planned depth of 16 feet bgs.
SVP263671	16	
SVP263693	24	Extended Class 2 FSS location to investigate the potential for intersecting a historical floodplain of CWC.
SVP263808	16	Extended Class 2 FSS grid, drilled and sampled to a planned depth of 16 feet bgs.
SVP263644	16	
SVP263662	16	
SVP263706	16	
SVP263715	28	Extended Class 2 FSS location to investigate the potential for intersecting a historical floodplain of CWC.
SVP264000	16	Extended Class 2 FSS grid, drilled and sampled to a planned depth of 16 feet bgs.
SVP263817	16	
SVP263826	16	
SVP263844	16	
SVP264080	16	
SVP263889	28	Extended Class 2 FSS location to investigate the potential for intersecting a historical floodplain of CWC.
SVP264104	24	
SVP264009	16	Extended Class 2 FSS grid, drilled and sampled to a planned depth of 16 feet bgs.
SVP264018	16	Extended Class 2 FSS grid, drilled and sampled to a planned depth of 16 feet bgs.
SVP263853	16	
SVP263880	16	
SVP264089	28	Extended Class 2 FSS location to investigate the potential for intersecting a historical floodplain of CWC.
SVP263835	16	Extended Class 2 FSS grid, drilled and sampled to a planned depth of 16 feet bgs.
SVP263862	16	
SVP264071	16	
SVP263904	28	Extended Class 2 FSS location to investigate the potential for intersecting a historical floodplain of CWC.
SVP264027	16	Extended Class 2 FSS grid, drilled and sampled to a planned depth of 16 feet.
SVP264062	16	
SVP263871	16	
SVP264036	16	
SVP264054	16	
SVP264045	16	
SVP263680	24	Extended a previously sampled borehole location from approximately 7 to 24 feet bgs to investigate the potential intersect of a historical floodplain of CWC.
SVP263730	24	Biased sampling near the wooded/riparian area adjacent to CWC to investigate the potential to intersect historical buried features including potential floodplain/meander of CWC.
SVP263743	24	
SVP263756	24	

Table B-1
Jana Elementary School Soil PDI
Extended Sampling Rationale
Page 2 of 2

Station ID	Borehole Depth (feet bgs)	Purpose of Borehole
SVP264300	16	Extended Class 2 FSS grid, drilled and sampled to a planned depth of 16 feet.
SVP264291	16	
SVP264151	6	High-traffic area samples planned by and sampled at the direction of the USACE.
SVP264289	6	
SVP264149	6	
SVP264147	6	
SVP264145	6	
SVP263984	6	

bgs = below ground surface
CWC = Coldwater Creek
FSS = final status survey
USACE = U.S. Army Corps of Engineers

FIGURES

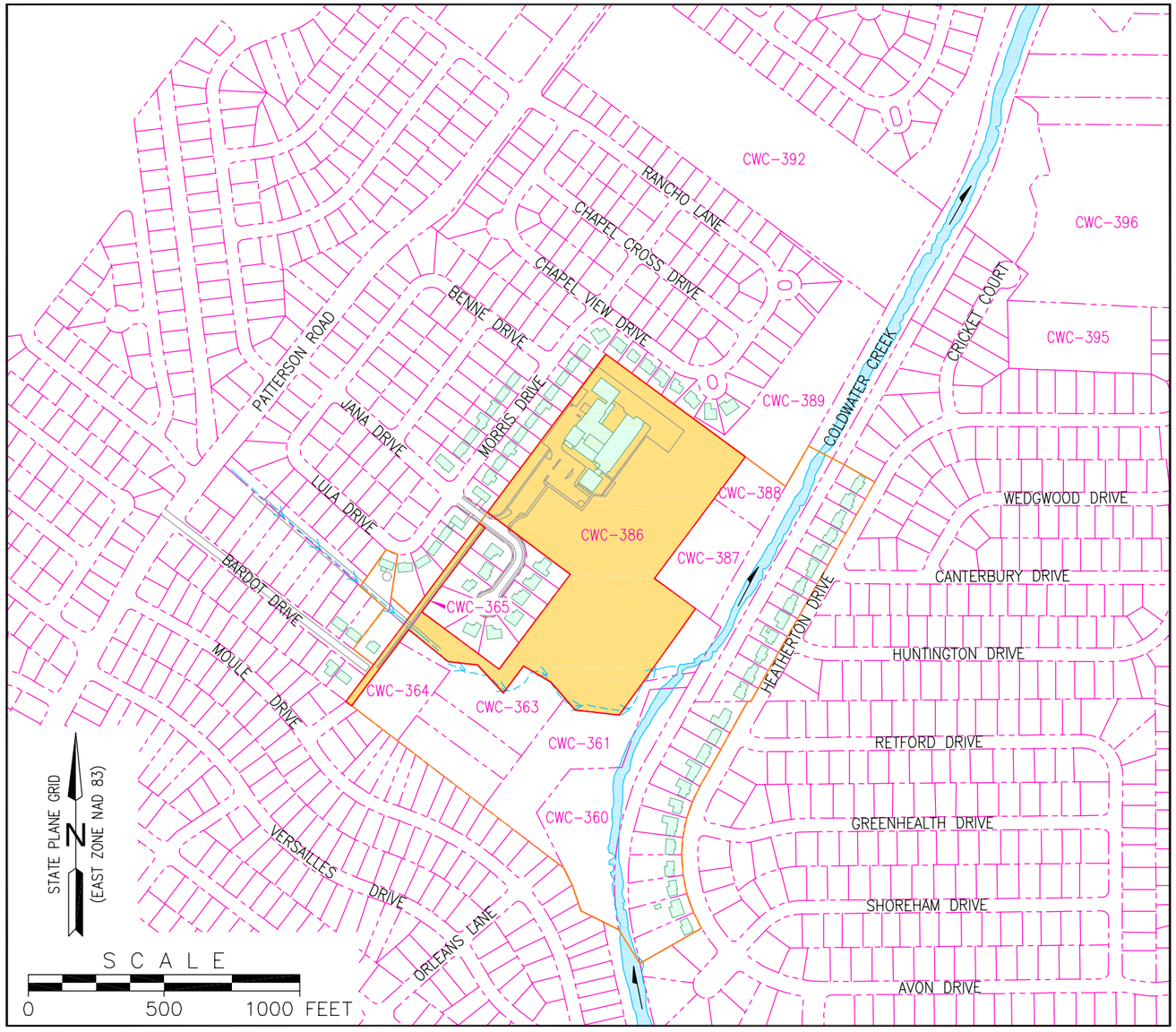
OFFICE STL
Drawing File: 123438-B611

PRE-DESIGN INVESTIGATION SUMMARY REPORT
JANA ELEMENTARY SCHOOL SOIL
FUSRAP NORTH ST. LOUIS COUNTY SITES
ST. LOUIS, MISSOURI

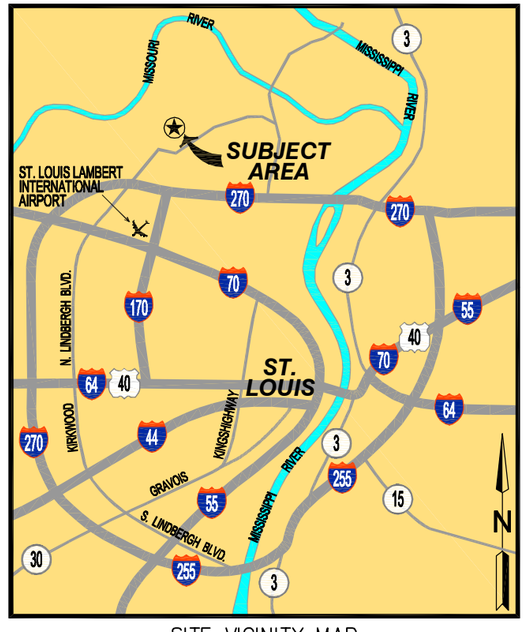
Prepared for:
U.S. ARMY CORPS of ENGINEERS
ST. LOUIS DISTRICT

FIGURE TITLE: FIGURE NUMBER:

COVER SHEET B-1
EXISTING FEATURES, UTILITIES, AND TOPOGRAPHY. B-2
PDI SAMPLE LOCATIONS B-3



SITE LOCATION MAP



SITE VICINITY MAP
NOT TO SCALE

UTILITY NOTES:

EXISTING UTILITIES SHOWN HEREON ARE LOCATED ACCORDING TO AVAILABLE PUBLIC AND PRIVATE MAPS AND SURVEYS. LOCATIONS ARE ASSUMED TO BE APPROXIMATE AND SHOULD BE FIELD VERIFIED BEFORE SAMPLING BEGINS.

CALL BEFORE YOU DIG: 800-DIG-RITE.
MISSOURI LAW REQUIRES THAT ANY PERSON MAKING OR BEGINNING ANY EXCAVATION/DRILLING NOTIFY ALL UNDERGROUND FACILITY OWNERS/OPERATORS WHICH MAY BE AFFECTED BY SAID EXCAVATION AT LEAST THREE BUT NOT MORE THAN TEN WORKING DAYS IN ADVANCE, EXCEPT IN THE CASE OF AN EMERGENCY.

ABBREVIATIONS:

FSSE = FINAL STATUS SURVEY EVALUATION
FUSRAP = FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM
MSL = MEAN SEA LEVEL
NAD = NORTH AMERICAN DATUM
PDI = PRE-DESIGN INVESTIGATION
SOR_N = NET SUM-OF-RATIOS
USACE = UNITED STATES ARMY CORPS OF ENGINEERS

GENERAL LEGEND:

- APPROXIMATE PROPERTY LINE
- CWC-386 — PROPERTY ID
- SUBJECT AREA BOUNDARY
- SUBJECT AREA
- GROUP 24 BOUNDARY
- EXISTING BUILDING (INCLUDING TEMPORARY BUILDING)
- 510 — EXISTING GROUND CONTOUR (ELEVATION IN FEET ABOVE MSL)
- EDGE OF PAVEMENT
- CHANNEL FLOW DIRECTION
- SURFACE DRAINAGE AND FLOW DIRECTION
- G — GAS LINE
- W — WATER LINE
- S — SANITARY SEWER LINE
- ST — STORM SEWER LINE
- UE — UNDERGROUND ELECTRIC LINE
- FO — FIBER OPTIC LINE
- OC — OVERHEAD COMMUNICATION LINE
- GRATED INLET

Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/17/23	D. Williams

HGL FUSRAP

Designed by: P. Ciuffini	COVER SHEET JANA ELEMENTARY SCHOOL SOIL U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI		
Drawn by: T. May/M. Herzog			
Checked by: M. Cummings	Scale: As Shown	Figure Number: B-1	Sheet: –
Approved by: A. Neil DeYong	Drawing File: 123438B611.dwg		Contract No. W912P9-19-D-0011

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Plot Date/Time: May 17, 2023 - 2:59pm
Plotted By: mherzog

OFFICE STL
Drawing File: 123438-B611

BENNE DRIVE
ROBERT DRIVE
MORRIS DRIVE
CHAPEL VIEW DRIVE
JANA ELEMENTARY SCHOOL
JANA DRIVE
LULA DRIVE
BARDOT DRIVE
MARSELLE PLACE
HEATHERTON DRIVE
RETFORD DRIVE
COLDWATER CREEK
LAWNVIEW CREEK

CWC-361
CWC-362
CWC-363
CWC-364
CWC-365
CWC-366
CWC-367
CWC-368
CWC-369
CWC-381
CWC-382
CWC-383
CWC-384
CWC-385
CWC-386
CWC-387
CWC-388
CWC-389
CWC-327
CWC-328
CWC-329
CWC-330

GENERAL NOTE:

SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.

STATE PLANE GRID
N
(EAST ZONE NAD 83)

SCALE
0 150 300 FEET

Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/17/23	D. Williams

HGL FUSRAP

Designed by: P. Ciuffini	EXISTING FEATURES, UTILITIES, AND TOPOGRAPHY JANA ELEMENTARY SCHOOL SOIL U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI		
Drawn by: T. May/M. Herzog			
Checked by: M. Cummings	Scale: As Shown	Figure Number: B-2	Sheet: –
Approved by: A. Neil DeYong	Drawing File: 123438B611.dwg		Contract No. W912P9-19-D-0011

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Plot Date/Time: May 17, 2023 - 3:00pm
Plotted By: mherzog

OFFICE STL
Drawing File: 123438-B611

BENNE DRIVE
ROBERT DRIVE
MORRIS DRIVE
CHAPEL VIEW DRIVE
JANA DRIVE
LULA DRIVE
BARDOT DRIVE
MARSELLE PLACE
HEATHERTON DRIVE
RETFORD DRIVE
JANA ELEMENTARY SCHOOL
COLDWATER CREEK
LAWNVIEW CREEK

CWC-361
CWC-362
CWC-363
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CWC-330

SVP264149 SVP264045 SVP264289 SVP264036 SVP264151 SVP264027 SVP264054 SVP264147 SVP264145 SVP263871 SVP264062 SVP263835 SVP263862 SVP264071 SVP263904 SVP190267 SVP264009 SVP264018 SVP263853 SVP263880 SVP264089 SVP190263 SVP264000 SVP263817 SVP263826 SVP263844 SVP264080 SVP263889 SVP264104 SVP263984 SVP263808 SVP263644 SVP263662 SVP263706 SVP263715 SVP190247 SVP201660 SVP263653 SVP263671 SVP263693 SVP264291 SVP264300 SVP190221 SVP263680 SVP190223 SVP190227 SVP190177 SVP190179 SVP190181 SVP190183 SVP190187 SVP190157 SVP190159 SVP190309 SVP190137 SVP190319 SVP190139 SVP190325 SVP190161 SVP190163 SVP190167 SVP190169 SVP190171 SVP263756 SVP190145 SVP190147 SVP190149 SVP190153 SVP263730 SVP263743 SVP190335 SVP190337 SVP190329 SVP190123 SVP190125 SVP190129 SVP190119 SVP190121 SVP190343 SVP190353 SVP190365 SVP207127 SVP207131 SVP207129

GENERAL NOTE:

SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.

SAMPLE LEGEND:

SYMBOL	ID	DESCRIPTION
⊕	SVPxxxxxx	FSSE SYSTEMATIC SAMPLE LOCATION WITH $SOR_N \leq 1.0$
⊕	SVPxxxxxx	PDI SAMPLE LOCATION WITH $SOR_N \leq 1.0$

STATE PLANE GRID
N
(EAST ZONE NAD 83)

SCALE
0 150 300 FEET

Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/17/23	D. Williams

HGL FUSRAP

Designed by: P. Ciuffini	PDI SAMPLE LOCATIONS JANA ELEMENTARY SCHOOL SOIL U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI		
Drawn by: T. May/M. Herzog	Scale: As Shown	Figure Number: B-3	Sheet: –
Checked by: M. Cummings	Drawing File: 123438B611.dwg		Contract No. W912P9-19-D-0011
Approved by: A. Neil DeYong			

File: X:\123438\North St. Louis County Sites\Coldwater Creek\Reach C\Group 24 Jana School\123438B611.dwg
Plot Date/Time: May 17, 2023 - 3:00pm
Plotted By: mherzog

Attachment A-1

Historical and Geological Evaluation - Coldwater Creek – Jana Elementary School

Historical and Geological Evaluation - Coldwater Creek – Jana Elementary School

As described in the *Record of Decision for the North St. Louis County Sites, St. Louis, Missouri* (ROD) (U.S. Army Corps of Engineers [USACE], 2005), Mallinckrodt Chemical Works (now known as Mallinckrodt LLC [Mallinckrodt]) was under contract with the Manhattan Engineer District (MED)/U.S. Atomic Energy Commission (AEC) to process uranium ore and ore concentrates for the production of uranium metal between 1942 and 1957. This process work, performed at Mallinckrodt's St. Louis downtown facility, generated large quantities of byproduct waste that required management. In 1946, the AEC acquired a 21.7-acre site (now known as the St. Louis Airport Site [SLAPS]) near St. Louis Lambert International Airport for the storage and management of the byproduct waste, which included process residues and metal scraps, from Mallinckrodt's uranium processing activities.

In the mid- to late-1960s, the SLAPS residues were purchased and transported by truck to the property now known as Futura Coatings Company (Futura) for storage, and later shipped to Cañon City, Colorado. In 1973, the last of the MED/AEC residues were removed from Futura. Between 1977 and 1986, the U.S. Department of Energy used the property now known as the Hazelwood Interim Storage Site (HISS), located immediately east of Futura, to store radiologically contaminated material that was generated during a series of property development projects at Futura, Latty Avenue, and other nearby Latty Avenue properties. As described in the ROD, this material was consolidated and maintained in interim storage piles until they were subsequently removed.

The SLAPS, Futura, and HISS properties are located adjacent to Coldwater Creek (CWC) and upstream of Jana Elementary School (the subject area). These properties may have been subject to rain events and/or flooding that could have carried MED/AEC byproducts (residues) into the CWC corridor and floodplain areas. This historical evaluation is focused on determining anthropogenic and geomorphic changes to the subject area that could have resulted in the burial or removal of residues originating from the SLAPS, Futura, and HISS. The available aerial photography and topographic maps (listed in Section 2.1 of the Pre-Design Investigation Summary Report [PDIR]) were compared with the times and locations that MED/AEC byproducts (residues) were handled, transported, and disposed of to gather information for subsequent pre-design investigation boring locations. The following sections present a summary of the relevant information gathered about historical land use and development activities that occurred in the subject area.

A.1 Historical Land Use – Jana Elementary School

According to the available historical information, CWC was channelized or straightened sometime before 1937. The 1927 and 1933 historical topographic maps depict meanders in CWC, while the

1935 historical topographic map shows the historic meanders as intermittent streams with the modern stream profile present (U.S. Geological Survey, 1927, 1933, and 1935). In the 1937 aerial photograph, the modern stream profile of CWC is evident as a straight line at the location of the modern-day Jana Elementary School building's eastern border (St. Louis County, 2022). Much of the eastern side of the subject area is covered with a large riparian area. The majority of the subject area is undeveloped farmland with a structure present at the location of the modern-day Jana Elementary School building. A secondary drainage area with well-developed meanders and no riparian areas is noted along the southwestern border of the subject area, likely directing runoff from the surrounding farm fields to CWC. The only main road present during this time is modern-day Patterson Road to the west of the subject area.

By 1955, both CWC and the southwestern drainage area show evidence of more vegetation, and the number of structures present at the location of Jana Elementary School has increased (St. Louis County, 2022). Based on the *Floods in Coldwater Creek, Watkins Creek, and River des Peres Basins, St. Louis County, Missouri* (USGS, 1971) report, during 1957, CWC floodwaters overtopped the established 10-year floodplain. Floodwaters may have inundated the riparian areas along the western bank of the creek but do not appear to have advanced beyond the eastern edges of what are now modern-day soccer fields behind and due east of Jana Elementary School (see Figure B-1-1).

In the 1966 aerial photograph (see Figure B-1-1), large swathes of residential properties have been constructed to the west and southwest of the subject area, and across CWC to the east, replacing the farmland that had surrounded the subject area (St. Louis County, 2022). The riparian areas have been cleared from the banks of CWC and from the southwestern drainage area, which still shows well-developed meanders at its intersection with CWC. The number of structures present where modern-day Jana Elementary School resides has decreased so that only one building is evident, and the subject area itself is still undeveloped farmland, as is the land to the north and northeast.

By 1970, Jana Elementary School had been built to the west of the pre-existing structure visible in earlier aerial photographs (see Figure B-1-2) (St. Louis County, 2022). Modern (2017 and present) topographic contours indicate that Jana Elementary School was built on the highest portion of the subject area. Based on the location of CWC and the southwestern drainage area, it appears that runoff from the historical farm fields was directed to the east and southwest of the pre-existing structure, downhill from modern-day Jana Elementary School. The school is composed of a western wing facing Morris Drive, an eastern wing of roughly equal proportions to the western wing, and a narrow central building which appears to connect the two wings. A parking lot is situated adjacent to the school building against its south end and connects to Jana Drive. A large concrete pad of unknown application is situated adjacent to the north end of the school. The pre-existing structure still appears to be present behind and due east of Jana Elementary School

and to the west of CWC. Sparse vegetation is evident along the southwestern drainage stream and in areas along the western bank of CWC. Few changes occur within the subject area between the 1970 and the 1981 aerial photographs, except that the pre-existing structure has been demolished, leaving an empty grass field between Jana Elementary School and CWC; the parking lot south of the elementary has been expanded; and the riparian areas along the banks of CWC are more extensive (St. Louis County, 2022).

The following changes to the subject area from the 1995, 2000, and 2002 aerial photographs are listed below and are visible in the 2008 aerial photograph (Figure B-1-2) (St. Louis County, 2022):

- The pre-existing structure behind Jana Elementary School has been demolished, and the parking lot south of the school building, as well as the riparian areas along CWC, have expanded.
- A large residential area north of the subject area and a smaller residential cul-de-sac south of the subject area have been constructed.
- A small concrete pad against the northeastern corner and a building connecting to the south end of the eastern wing of Jana Elementary School have been added to the school building. The grass field east of the school has been turned into soccer fields.
- Riparian areas on the southwestern, eastern, and northeastern borders of the subject area have expanded.
- A strip of land has been cleared between the riparian area east of Jana School and the western bank of CWC.

No changes appear to occur to the subject area in the 2002, 2004, and 2006 aerial photographs (St. Louis County, 2022). By the 2008 aerial photograph, an addition to the school building has been constructed in the space adjacent to the south of the central hallway and between the eastern and western wings (see Figure B-1-2) (St. Louis County, 2022). The new section appears to connect to all three parts of the existing building. No other changes to the subject area appear to have occurred in the 2010, 2012, 2014, 2016, and 2018 aerial photographs (St. Louis County, 2022).

A.2 Geological Setting – Jana Elementary School

The North St. Louis County sites, as defined by the ROD, are situated on a modest upland area between the Missouri and Mississippi River floodplains in North St. Louis County, Missouri. The upland area surrounds a topographic depression known as the Florissant Basin. Pleistocene sediments and recent surficial material (including clay and silt deposits that originated from former glacial advances, historical Missouri and Mississippi River flooding, and/or more recent fill activities) overlie shale and limestone bedrock which is present at an estimated depth of

approximately 100 feet below ground surface (bgs). Faulting is not evident in the area, and bedrock at depth appears to be almost flat.

Coldwater Creek is the major drainage mechanism for the North St. Louis County sites, and it discharges into the Missouri River downstream from the subject area. The flow volume within CWC increases as it travels from its origin south of St. Louis Lambert International Airport to its discharge into the Missouri River. Portions of the subject area fall within the CWC 10-year floodplain (see Figures 14, 15, and 25 of the *Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge, St. Louis, Missouri* [PDI WP] [USACE, 2019a]). According to the PDI WP, boundaries of the 10-year floodplain were determined through the study of historic 10-year flood elevations for CWC and appropriate Light Detection and Ranging-based elevation information. According to the *Feasibility Study for the St. Louis North County Site, St. Louis, Missouri* (USACE, 2003), flooding in CWC occurs annually, and most of the flooding results from short-term, high-intensity thunderstorms that cause flash floods.

Topographically, the ground surface within the subject area slopes toward CWC to the east of Jana Elementary School and the southwestern drainage area (see Figure B-2 of this PDIR [Appendix B of the *Pre-Design Investigation Summary Report and Final Status Survey Evaluation for Jana School Soil (Partial) – Including Coldwater Creek (CWC)-Floodplain Properties CWC-365 and CWC-386*]). The building sits at 510 feet mean sea level (msl), with the northwestern parking lot at 511 feet msl and the southern parking lots sloping to the south from the edge of the building to 504 feet msl at the intersection with Jana Drive. The northern concrete pads, which generally seem to be used for student recreation, slope north-northeast toward CWC from approximately 510 to 505 feet msl. The undeveloped grass field to the east of the school building meets the building at approximately 510 feet msl and slopes toward CWC, meeting the large riparian area at approximately 498 feet msl. The field also slopes toward the southwestern drainage area, meeting it at an elevation of approximately 496 feet msl. The riparian area slopes to a topographic low of 492 feet msl, then meets a shallow ridge with a maximum height of 502 feet msl. The ridge slopes steeply east down to the creek bed at approximately 474 feet msl, and shallowly southwest to the undeveloped grass field which is at approximately 497 feet msl. The ridge continues past the subject area boundary to the north-northeast, roughly paralleling the CWC stream profile.

Chemical and hydrologic characteristics define five hydrostratigraphic (water property) zones (HZs) at the North St. Louis County sites. The shallow groundwater zone, HZ-A, consists of fill, silts, and clays. Underlying HZ-A are HZ-B, which consists of highly impermeable clay, and HZ-C, which consists of silty clay and clayey silt deposits. The underlying shale and limestone bedrock are recognized as HZ-D and HZ-E, respectively. The limestone aquifer (HZ-E) is the protected aquifer for the area. The uppermost HZ, HZ-A, cannot be considered a viable source of potable water because of its low recharge rate and the presence of chemical pollutants from the highly industrialized North St. Louis County region. The groundwater in HZ-A generally flows to

the west and northwest. The PDI sampling activities completed within the subject area were within HZ-A.

The soils within the subject area generally consist of variable brown and gray silt, clayey silt, and silty clay, with occasional mottling, iron oxide staining and manganese oxide nodules, and traces of gravel, marine fossils, and sand. Layers of wood, organics, and peat were observed at varying thicknesses and at depths of up to 28 feet bgs across the subject area.

OFFICE STL
Drawing File: 123438-B611



1937 AERIAL PHOTOGRAPH



1966 AERIAL PHOTOGRAPH

PHOTOGRAPH SOURCES:

1937 AERIAL PHOTOGRAPH:
ST. LOUIS COUNTY, 2023, PROPERTY LOOKUP, ST. LOUIS COUNTY, MISSOURI, PREPARED BY ST. LOUIS COUNTY GIS SERVICE CENTER, ST. LOUIS, MISSOURI
https://data.stlouisco.com/apps/property-lookup/explore/

1966 AERIAL PHOTOGRAPH:
ST. LOUIS COUNTY, 2023, PROPERTY LOOKUP, ST. LOUIS COUNTY, MISSOURI, PREPARED BY ST. LOUIS COUNTY GIS SERVICE CENTER, ST. LOUIS, MISSOURI
https://data.stlouisco.com/apps/property-lookup/explore/

STATE PLANE GRID (EAST ZONE NAD 83)
N

SCALE
0 250 500 FEET

Revisions

Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/17/23	D. Williams

HGL FUSRAP

Designed by: P. Ciuffini
Drawn by: M. Herzog
Checked by: M. Cummings
Approved by: A. Neil DeYong

1937 AND 1966 AERIAL PHOTOGRAPHS
JANA ELEMENTARY SCHOOL SOIL
U.S. ARMY CORPS OF ENGINEERS
FUSRAP NORTH ST. LOUIS COUNTY SITES
ST. LOUIS, MISSOURI

Scale: As Shown
Figure Number: B-1-1
Sheet: -
Drawing File: 123438B611.dwg
Contract No. W912P9-19-D-0011

File: X:\123438\North St. Louis County Sites\Coldwater Creek\Reach C\Group 24 Jana School\123438B611.dwg
Plot Date/Time: May 17, 2023 - 4:10pm
Plotted By: mherzog

OFFICE STL

Drawing File: 123438-B611



1970 AERIAL PHOTOGRAPH

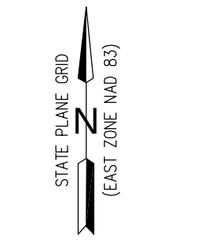


2008 AERIAL PHOTOGRAPH

PHOTOGRAPH SOURCES:

1970 AERIAL PHOTOGRAPH:
ST. LOUIS COUNTY, 2023, PROPERTY LOOKUP, ST. LOUIS COUNTY, MISSOURI, PREPARED BY ST. LOUIS COUNTY GIS SERVICE CENTER, ST. LOUIS, MISSOURI
https://data.stlouisco.com/apps/property-lookup/explore/

2008 AERIAL PHOTOGRAPH:
ST. LOUIS COUNTY, 2023, PROPERTY LOOKUP, ST. LOUIS COUNTY, MISSOURI, PREPARED BY ST. LOUIS COUNTY GIS SERVICE CENTER, ST. LOUIS, MISSOURI
https://data.stlouisco.com/apps/property-lookup/explore/



SCALE
0 250 500 FEET

Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/17/23	D. Williams

HGL FUSRAP

Designed by: P. Ciuffini	1970 AND 2008 AERIAL PHOTOGRAPHS JANA ELEMENTARY SCHOOL SOIL U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI		
Drawn by: M. Herzog			
Checked by: M. Cummings	Scale: As Shown	Figure Number: B-1-2	Sheet: -
Approved by: A. Neil DeYong	Drawing File: 123438B611.dwg		Contract No. W912P9-19-D-0011

File: X:\123438\North St. Louis County Sites\Coldwater Creek\Reach C\Group 24 Jana School\123438B611.dwg
Plot Date/Time: May 17, 2023 - 4:11pm
Plotted By: mherzog

APPENDIX C

GAMMA RADIOACTIVITY WALKOVER SURVEY

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GAMMA RADIOACTIVITY WALKOVER SURVEY

Many radioactive contaminants can be identified through field detection methods such as a GWS. (Field detection methods are generally not available for detection of non-radioactive contaminants, which rely solely on laboratory analysis of field samples.) While radioactive contaminants that emit gamma radioactivity can be detected through a GWS, the contaminants are not the only radioactivity that may be detected. The GWS detects radioactivity from both naturally occurring sources and environmental contamination, and both are present in the GWS results. In areas with higher levels of naturally occurring radioactivity, higher GWS readings will occur even though the soil radionuclide RG is met. The GWS is used as a qualitative tool to help locate potential radioactive contamination, even though the ROD does not specify a maximum GWS result (in cpm). Elevated GWS readings are used to prompt investigation of areas, applying as necessary the methods that quantitatively determine if the soil radionuclide RG has been exceeded.

Before starting the GWS, professional survey technicians establish the relative general area ambient background gamma count rate (in cpm) for the specific survey area with the survey instrument being used. The GWS is performed by walking approximately parallel lines while moving a 2-inch-by-2-inch NaI gamma scintillation detector coupled to a scaler/rate meter in a serpentine pattern. This pattern allows the lines to be approximately 1 m apart. During the GWS, the technicians assess the count rates displayed on the instrument and the associated audible click rates to identify locations (by paint or flag) requiring investigation.

Professional health physicists review the GWS results and define locations from which any additional representative biased soil samples should be collected. This review considers the following:

- Count rates and mathematical analysis of the count rates;
- Existing sample information in the area(s) of interest;
- Increased gamma count rates from materials with higher concentrations of naturally occurring radioactivity (e.g., granite, brick, some concrete, coal or coal ash, and road salt);
- Increased gamma count rates from soil located perpendicular to the surveyed surface (e.g., in an excavation or next to a hill or mound);
- Attempts to duplicate higher count rates; and
- Experience with variations in the gamma count rates of soil.

As an example of the wide variation of naturally occurring radioactivity in soil, the laboratory analytical results for soil samples collected to establish background levels for the North St. Louis County Sites identified some samples with radionuclide concentrations that were 50 percent higher than the average of the background results.

GWS figures are developed using a geographic information system (GIS). The GWS results (in count rates) and the location coordinates are translated into a map of colored data points. GWS figures are a composite of data collected on different days with different instruments. For areas without remediation, the higher results are plotted on top of lower results. If remediation occurred, the most recent files of current conditions are plotted on top of older data files.

The range for the colors applied to the data points is calculated using the mean and standard deviation of the count rate from each GWS, with a factor to account for count rate variability that surveyors can distinguish from general levels. Environmental data do not generally fit a normal

distribution and require use of non-parametric tests (DoD 2000). Accordingly, Chebyshev's Inequality for non-parametric data is used for setting the ranges of the colors for the GWS data. The 85th and 95th percentile of the data are chosen to focus on areas of interest with higher cpm. The 85th percentile means that 85 percent of the data have values less than the 85th percentile value; the 95th percentile is similarly defined. To achieve the 85th percentile of the data, a 1.83 factor from Chebyshev's Inequality is applied to the calculated standard deviation for each GWS data file. To achieve the 95th percentile of the data, a 3.15 factor from Chebyshev's Inequality is applied to the calculated standard deviation. To mathematically account for the count rate variability that surveyors can distinguish from general levels, a factor is added to these percentile values to determine the color set points for each GWS file. This factor is calculated using equations 6.2, 6.11, and 6.16 from NUREG-1507, *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions* (NRC 2020).

An area represented by red on a GWS figure indicates an area of interest for investigation. However, not every red data point is sampled. In some cases, a sampled location is representative of multiple areas of interest based on a professional health physicist review, as previously described. For each GWS-based soil sample, the technicians and professional health physicists determine the area of elevated readings that is represented by the biased sample. For CWC-365 and CWC-386, this area was determined by the technicians using their instruments to find where the auditory clicks and readings are elevated and then recording the area in a logbook (Appendix F). The GWS of CWC-365 and CWC-386 resulted in the collection of 263,879 measurements (Figure 3 and Appendix C [distributed as a separate electronic file]). Based on the GWS, three biased soil samples were collected for this FSSE. The red area shown on Figure 3 near the southern corner of the building on CWC-386 was determined to be caused by the presence of fire brick, which has higher levels of naturally occurring radioactivity, resulting in higher count rates.

The GPS used for the GWS has inherent variability in identifying location coordinates. Some of the GWS data points may be, or may appear to be, outside the subject area or SU boundaries due to structural interferences and/or variance in the GPS and the GIS. Sample station coordinates are obtained after the GWS with civil survey-grade equipment. Thus, elevated GWS readings and their corresponding soil samples may have different coordinates and may be separated by several feet on the figures when, in reality, they are in the same location. The accuracy of these GPS units is approximately 10 ft for optimal conditions without buildings, trees, and other taller objects.

GWS detection sensitivities were determined following the guidance of MARSSIM and NUREG-1507. Based on the methodology, parameters, and calculations contained in Appendix E of the FSSP (USACE 2015), the radionuclide COCs are demonstrated to collectively produce sufficient gamma radioactivity to reliably detect when the average SOR_N over 100 m^2 exceeds 1.0.

APPENDIX D

GAMMA RADIOACTIVITY WALKOVER SURVEY FILE

(Distributed as a Separate Electronic File)

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APPENDIX E

DETERMINATION OF THE MINIMUM NUMBER OF SYSTEMATIC SOIL SAMPLE STATIONS

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DETERMINATION OF THE MINIMUM NUMBER OF SYSTEMATIC SOIL SAMPLE STATIONS

The number of soil sample stations estimated for CWC-365 and CWC-386 was based on experience with other properties. The following retrospective analysis confirms that systematic soil samples were collected from an adequate number of stations.

FOR SOIL SURVEY UNITS

To meet the minimum statistical requirements (i.e., WRS Test) for each soil SU, MARSSIM guidance (DoD 2000) provides a method for determining the minimum number of soil sample stations. The necessary parameters for calculating the minimum number of soil sample stations and their values are as follows.

- Type I error probability (probability of a false decision that the radionuclide RGs are met when they are actually not met)—set at 0.05 per the FSSP (USACE 2015).
- Type II error probability (probability of a false decision that the radionuclide RGs are not met when they are actually met)—normally set at 0.20 per the FSSP, with allowed values ranging from 0.05 to 0.25.
- DCGL—set at SOR_N = 1.0 per the ROD (USACE 2005a).
- Variability of the contaminant concentration (i.e., standard deviation [σ])—set based upon engineering estimates for the SU per MARSSIM. Examples include calculating the effective standard deviation (σ_{eff}) for multiple radionuclides using characterization or screening soil sample results from the SU, and using a historical effective standard deviation based on soil samples collected previously from other SUs within the North St. Louis County Sites.
- Lower bound of the gray region (LBGR)—set based upon engineering estimates for the SU per MARSSIM guidance. Examples include using the mean SOR_N calculated from characterization or screening soil samples in the SU, and using half of the DCGL as a reasonable starting point per MARSSIM. The LBGR is the SOR_N value at which the Type II error is specified, and is adjustable to achieve the desired relative shift (Δ/σ) between 1.0 and 3.0.

The effective standard deviation is calculated for each SU using analytical results from the systematic FSS soil samples. The calculation treats all soil samples as surface samples, which ensures the estimated number of required soil sample stations is greater than the actual minimum. The calculation uses the greater of the standard deviation values for each radionuclide between the SU (Appendix H) and the background reference area (Appendix F).

As an example of this calculation, the effective standard deviation value (in pCi/g) for SU-1 is calculated using the standard deviation value for SU-1 for Th-230 because it is greater than or equal to its reference area counterpart. The reference area standard deviation values for Ra-226 and U-238 are used because they are greater than their SU-1 counterparts.

$$\sigma_{eff}^{SU-1} = \sqrt{\frac{\sigma_{Ra-226}^2}{DCGL_{Ra-226}^2} + \frac{\sigma_{Th-230}^2}{DCGL_{Th-230}^2} + \frac{\sigma_{U-238}^2}{DCGL_{U-238}^2}} = \sqrt{\frac{0.19^2}{5^2} + \frac{0.32^2}{14^2} + \frac{0.28^2}{50^2}} = 0.04$$

The next step is to calculate the relative shift. For this calculation, the LBGR is set to the mean SOR_N value of the systematic sample results for the SU. Based on MARSSIM guidance (DoD 2000), the LBGR does not require adjustment to obtain a relative shift between 1.0 and 3.0 when the calculation uses FSS sample results.

$$Relative\ Shift = \frac{\Delta}{\sigma_{eff}} = \frac{DCGL - LBGR}{\sigma_{eff}} = \frac{DCGL - SOR_N^{mean}}{\sigma_{eff}} = \frac{1.0 - 0.02}{0.04} = 24.5$$

The calculated value for the relative shift is used to obtain the measure of probability, P_r, from MARSSIM Table 5.1. MARSSIM Table 5.1 is used because the WRS Test applies to soil SUs. For a relative shift of 24.5, P_r is assigned a value of 1. The combined minimum number of sample stations from the reference area and this SU necessary to satisfy requirements, N, is calculated using the following MARSSIM equation. $Z_{1-\alpha}$ and $Z_{1-\beta}$ are critical values that can be found in MARSSIM Table 5.2 using a Type I error of 5 percent and a Type II error of 20 percent established by the DQO process.

$$N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{3(P_r - 0.5)^2} = \frac{(1.645 + 0.842)^2}{3(1 - 0.5)^2} = 8.2$$

The uncertainty associated with the calculation, N, should be accounted for during survey planning; thus, the number of data points is increased by 20 percent and rounded up to yield the minimum number of sample stations required, or N^*. This ensures sufficient data points to allow for any possible unusable or unavailable data.

$$N^* = 8.2 + 0.2(8.2) = 10\ Sample\ Stations$$

Normally, samples are collected from $N^*/2$ stations in the SU and from $N^*/2$ stations in the reference (background) area. However, the statistical methods are still valid if an unequal number of sample stations exists between the SU and its reference area.

$$\frac{N^*}{2} = \frac{10}{2} = 5\ Sample\ Stations$$

Therefore, five sample stations are required in the reference area and five sample stations are required in SU-1. The actual number of systematic soil sample stations in SU-1 was seven. The actual number of systematic soil sample stations exceeds the minimum required number of soil sample stations, which supports the use of the soil sample analytical results for the FSS.

APPENDIX F

SOIL SAMPLE DATA

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Table F-1. Final Status Survey Soil Sample Analytical Data

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
1	HTZ250128	HTZ250128	872149	1086031	508.1	11/07/2022	0.0	0.0	0.5	0.1	0.14	0.24	UJ	-0.21	0.47	0.78	UJ	1.00	0.26	0.05	=	0.80	0.11	0.05	=	1.18	0.39	0.20	J	2.07	0.5	0.16	=	0.97	0.3	0.20	=	0.06	0.16	0.26	UJ	1.08	0.18	0.3	=	0.05
1	SVP263853	SVP263853	872066	1085885	507.4	11/01/2022	0.0	0.0	0.5	0.06	0.20	0.35	UJ	0.71	0.72	1.29	UJ	0.98	0.26	0.08	=	0.83	0.13	0.08	=	1.58	0.46	0.19	=	1.78	0.49	0.19	J	1.41	0.43	0.19	=	0.10	0.25	0.43	UJ	1.25	0.26	0.4	=	0.03
		SVP263854	872066	1085885	507.4	11/01/2022	0.0	1.5	2.0	-0.06	0.20	0.33	UJ	-0.25	0.72	1.21	UJ	0.87	0.23	0.07	=	0.82	0.11	0.08	=	1.28	0.36	0.15	=	1.55	0.41	0.12	J	1.18	0.35	0.15	=	-0.01	0.24	0.40	UJ	1.33	0.27	0.4	=	0.00
		SVP263855	872066	1085885	507.4	11/01/2022	0.0	3.0	3.5	0.01	0.14	0.23	UJ	0.12	0.54	0.92	UJ	1.09	0.28	0.06	=	0.94	0.11	0.06	=	1.54	0.42	0.17	=	2.01	0.50	0.17	J	1.17	0.36	0.17	=	0.08	0.18	0.31	UJ	1.43	0.23	0.3	=	0.02
		SVP263856	872066	1085885	507.4	11/01/2022	0.0	5.5	6.0	0.04	0.13	0.22	UJ	0.10	0.49	0.83	UJ	1.02	0.26	0.05	=	0.86	0.11	0.05	=	1.05	0.32	0.15	=	1.32	0.37	0.15	J	0.84	0.29	0.15	=	0.05	0.17	0.29	UJ	1.20	0.20	0.3	=	0.00
		SVP263857	872066	1085885	507.4	11/01/2022	0.0	7.5	8.0	-0.02	0.15	0.25	UJ	-0.16	0.54	0.90	UJ	0.93	0.24	0.06	=	0.78	0.10	0.05	=	1.01	0.34	0.18	=	1.34	0.40	0.14	J	0.98	0.33	0.18	=	-0.07	0.18	0.30	UJ	0.84	0.16	0.3	=	0.00
		SVP263858	872066	1085885	507.4	11/01/2022	0.0	9.5	10.0	0.02	0.13	0.22	UJ	-0.10	0.50	0.84	UJ	1.16	0.29	0.05	=	0.85	0.10	0.05	=	1.06	0.32	0.15	=	1.52	0.39	0.12	J	1.08	0.32	0.15	=	-0.01	0.17	0.29	UJ	1.18	0.20	0.3	=	0.00
		SVP263859	872066	1085885	507.4	11/01/2022	0.0	11.0	11.5	0.02	0.13	0.22	UJ	-0.01	0.49	0.83	UJ	0.95	0.25	0.05	=	0.92	0.11	0.05	=	1.17	0.37	0.15	=	1.60	0.45	0.18	J	1.37	0.41	0.18	=	-0.09	0.17	0.28	UJ	1.10	0.20	0.3	=	0.00
		SVP263860	872066	1085885	507.4	11/01/2022	0.0	13.5	14.0	0.01	0.12	0.21	UJ	0.30	0.48	0.83	UJ	0.97	0.24	0.05	=	0.82	0.10	0.05	=	1.26	0.37	0.16	=	1.21	0.36	0.13	J	0.81	0.29	0.13	=	0.01	0.17	0.28	UJ	1.05	0.19	0.3	=	0.00
		SVP263861	872066	1085885	507.4	11/01/2022	0.0	15.0	15.5	0.02	0.11	0.19	UJ	-0.38	0.47	0.76	UJ	0.93	0.23	0.05	=	0.72	0.09	0.05	=	1.03	0.35	0.19	=	1.64	0.46	0.19	J	0.86	0.32	0.19	=	0.01	0.17	0.28	UJ	0.99	0.17	0.3	=	0.00
1	SVP263862	SVP263862	872124	1085986	507.8	11/01/2022	0.0	0.0	0.5	-0.07	0.20	0.34	UJ	-0.13	0.71	1.21	UJ	1.07	0.29	0.08	=	0.83	0.11	0.08	=	1.05	0.35	0.18	=	1.57	0.44	0.18	J	1.19	0.38	0.12	=	0.21	0.23	0.40	UJ	1.00	0.21	0.4	=	0.03
		SVP263862-1	872124	1085986	507.8	11/01/2022	0.0	0.0	0.5	0.18	0.14	0.19	UJ	-0.10	0.68	1.16	UJ	1.06	0.28	0.08	=	0.86	0.13	0.08	=	1.35	0.40	0.14	=	1.78	0.48	0.18	J	1.13	0.37	0.18	=	0.10	0.24	0.41	UJ	1.11	0.23	0.4	=	0.04
		SVP263862-2	872124	1085986	507.8	11/01/2022	0.0	0.0	0.5	0.44	0.98	1.27	UJ	1.19	3.64	8.18	UJ	1.56	0.29	0.13	=	1.35	0.29	0.34	=	0.91	0.21	0.13	=	1.00	0.23	0.13	=	0.85	0.20	0.06	=	0.40	0.78	1.73	UJ	0.97	1.04	1.9	UJ	0.12
		SVP263863	872124	1085986	507.8	11/01/2022	0.0	1.5	2.0	0.07	0.04	0.11	UJ	-0.14	0.51	0.85	UJ	1.25	0.31	0.05	=	0.95	0.11	0.06	=	1.23	0.39	0.12	=	2.01	0.52	0.15	J	0.85	0.32	0.19	=	0.10	0.18	0.30	UJ	1.25	0.24	0.3	=	0.02
		SVP263864	872124	1085986	507.8	11/01/2022	0.0	3.2	3.7	-0.06	0.13	0.21	UJ	-0.17	0.50	0.83	UJ	1.19	0.30	0.06	=	0.90	0.11	0.05	=	1.16	0.38	0.19	=	1.90	0.50	0.15	J	1.48	0.43	0.16	=	0.03	0.17	0.28	UJ	1.20	0.20	0.3	=	0.01
		SVP263865	872124	1085986	507.8	11/01/2022	0.0	5.5	6.0	0.02	0.13	0.22	UJ	-0.15	0.49	0.81	UJ	1.14	0.29	0.06	=	0.94	0.12	0.05	=	1.56	0.46	0.20	=	1.96	0.52	0.13	J	1.24	0.40	0.20	=	0.06	0.17	0.28	UJ	0.89	0.17	0.3	=	0.01
		SVP263866	872124	1085986	507.8	11/01/2022	0.0	7.5	8.0	0.09	0.13	0.23	UJ	0.57	0.49	0.86	UJ	1.14	0.29	0.05	=	0.92	0.11	0.05	=	1.20	0.37	0.18	=	1.66	0.45	0.18	J	1.11	0.36	0.18	=	0.03	0.16	0.28	UJ	1.00	0.18	0.3	=	0.00
		SVP263867	872124	1085986	507.8	11/01/2022	0.0	9.0	9.5	0.06	0.12	0.22	UJ	-0.25	0.45	0.74	UJ	0.99	0.25	0.06	=	0.76	0.10	0.05	=	1.02	0.35	0.15	=	1.52	0.45	0.13	J	1.05	0.36	0.13	=	0.01	0.15	0.26	UJ	0.96	0.17	0.3	=	0.00
		SVP263868	872124	1085986	507.8	11/01/2022	0.0	11.5	12.0	0.05	0.13	0.23	UJ	0.39	0.47	0.82	UJ	1.15	0.29	0.05	=	0.91	0.11	0.05	=	1.33	0.40	0.18	=	1.76	0.47	0.18	J	0.86	0.32	0.18	=	0.16	0.17	0.29	UJ	1.18	0.20	0.3	=	0.00
		SVP263869	872124	1085986	507.8	11/01/2022	0.0	13.5	14.0	0.15	0.13	0.23	UJ	0.12	0.46	0.78	UJ	1.03	0.26	0.06	=	0.79	0.10	0.05	=	1.01	0.34	0.15	=	1.57	0.43	0.11	J	1.17	0.37	0.18	=	-0.01	0.17	0.28	UJ	1.06	0.18	0.3	=	0.00
		SVP263870	872124	1085986	507.8	11/01/2022	0.0	15.0	15.5	0.00	0.13	0.22	UJ	-0.02	0.50	0.84	UJ	1.01	0.26	0.06	=	0.92	0.11	0.05	=	1.51	0.45	0.15	=	2.06	0.54	0.20	J	0.95	0.34	0.15	=	0.06	0.17	0.29	UJ	1.10	0.20	0.3	=	0.02
1	SVP264027	SVP264027	871842	1086081	509.8	10/31/2022	0.7	0.7	1.2	0.05	0.13	0.22	UJ	-0.1	0.45	0.76	UJ	1.00	0.26	0.05	=	0.77	0.10	0.05	=	1.26	0.39	0.12	=	1.96	0.5	0.19	=	1.64	0.5	0.12	=	-0.04	0.16	0.26	UJ	1.04	0.18	0.3	=	0.01
		SVP264028	871842	1086081	509.8	10/31/2022	0.7	1.5	2.0	0.09	0.20	0.35	UJ	0.3	0.76	1.32	UJ	1.19	0.31	0.09	=	0.83	0.12	0.09	=	1.35	0.40	0.11	=	1.35	0.4	0.11	J	1.19	0.4	0.18	=	0.11	0.24	0.42	UJ	1.13	0.24	0.4	=	0.00
		SVP264028-1	871842	1086081	509.8	10/31/2022	0.7	1.5	2.0	-0.1	0.23	0.38	UJ	0.18	0.80	1.38	UJ	1.25	0.33	0.10	=	0.93	0.12	0.09	=	1.41	0.40	0.17	=	1.57	0.4	0.17	J	0.78	0.3	0.11	=	0.07	0.26	0.44	UJ	1.33	0.26	0.4	=	0.01
		SVP264028-2	871842	1086081	509.8	10/31/2022	0.7	1.5	2.0	-0.1	0.76	0.95	UJ	0.80	2.51	5.61	UJ	1.36	0.25	0.12	=	1.30	0.25	0.08	=	1.09	0.23	0.11	=	0.99	0.2	0.12	=	1.25	0.2	0.06	=	-0.21	0.59	0.99	UJ	-0.53	1.72	2.9	UJ	0.01
		SVP264029	871842	1086081	509.8	10/31/2022	0.7	2.5	3.0	0.11	0.14	0.25	UJ	-0.26	0.56	0.92	UJ	1.23	0.31	0.06	=	0.89	0.11	0.06	=	1.44	0.43	0.13	=	1.45	0.4	0.20	J	1.44	0.4	0.20	=	-0.10	0.18	0.30	UJ	1.24	0.21	0.3	=	0.01
		SVP264030	871842	1086081	509.8	10/31/2022	0.7	8.5	9.0	0.11	0.12	0.21	UJ	0.0	0.44	0.74	UJ	0.76	0.19	0.05	=	0.65	0.08	0.04	=	1.09	0.35	0.13	=	1.12	0.4	0.18	J	0.79	0.3	0.18	=	-0.06	0.14	0.24	UJ	0.78	0.15	0.2	=	0.00
		SVP264031	871842	1086081	509.8	10/31/2022	0.7	10.5	11.0	0.0	0.12	0.21	UJ	-0.18	0.46	0.76	UJ	0.94	0.24	0.05	=	0.81	0.10	0.05	=	1.18	0.38	0.18	=	1.55	0.4	0.14	J	1.29	0.4	0.16	=	-0.06	0.16	0.26	UJ	1.15	0.19	0.3	=	0.00
		SVP264032	871842	1086081	509.8	10/31/2022	0.7	4.5	5.0	0.04	0.13	0.22	UJ	-0.38	0.49	0.79	UJ	1.05	0.27	0.06	=	0.89	0.11	0.05	=	1.11	0.38	0.20	=	1.91	0.5	0.13	=	1.13	0.4	0.20	=	0.12	0.16	0.28	UJ	1.10	0.19	0.3	=	0.01
		SVP264033	871842	1086081	509.8	10/31/2022	0.7	7.0	7.5	0.02	0.12	0.20	UJ	0.2	0.46	0.78	UJ	0.90	0.23	0.05	=	0.77	0.09	0.05	=	1.20	0.39	0.20	=	1.33	0.4	0.20	J	0.72	0.3	0.20	=	-0.05	0.15	0.25	UJ	0.92	0.17	0.3	=	0.00
		SVP264034	871842	1086081	509.8	10/31/2022	0.7	13.5	14.0	0.04	0.12	0.21	UJ	0.04	0.46	0.78	UJ	0.82	0.21	0.05	=	0.71	0.09	0.05	=	0.68	0.27	0.12	=	1.17	0.4	0.12	J	0.80	0.3	0.12	=	0.01	0.15	0.25	UJ	0.77	0.15	0.3	=	0.00
		SVP264035	871842	1086081	509.8	10/31/2022	0.7	15.0	15.5	-0.01	0.12	0.20	UJ	-0.28	0.47	0.77	UJ	0.93	0.23	0.05	=	0.76	0.09	0.06	=	0.91	0.31	0.17	=	1.56	0.4	0.17	J	0.77	0.3	0.17	=	0.06	0.15	0.26	UJ	0.91	0.17	0.3	=	0.00
1	SVP264036	SVP264036	871912	1086172	510.2	11/01/2022	0.6	1.0	1.5	0.01	0.14	0.23	UJ	0.27	0.49	0.85	UJ	1.02	0.27	0.06	=	0.83	0.10	0.05	=	0.93	0.30	0.18	=	1.31	0.4	0.15	J	0.83	0.3	0.10	=	0.19	0.17	0.29	UJ	1.04	0.17	0.3	=	0.00
		SVP264037	871912	1086172	510.2	11/01/2022	0.6	1.5	2.0	-0.03	0.14	0.23	UJ	-0.22	0.49	0.81	UJ	1.01	0.26	0.06	=	0.92	0.12	0.06	=	1.21	0.33	0.09	=	1.73	0.4	0.10	J	0.94	0.3	0.14	=	-0.05	0.16	0.26	UJ	1.28	0.20	0.3	=	0.00
		SVP264038	871912	1086172	510.2	11/01/2022	0.6	2.0	2.5	0.09	0.13	0.23	UJ	0.08	0.45	0.77	UJ	0.97	0.25	0.05	=	0.82	0.11	0.06	=	1.31	0.38	0.19	=	1.74	0.4	0.16	J	1.02	0.3	0.12	=	0.07	0.15	0.26	UJ	1.16	0.20	0.3	=	0.00
		SVP264039	871912	1086172	510.2	11/01/2022	0.6	4.5	5.0	-0.08	0.13	0.22	UJ	0.17	0.48	0.81	UJ	0.96	0.25	0.05	=	0.89	0.10	0.05	=	1.21	0.35	0.17	=	1.45	0.39	0.11	J	1.19	0.3	0.15	=	0.01	0.16	0.26	UJ	1.03	0.16	0.3	=	0.00
		SVP264040	871912	1086172	510.2	11/01/2022	0.6	7.0	7.5	0.00	0.13	0.21	UJ	0.00	0.45	0.76	UJ	0.88	0.23	0.05	=	0.66	0.09	0.05	=	1.02	0.30	0.13	=	1.50	0.4	0.14	J	0.79	0.3	0.14	=	-0.01	0.14	0.24	UJ	0.84	0.15	0.3	=	0.00
		SVP264041	871912	1086172	510.2	11/01/2022	0.6	9.0	9.5	0.18	0.12	0.22	UJ	-0.29	0.46	0.75	UJ	0.86	0.22	0.05	=	0.74	0.10	0.05	=	1.12	0.32	0.09	=	1.61	0.4	0.12	J	1.38	0.4	0.14	=	0.03	0.14	0.24	UJ	0.95	0.16	0.3	=	0.00
		SVP264042	871912	1086172	510.2	11/01/2022	0.6	10.3	10.8	-0.04	0.13	0.21	UJ	-0.30	0.47	0.77	UJ	1.04	0.27	0.06	=	0.86	0.10	0.06	=	1.43	0.42	0.17	=	1.41	0.4	0.15	J	1.00	0.34	0.12	=	0.05	0.15	0.26	UJ	1.14	0.19	0.3	=	0.00
		SVP264043	871912	1086172	510.2	11/01/2022	0.6	13.0	13.5	0.07	0.13	0.22	UJ	-0.07	0.47	0.79	UJ	0.90	0.23	0.05	=	0.80	0.11	0.05	=	1.14	0.37	0.12	=	1.66	0.5	0.12	J	0.99	0.3	0.19	=	-0.06	0.15	0.25	UJ	1.07	0.19	0.3	=	0.00
		SVP264044	871912	1086172	510.2	11/01/2022	0.6	14.5	15.0	-0.04	0.14	0.23	UJ	-0.03	0.49	0.81	UJ	1.09	0.28	0.06	=	0.83	0.10	0.06	=	0.79	0.29	0.17	=	1.34	0.4	0.14	J	1.50	0.4	0.13	=	0.04	0.16	0.27	UJ	1.10	0.19	0.3	=	0.00

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
1	SVP264045	SVP264045	872053	1086271	509.6	11/01/2022	0.0	0.0	0.5	0.02	0.19	0.33	UJ	-0.16	0.68	1.15	UJ	0.94	0.26	0.08	=	0.63	0.09	0.08	=	1.58	0.45	0.19	=	2.04	0.5	0.19	=	1.06	0.4	0.19	=	0.04	0.22	0.37	UJ	1.14	0.22	0.4	=	0.04
		SVP264045-1	872053	1086271	509.6	11/01/2022	0.0	0.0	0.5	0.06	0.20	0.35	UJ	0.23	0.69	1.19	UJ	0.94	0.26	0.08	=	0.68	0.10	0.08	=	1.04	0.36	0.19	=	1.68	0.5	0.15	J	1.13	0.4	0.19	=	0.12	0.22	0.38	UJ	0.94	0.20	0.4	=	0.01
		SVP264045-2	872053	1086271	509.6	11/01/2022	0.0	0.0	0.5	0.19	0.40	1.14	UJ	0.94	2.95	6.55	UJ	1.31	0.24	0.10	=	0.94	0.26	0.11	=	0.68	0.18	0.13	=	0.93	0.2	0.13	=	0.76	0.2	0.05	=	0.04	0.07	1.29	UJ	-0.02	0.03	2.2	UJ	0.07
		SVP264046	872053	1086271	509.6	11/01/2022	0.0	1.0	1.5	-0.04	0.16	0.27	UJ	0.05	0.55	0.93	UJ	1.24	0.32	0.07	=	0.93	0.12	0.06	=	1.51	0.45	0.20	=	1.89	0.5	0.20	J	1.32	0.4	0.20	=	-0.02	0.18	0.29	UJ	1.44	0.23	0.3	=	0.01
		SVP264047	872053	1086271	509.6	11/01/2022	0.0	3.5	4.0	-0.07	0.15	0.24	UJ	0.13	0.53	0.90	UJ	1.23	0.31	0.06	=	0.98	0.12	0.06	=	1.07	0.36	0.15	=	1.65	0.5	0.19	J	1.05	0.36	0.19	=	-0.01	0.18	0.29	UJ	1.39	0.23	0.3	=	0.01
		SVP264048	872053	1086271	509.6	11/01/2022	0.0	4.5	5.0	0.02	0.13	0.23	UJ	-0.03	0.49	0.83	UJ	1.11	0.28	0.06	=	0.87	0.11	0.05	=	1.09	0.35	0.14	=	1.88	0.5	0.18	=	1.21	0.4	0.14	=	0.12	0.16	0.28	UJ	0.91	0.16	0.3	=	0.00
		SVP264049	872053	1086271	509.6	11/01/2022	0.0	7.0	7.5	0.08	0.13	0.23	UJ	-0.34	0.48	0.78	UJ	1.13	0.29	0.06	=	0.87	0.11	0.06	=	1.25	0.37	0.13	=	1.69	0.4	0.13	J	1.09	0.3	0.13	=	0.13	0.16	0.26	UJ	1.27	0.20	0.3	=	0.00
		SVP264050	872053	1086271	509.6	11/01/2022	0.0	9.0	9.5	-0.08	0.13	0.21	UJ	-0.02	0.47	0.79	UJ	0.97	0.25	0.05	=	0.80	0.11	0.05	=	0.59	0.24	0.16	=	1.27	0.4	0.17	J	0.87	0.3	0.16	=	0.09	0.16	0.26	UJ	1.08	0.18	0.3	=	0.00
		SVP264051	872053	1086271	509.6	11/01/2022	0.0	10.0	10.5	-0.03	0.13	0.22	UJ	-0.19	0.47	0.77	UJ	1.14	0.28	0.06	=	0.85	0.11	0.06	=	1.11	0.37	0.19	=	2.51	0.6	0.19	=	1.22	0.4	0.18	=	0.05	0.16	0.27	UJ	1.05	0.18	0.3	=	0.05
		SVP264052	872053	1086271	509.6	11/01/2022	0.0	13.5	14.0	0.00	0.12	0.21	UJ	0.30	0.46	0.79	UJ	0.96	0.24	0.05	=	0.77	0.09	0.05	=	1.01	0.34	0.18	=	2.22	0.5	0.18	=	1.13	0.4	0.18	=	0.12	0.15	0.26	UJ	0.92	0.17	0.3	=	0.03
		SVP264053	872053	1086271	509.6	11/01/2022	0.0	15.5	16.0	0.09	0.15	0.26	UJ	-0.15	0.53	0.89	UJ	1.02	0.26	0.06	=	0.92	0.12	0.06	=	1.02	0.33	0.16	=	1.00	0.32	0.16	J	0.93	0.3	0.16	=	-0.04	0.17	0.28	UJ	1.31	0.22	0.3	=	0.00
1	SVP264054	SVP264054	872111	1086193	508.8	11/01/2022	0.0	0.0	0.5	0.01	0.20	0.34	UJ	-0.22	0.67	1.12	UJ	0.86	0.24	0.08	=	0.71	0.10	0.08	=	1.13	0.39	0.20	=	1.17	0.4	0.20	J	0.86	0.3	0.20	=	0.20	0.24	0.41	UJ	0.97	0.19	0.4	=	0.00
		SVP264055	872111	1086193	508.8	11/01/2022	0.0	1.5	2.0	0.12	0.13	0.23	UJ	-0.31	0.48	0.78	UJ	1.08	0.27	0.05	=	0.94	0.12	0.05	=	1.32	0.38	0.16	=	1.82	0.5	0.16	J	1.24	0.4	0.13	=	-0.13	0.17	0.27	UJ	1.25	0.20	0.3	=	0.00
		SVP264056	872111	1086193	508.8	11/01/2022	0.0	2.0	2.5	0.00	0.13	0.22	UJ	0.06	0.45	0.77	UJ	1.06	0.27	0.05	=	0.85	0.11	0.05	=	1.20	0.36	0.16	=	1.53	0.41	0.16	J	1.02	0.33	0.16	=	-0.06	0.16	0.26	UJ	1.05	0.18	0.3	=	0.00
		SVP264057	872111	1086193	508.8	11/01/2022	0.0	5.5	6.0	-0.05	0.13	0.22	UJ	0.81	0.46	0.82	UJ	1.01	0.26	0.05	=	0.90	0.11	0.05	=	1.24	0.40	0.19	=	1.92	0.51	0.19	J	1.09	0.37	0.19	=	0.03	0.17	0.28	UJ	1.02	0.18	0.3	=	0.01
		SVP264058	872111	1086193	508.8	11/01/2022	0.0	9.0	9.5	-0.02	0.12	0.21	UJ	-0.18	0.44	0.73	UJ	1.05	0.27	0.05	=	0.84	0.11	0.05	=	1.24	0.40	0.19	=	1.42	0.43	0.19	J	0.88	0.33	0.15	=	-0.09	0.16	0.26	UJ	0.84	0.15	0.3	=	0.00
		SVP264059	872111	1086193	508.8	11/01/2022	0.0	10.0	10.5	0.02	0.20	0.34	UJ	-0.12	0.70	1.17	UJ	0.98	0.26	0.08	=	0.83	0.12	0.07	=	1.36	0.41	0.14	=	1.49	0.43	0.18	J	1.08	0.36	0.14	=	-0.05	0.23	0.38	UJ	0.90	0.39	0.7	UJ	0.00
		SVP264060	872111	1086193	508.8	11/01/2022	0.0	13.5	14.0	-0.09	0.13	0.21	UJ	-0.08	0.46	0.78	UJ	1.03	0.26	0.05	=	0.77	0.09	0.05	=	1.04	0.34	0.17	=	1.39	0.40	0.17	J	1.11	0.35	0.17	=	0.11	0.12	0.19	UJ	1.01	0.18	0.3	=	0.00
		SVP264061	872111	1086193	508.8	11/01/2022	0.0	15.0	15.5	0.12	0.13	0.23	UJ	-0.05	0.46	0.78	UJ	1.03	0.26	0.05	=	0.81	0.10	0.05	=	1.13	0.37	0.18	=	1.06	0.36	0.15	J	1.04	0.36	0.19	=	-0.09	0.16	0.26	UJ	0.78	0.14	0.3	=	0.00
1	SVP264062	SVP264062	872182	1086087	508.2	11/01/2022	0.7	0.7	1.2	0.09	0.14	0.24	UJ	0.07	0.51	0.86	UJ	1.13	0.29	0.05	=	0.99	0.11	0.05	=	1.04	0.31	0.17	=	1.71	0.42	0.15	=	1.10	0.32	0.15	=	-0.01	0.18	0.30	UJ	1.21	0.20	0.3	=	0.00
		SVP264063	872182	1086087	508.2	11/01/2022	0.7	1.5	2.0	0.51	0.21	0.41	UJ	0.33	0.77	1.34	UJ	1.17	0.31	0.09	=	0.99	0.14	0.08	=	1.09	0.33	0.15	=	1.45	0.39	0.16	J	1.08	0.33	0.16	=	0.01	0.25	0.42	UJ	1.15	0.27	0.4	=	0.00
		SVP264063-1	872182	1086087	508.2	11/01/2022	0.7	1.5	2.0	-0.10	0.20	0.33	UJ	-0.35	0.81	1.33	UJ	1.10	0.30	0.08	=	0.93	0.13	0.08	=	1.47	0.44	0.19	=	1.53	0.45	0.19	J	1.15	0.38	0.19	=	0.23	0.26	0.45	UJ	1.27	0.23	0.4	=	0.00
		SVP264063-2	872182	1086087	508.2	11/01/2022	0.7	1.5	2.0	0.31	0.68	0.88	UJ	1.46	5.84	9.81	UJ	1.16	0.25	0.16	=	1.43	0.32	0.12	=	0.94	0.22	0.13	=	0.90	0.22	0.14	=	0.86	0.20	0.07	=	0.02	0.03	1.05	UJ	1.31	1.06	2.5	UJ	0.00
		SVP264064	872182	1086087	508.2	11/01/2022	0.7	3.0	3.5	0.13	0.14	0.25	UJ	0.12	0.52	0.88	UJ	1.17	0.30	0.06	=	0.99	0.12	0.05	=	1.20	0.35	0.19	=	1.80	0.45	0.16	=	1.00	0.32	0.16	=	0.07	0.18	0.30	UJ	1.32	0.22	0.3	=	0.00
		SVP264065	872182	1086087	508.2	11/01/2022	0.7	5.0	5.5	0.00	0.14	0.24	UJ	-0.26	0.50	0.82	UJ	1.12	0.28	0.05	=	0.91	0.11	0.05	=	1.41	0.38	0.15	=	1.68	0.42	0.15	=	1.06	0.32	0.15	=	0.03	0.18	0.30	UJ	1.02	0.21	0.3	=	0.00
		SVP264066	872182	1086087	508.2	11/01/2022	0.7	6.5	7.0	0.06	0.13	0.23	UJ	0.20	0.52	0.89	UJ	1.06	0.27	0.05	=	0.84	0.10	0.05	=	1.19	0.35	0.17	=	1.46	0.39	0.16	J	0.99	0.32	0.16	=	-0.19	0.18	0.28	UJ	1.10	0.19	0.3	=	0.00
		SVP264067	872182	1086087	508.2	11/01/2022	0.7	9.5	10.0	0.02	0.13	0.22	UJ	-0.28	0.51	0.83	UJ	1.06	0.27	0.05	=	0.89	0.11	0.05	=	1.26	0.37	0.18	=	1.54	0.42	0.16	J	1.01	0.33	0.17	=	0.11	0.17	0.29	UJ	1.26	0.20	0.3	=	0.00
		SVP264068	872182	1086087	508.2	11/01/2022	0.7	10.5	11.0	0.01	0.13	0.22	UJ	-0.21	0.51	0.84	UJ	1.02	0.26	0.05	=	0.81	0.10	0.05	=	1.55	0.44	0.21	=	1.95	0.51	0.19	=	1.24	0.39	0.19	=	0.00	0.17	0.29	UJ	1.03	0.17	0.3	=	0.01
		SVP264069	872182	1086087	508.2	11/01/2022	0.7	13.5	14.0	0.05	0.13	0.22	UJ	-0.35	0.50	0.81	UJ	1.03	0.26	0.05	=	0.81	0.10	0.05	=	1.08	0.33	0.16	=	1.37	0.38	0.12	J	0.87	0.29	0.16	=	0.08	0.17	0.29	UJ	1.00	0.17	0.3	=	0.00
		SVP264070	872182	1086087	508.2	11/01/2022	0.7	14.0	14.5	-0.02	0.12	0.21	UJ	-0.04	0.48	0.80	UJ	0.95	0.24	0.05	=	0.76	0.10	0.05	=	1.05	0.31	0.13	=	1.65	0.40	0.14	=	0.70	0.25	0.14	=	0.03	0.16	0.27	UJ	0.98	0.17	0.3	=	0.00
1	SVP264145	SVP264145[a]	872186	1086151	508.2	11/03/2022	0.0	0.0	0.5	-0.10	1.10	1.92	R	-0.25	3.65	6.44	R	0.75	0.50	0.74	R	0.42	0.37	0.77	R	0.28	0.20	0.23	J	0.38	0.23	0.22	J	0.22	0.18	0.23	UJ	0.17	1.03	1.84	R	3.29	1.92	3.6	R	0.04
		SVP264146	872186	1086151	508.2	11/03/2022	0.0	0.5	1.0	0.13	0.16	0.29	UJ	0.13	0.58	1.01	UJ	0.94	0.25	0.07	=	0.19	0.04	0.05	J	0.55	0.31	0.30	J	1.52	0.53	0.27	J	0.18	0.18	0.27	UJ	0.07	0.16	0.28	UJ	0.59	0.19	0.3	=	0.00
1	SVP264147	SVP264147	872146	1086185	508.7	11/03/2022	0.0	0.0	0.5	0.09	0.17	0.30	UJ	-0.50	0.60	0.96	UJ	0.92	0.25	0.07	=	0.33	0.06	0.07	=	0.75	0.29	0.20	=	1.13	0.36	0.17	J	0.83	0.31	0.18	=	0.18	0.20	0.35	UJ	0.74	0.16	0.3	=	0.00
		SVP264148	872146	1086185	508.7	11/03/2022	0.0	1.5	2.0	0.03	0.14	0.24	UJ	-0.19	0.51	0.85	UJ	1.21	0.30	0.06	=	0.83	0.11	0.05	=	1.55	0.44	0.18	=	1.07	0.36	0.18	J	0.72	0.29	0.18	=	-0.05	0.18	0.30	UJ	1.22	0.20	0.3	=	0.00
1	SVP264149	SVP264149	872005	1086299	510.4	11/03/2022	0.0	0.0	0.5	0.13	0.15	0.27	UJ	-0.61	0.59	0.93	UJ	0.82	0.22	0.06	=	0.13	0.03	0.05	J	0.48	0.26	0.24	J	0.95	0.37	0.19	J	0.29	0.21	0.24	J	0.00	0.18	0.31	UJ	0.44	0.13	0.3	=	0.00
		SVP264149-1	872005	1086299	510.4	11/03/2022	0.0	0.0	0.5	0.03	0.17	0.30	UJ	0.35	0.57	1.03	UJ	0.79	0.22	0.07	=	0.15	0.04	0.05	J	0.57	0.39	0.46	J	1.08	0.54	0.42	J	0.23	0.26	0.42	UJ	-0.03	0.20	0.34	UJ	0.52	0.13	0.3	=	0.00
		SVP264149-2	872005	1086299	510.4	11/03/2022	0.0	0.0	0.5	0.06	0.54	0.75	UJ	-1.67	6.42	10.80	UJ	0.72	0.22	0.17	=	0.14	0.24	0.32	UJ	0.09	0.09	0.12	UJ	0.54	0.18	0.13	=	0.25	0.11	0.07	=	0.08	0.46	0.79	UJ	-0.49	2.40	4.1	UJ	0.00
		SVP264150	872005	1086299	510.4	11/03/2022	0.0	1.0	1.5	0.05	0.14	0.25	UJ	0.17	0.54	0.93	UJ	1.29	0.33	0.06	=	0.87	0.11	0.06	=	1.31	0.40	0.19	=	1.67	0.47	0.19	J	0.93	0.33	0.18	=	0.20	0.96	0.30	UJ	1.24	0.21	0.3	=	0.01
1	SVP264151	SVP264151	871931	1086143	511.0	11/03/2022	0.0	0.0	0.5	-0.03	0.24	0.43	UJ	-0.08	0.88	1.54	UJ	0.62	0.20	0.12	J	0.09	0.07	0.10	UJ	0.16	0.14	0.18	UJ	0.70	0.29	0.19	J	0.10	0.12	0.19	UJ	0.06	0.28	0.50	UJ	0.50	0.41	0.8	UJ	0.00
		SVP264152	871931	1086143	511.0	11/03/2022	0.0	1.5	2.0	0.16	0.13	0.23	UJ	-0.37	0.49	0.79	UJ	1.27	0.32	0.05	=	0.92	0.11	0.06	=	1.16	0.35	0.15	=	1.85	0.46	0.16	J	1.56	0.41	0.13	=	0.10	0.17	0.29	UJ	1.23	0.20	0.3	=	0.01
1	SVP264289	SVP264289	871911	1086188	511.0	11/04/2022	0.0	0.0	0.5	-0.21	0.43	0.72	UJ	-0.56	1.50	2.52	UJ	0.62	0.22	0.16	J	0.32	0.09	0.14	J	0.57	0.27	0.20	=	0.82	0.32	0.20	J	0.44	0.23	0.20	J	0.16	0.42	0.76	UJ	0.53	0.32	0.5	J	0.00
		SVP264289-1	871911	1086188	511.0	11/04/2022	0.0	0.0	0.5	-0.32	0.37	0.58	UJ	0.77	1.50	2.76	UJ	0.69	0.24	0.16	J	0.31	0.11	0.29	J	0.52	0.25	0.19	=	0.73	0.30	0.19	J	0.36	0.21	0.19	J	0.05	0.44	0.78	UJ	0.13	0.66	1.1	UJ	0.00
		SVP264289-2	871911	1086188	511.0	11/04/2022	0.0	0.0	0.5	0.14	0.52	1.03	UJ	-2.19	6.59	11.10	UJ	0.39	0.25	0.30	J	0.57	0.37	0.39	J	0.41	0.14	0.10	=	0.42	0.15	0.13	=	0.39	0.12	0.06	=	0.11	0.48	0.94	UJ	2.41	1.67	2.1	J	0.03
		SVP264290	871911	1086188	511.0	11/04/2022	0.0	1.0	1.5	0.01	0.14	0.23	UJ	-0.20	0.53	0.88	UJ	1.20	0.30	0.06	=	0.87	0.10	0.05	=	1.34	0.41	0.19	=	1.81	0.49	0.19	J	0.82	0.31	0.15	=	-0.08	0.18	0.30	UJ	1.26	0.20	0.3	=	0.00
2	HTZ250129	HTZ250129	872277	1086072	505.3	11/07/2022	0.0	0.0	0.5	0.15	0.13	0.24	UJ	-0.38	0.49	0.79	UJ	1.04	0.26	0.05	=	0.84	0.11	0.06	=	1.41	0.42	0.19	J	1.80	0.5	0.15	J	1.23	0.4	0.19	=	0.04	0.15	0.26	UJ	1.06	0.19	0.3	=	0.04

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
2	SVP190263	SVP190263	872414	1085885	494.8	06/04/2019	0.0	0.0	0.5	-1.55	0.34	0.29	UJ	-0.60	1.05	1.72	UJ	1.33	0.36	0.12	=	0.98	0.13	0.11	=	1.70	0.58	0.15	=	1.90	0.63	0.21	J	0.79	0.37	0.18	=	0.22	0.32	0.55	UJ	1.12	0.25	0.5	=	0.11
		SVP190264	872414	1085885	494.8	06/04/2019	0.0	1.5	2.0	-2.10	0.44	0.29	UJ	-0.55	1.02	1.68	UJ	1.34	0.36	0.11	=	0.89	0.12	0.11	=	1.38	0.48	0.20	=	1.73	0.55	0.16	J	0.95	0.38	0.22	=	0.14	0.33	0.56	UJ	1.10	0.24	0.5	=	0.01
		SVP211120	872414	1085885	494.8	06/04/2019	0.0	3.0	3.5	-2.23	0.44	0.28	UJ	-0.90	0.99	1.58	UJ	1.53	0.40	0.11	=	0.94	0.13	0.12	=	1.63	0.54	0.22	=	1.67	0.55	0.18	J	1.26	0.46	0.15	=	0.15	0.31	0.52	UJ	1.28	0.26	0.5	=	0.03
2	SVP190267	SVP190267	872470	1085988	503.2	08/21/2018	0.0	0.0	0.5	-1.13	0.23	0.15	UJ	0.20	0.59	1.02	UJ	1.34	0.34	0.07	=	0.84	0.10	0.06	=	1.57	0.52	0.18	=	1.97	0.60	0.14	=	0.86	0.36	0.14	=	-0.02	0.18	0.30	UJ	1.25	0.21	0.3	=	0.12
		SVP190267-1	872470	1085988	503.2	08/21/2018	0.0	0.0	0.5	-0.72	0.16	0.17	UJ	-0.19	0.57	0.95	UJ	1.44	0.37	0.06	=	0.80	0.12	0.06	=	1.03	0.39	0.21	=	1.51	0.49	0.11	=	1.16	0.42	0.15	=	0.05	0.20	0.33	UJ	1.24	0.22	0.4	=	0.10
		SVP190267-2	872470	1085988	503.2	08/21/2018	0.0	0.0	0.5	0.09	0.37	1.26	UJ	0.72	3.10	8.06	UJ	1.26	0.31	0.20	=	1.25	0.34	0.45	=	0.72	0.18	0.10	=	0.87	0.21	0.13	=	0.69	0.17	0.08	=	0.26	0.49	0.88	UJ	1.22	0.93	1.4	UJ	0.06
		SVP190268	872470	1085988	503.2	08/21/2018	0.0	1.5	2.0	-0.37	0.09	0.15	UJ	0.44	0.52	0.90	UJ	1.33	0.33	0.06	=	0.81	0.10	0.05	=	1.71	0.57	0.19	=	1.68	0.56	0.18	=	0.65	0.31	0.16	=	0.11	0.18	0.31	UJ	1.16	0.21	0.3	=	0.01
		SVP205289	872470	1085988	503.2	08/21/2018	0.0	3.5	4.0	-0.90	0.19	0.17	UJ	-0.55	0.62	1.00	UJ	1.51	0.38	0.08	=	0.90	0.12	0.08	=	1.47	0.48	0.18	=	1.47	0.48	0.17	=	1.43	0.47	0.11	=	0.20	0.21	0.35	UJ	1.30	0.22	0.4	=	0.02
		SVP205290	872470	1085988	503.2	08/21/2018	0.0	4.5	5.0	-1.22	0.23	0.17	UJ	-0.33	0.57	0.94	UJ	1.56	0.39	0.06	=	0.90	0.11	0.06	=	1.40	0.49	0.18	=	1.35	0.47	0.17	=	1.47	0.50	0.17	=	-0.14	0.20	0.33	UJ	1.40	0.23	0.4	=	0.03
		SVP232388	872470	1085988	503.2	07/06/2021	0.0	6.0	6.5	-0.03	0.15	0.25	UJ	-0.29	0.54	0.89	UJ	0.90	0.24	0.06	=	0.88	0.13	0.06	=	1.39	0.39	0.14	=	1.68	0.43	0.12	=	1.02	0.32	0.16	=	0.07	0.18	0.30	UJ	1.05	0.19	0.3	=	0.00
		SVP232389	872470	1085988	503.2	07/06/2021	0.0	8.0	8.5	0.10	0.15	0.26	UJ	0.07	0.53	0.90	UJ	0.87	0.23	0.06	=	0.80	0.10	0.06	=	1.14	0.38	0.16	=	1.86	0.50	0.19	=	1.10	0.37	0.19	=	0.05	0.16	0.28	UJ	1.02	0.18	0.3	=	0.00
		SVP232390	872470	1085988	503.2	07/06/2021	0.0	8.5	9.0	-0.06	0.16	0.26	UJ	0.13	0.55	0.94	UJ	0.98	0.26	0.06	=	0.90	0.11	0.07	=	1.04	0.33	0.17	=	1.73	0.45	0.13	=	1.23	0.37	0.13	=	-0.08	0.18	0.29	UJ	0.91	0.17	0.3	=	0.00
2	SVP263871	SVP263871	872291	1086080	504.1	11/01/2022	0.0	0.0	0.5	0.2	0.22	0.40	UJ	0.52	0.49	0.78	UJ	1.08	0.29	0.09	=	0.86	0.12	0.10	=	1.12	0.32	0.13	=	1.50	0.4	0.14	=	0.85	0.3	0.1	=	-0.02	0.24	0.41	UJ	1.06	0.23	0.4	=	0.03
		SVP263871-1	872291	1086080	504.1	11/01/2022	0.0	0.0	0.5	-0.01	0.20	0.34	UJ	0.35	0.78	1.36	UJ	1.03	0.28	0.09	=	0.81	0.11	0.09	=	1.28	0.39	0.18	=	1.93	0.5	0.18	=	1.32	0.4	0.2	=	0.06	0.24	0.40	UJ	1.04	0.23	0.4	=	0.05
		SVP263871-2	872291	1086080	504.1	11/01/2022	0.0	0.0	0.5	0.15	0.32	1.01	UJ	0.53	1.99	6.39	UJ	1.28	0.23	0.09	=	1.16	0.31	0.17	=	1.00	0.23	0.13	=	1.16	0.3	0.14	=	0.89	0.2	0.1	=	-0.30	0.79	1.32	UJ	0.81	0.80	1.1	UJ	0.07
		SVP263872	872291	1086080	504.1	11/01/2022	0.0	1.0	1.5	0.0	0.13	0.22	UJ	-0.37	0.48	0.78	UJ	1.03	0.26	0.06	=	0.96	0.11	0.05	=	1.25	0.36	0.19	=	1.64	0.4	0.15	=	1.42	0.4	0.15	=	0.09	0.16	0.27	UJ	1.06	0.19	0.3	=	0.00
		SVP263873	872291	1086080	504.1	11/01/2022	0.0	3.5	4.0	0.02	0.15	0.25	UJ	-0.03	0.53	0.89	UJ	1.18	0.30	0.06	=	0.93	0.11	0.06	=	1.21	0.37	0.17	=	2.16	0.5	0.17	=	0.78	0.29	0.17	=	0.22	0.11	0.27	U	1.23	0.21	0.3	=	0.02
		SVP263874	872291	1086080	504.1	11/01/2022	0.0	5.5	6.0	0.08	0.15	0.25	UJ	0.11	0.53	0.90	UJ	1.23	0.31	0.06	=	1.03	0.12	0.06	=	1.22	0.36	0.18	=	1.91	0.5	0.16	=	1.33	0.4	0.16	=	0.07	0.18	0.31	UJ	1.20	0.22	0.3	=	0.01
		SVP263875	872291	1086080	504.1	11/01/2022	0.0	7.5	8.0	-0.01	0.12	0.21	UJ	0.07	0.49	0.84	UJ	1.09	0.27	0.06	=	0.90	0.11	0.05	=	1.03	0.34	0.17	=	1.32	0.4	0.17	J	1.52	0.4	0.14	=	0.20	0.17	0.29	UJ	1.00	0.18	0.3	=	0.00
		SVP263876	872291	1086080	504.1	11/01/2022	0.0	9.5	10.0	-0.01	0.13	0.21	UJ	0.13	0.46	0.79	UJ	0.94	0.24	0.05	=	0.83	0.10	0.05	=	1.07	0.33	0.17	=	1.37	0.4	0.16	=	1.09	0.3	0.16	=	0.05	0.16	0.27	UJ	0.95	0.17	0.3	=	0.00
		SVP263877	872291	1086080	504.1	11/01/2022	0.0	10.5	11.0	-0.06	0.13	0.21	UJ	-0.06	0.49	0.82	UJ	0.92	0.23	0.05	=	0.83	0.10	0.05	=	0.87	0.30	0.17	=	1.34	0.4	0.13	J	0.89	0.3	0.17	=	0.13	0.16	0.27	UJ	0.96	0.17	0.3	=	0.00
		SVP263878	872291	1086080	504.1	11/01/2022	0.0	13.5	14.0	-0.01	0.12	0.21	UJ	-0.26	0.46	0.76	UJ	0.84	0.22	0.05	=	0.77	0.09	0.05	=	0.82	0.28	0.15	=	1.05	0.3	0.15	J	0.86	0.3	0.15	=	-0.02	0.16	0.26	UJ	0.82	0.16	0.3	=	0.00
		SVP263879	872291	1086080	504.1	11/01/2022	0.0	14.8	15.3	0.04	0.13	0.22	UJ	-0.2	0.51	0.85	UJ	1.22	0.30	0.06	=	0.73	0.09	0.05	=	1.12	0.35	0.17	=	1.30	0.4	0.17	J	1.05	0.3	0.17	=	0.12	0.17	0.28	UJ	0.85	0.17	0.3	=	0.00
2	SVP263880	SVP263880	872182	1085885	506.1	11/01/2022	0.0	0.0	0.5	-0.01	0.15	0.25	UJ	-0.20	0.53	0.87	UJ	1.01	0.26	0.06	=	0.85	0.12	0.06	=	0.96	0.30	0.15	=	1.53	0.39	0.14	J	1.16	0.33	0.15	=	0.00	0.17	0.29	UJ	1.01	0.18	0.3	=	0.01
		SVP263881	872182	1085885	506.1	11/01/2022	0.0	1.0	1.5	0.00	0.21	0.36	UJ	-0.42	0.71	1.17	UJ	1.02	0.27	0.10	=	0.90	0.13	0.08	=	1.39	0.37	0.16	=	1.71	0.42	0.15	J	1.33	0.36	0.15	=	0.01	0.23	0.39	UJ	1.20	0.23	0.4	=	0.00
		SVP263882	872182	1085885	506.1	11/01/2022	0.0	3.5	4.0	0.08	0.20	0.35	UJ	0.21	0.69	1.20	UJ	1.05	0.28	0.09	=	0.82	0.12	0.08	=	1.20	0.37	0.19	=	2.20	0.53	0.16	=	1.25	0.37	0.17	=	-0.06	0.24	0.40	UJ	1.09	0.21	0.4	=	0.02
		SVP263883	872182	1085885	506.1	11/01/2022	0.0	5.5	6.0	0.00	0.14	0.23	UJ	0.06	0.47	0.80	UJ	1.03	0.26	0.05	=	0.86	0.11	0.06	=	1.15	0.36	0.19	=	2.09	0.51	0.17	=	1.33	0.39	0.17	=	-0.05	0.16	0.26	UJ	1.14	0.19	0.3	=	0.02
		SVP263884	872182	1085885	506.1	11/01/2022	0.0	7.5	8.0	0.04	0.13	0.22	UJ	-0.36	0.47	0.76	UJ	1.05	0.27	0.05	=	0.89	0.11	0.06	=	0.80	0.28	0.16	=	2.26	0.52	0.13	=	1.13	0.34	0.16	=	-0.04	0.15	0.25	UJ	1.13	0.18	0.3	=	0.03
		SVP263885	872182	1085885	506.1	11/01/2022	0.0	9.5	10.0	0.00	0.14	0.24	UJ	-0.12	0.52	0.87	UJ	1.01	0.26	0.06	=	0.90	0.11	0.06	=	1.31	0.37	0.15	=	1.64	0.42	0.16	J	1.09	0.33	0.12	=	0.01	0.17	0.29	UJ	1.13	0.19	0.3	=	0.00
		SVP263886	872182	1085885	506.1	11/01/2022	0.0	11.5	12.0	0.00	0.20	0.34	UJ	-0.05	0.69	1.17	UJ	0.96	0.25	0.08	=	0.76	0.10	0.08	=	1.35	0.39	0.16	=	1.47	0.41	0.13	J	1.18	0.36	0.17	=	0.14	0.22	0.39	UJ	1.10	0.22	0.4	=	0.00
		SVP263887	872182	1085885	506.1	11/01/2022	0.0	12.5	13.0	-0.13	0.12	0.20	UJ	0.22	0.47	0.80	UJ	0.99	0.26	0.05	=	0.86	0.11	0.05	=	1.20	0.38	0.15	=	2.37	0.57	0.19	=	0.82	0.31	0.15	=	-0.04	0.15	0.25	UJ	1.01	0.17	0.3	=	0.04
		SVP263888	872182	1085885	506.1	11/01/2022	0.0	14.5	15.0	-0.05	0.12	0.20	UJ	0.58	0.45	0.79	UJ	0.85	0.22	0.05	=	0.73	0.10	0.05	=	0.83	0.28	0.15	=	1.25	0.35	0.15	J	1.22	0.35	0.12	=	-0.02	0.15	0.25	UJ	0.83	0.15	0.3	=	0.00

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
2	SVP263889	SVP263889	872241	1085783	504.3	11/02/2022	0.0	0.0	0.5	-0.07	0.21	0.35	UJ	-0.79	0.72	1.12	UJ	1.02	0.27	0.09	=	0.76	0.11	0.09	=	1.04	0.34	0.17	=	1.76	0.47	0.18	J	0.87	0.31	0.18	=	-0.01	0.24	0.41	UJ	1.10	0.23	0.4	=	0.03
		SVP263889-1	872241	1085783	504.3	11/02/2022	0.0	0.0	0.5	0.14	0.22	0.40	UJ	-0.40	0.78	1.29	UJ	1.07	0.29	0.09	=	0.78	0.11	0.09	=	1.08	0.32	0.16	=	1.34	0.37	0.15	J	0.95	0.30	0.12	=	-0.04	0.24	0.40	UJ	1.07	0.23	0.4	=	0.02
		SVP263889-2	872241	1085783	504.3	11/02/2022	0.0	0.0	0.5	0.15	0.36	1.18	UJ	0.00	2.24	13.70	UJ	1.33	0.30	0.16	=	1.59	0.47	0.38	=	0.61	0.18	0.13	=	0.76	0.20	0.13	=	0.83	0.19	0.07	=	0.27	0.47	0.74	UJ	-2.29	2.04	5.6	UJ	0.08
		SVP263890	872241	1085783	504.3	11/02/2022	0.0	0.5	1.0	0.09	0.14	0.24	UJ	-0.11	0.51	0.85	UJ	1.19	0.30	0.06	=	0.99	0.12	0.07	=	1.27	0.37	0.15	=	2.08	0.49	0.13	J	1.13	0.34	0.16	=	0.05	0.17	0.29	UJ	1.08	0.19	0.3	=	0.02
		SVP263891	872241	1085783	504.3	11/02/2022	0.0	3.5	4.0	0.01	0.13	0.23	UJ	0.17	0.50	0.85	UJ	1.11	0.28	0.05	=	0.91	0.11	0.05	=	1.21	0.38	0.18	=	1.61	0.45	0.19	=	1.10	0.36	0.19	=	0.07	0.17	0.29	UJ	1.03	0.17	0.3	=	0.00
		SVP263892	872241	1085783	504.3	11/02/2022	0.0	4.5	5.0	0.07	0.14	0.24	UJ	0.28	0.52	0.90	UJ	1.18	0.30	0.06	=	0.81	0.11	0.06	=	1.18	0.36	0.17	=	1.41	0.40	0.14	=	0.73	0.28	0.17	=	-0.09	0.18	0.30	UJ	1.23	0.18	0.3	=	0.00
		SVP263893	872241	1085783	504.3	11/02/2022	0.0	6.5	7.0	0.04	0.13	0.22	UJ	-0.20	0.48	0.79	UJ	0.99	0.25	0.05	=	0.76	0.09	0.05	=	1.10	0.36	0.18	=	1.03	0.35	0.18	=	1.10	0.36	0.18	=	-0.11	0.17	0.27	UJ	0.97	0.17	0.3	=	0.00
		SVP263894	872241	1085783	504.3	11/02/2022	0.0	9.5	10.0	0.06	0.14	0.24	UJ	-0.16	0.51	0.86	UJ	0.98	0.25	0.05	=	0.84	0.10	0.06	=	1.31	0.40	0.18	=	2.15	0.53	0.18	=	1.26	0.39	0.18	=	0.16	0.18	0.31	UJ	1.27	0.21	0.3	=	0.02
		SVP263895	872241	1085783	504.3	11/02/2022	0.0	10.5	11.0	0.03	0.13	0.22	UJ	-0.56	0.51	0.81	UJ	1.01	0.26	0.05	=	0.86	0.11	0.05	=	1.24	0.39	0.19	=	1.70	0.47	0.19	=	1.21	0.39	0.19	=	0.05	0.17	0.28	UJ	0.99	0.23	0.3	=	0.00
		SVP263896	872241	1085783	504.3	11/02/2022	0.0	13.5	14.0	0.01	0.13	0.21	UJ	0.31	0.48	0.83	UJ	0.99	0.25	0.05	=	0.73	0.09	0.05	=	1.10	0.36	0.19	=	1.58	0.44	0.19	=	0.95	0.33	0.18	=	-0.09	0.17	0.27	UJ	0.92	0.16	0.3	=	0.00
		SVP263897	872241	1085783	504.3	11/02/2022	0.0	15.0	15.5	-0.04	0.14	0.23	UJ	-0.11	0.51	0.86	UJ	1.06	0.26	0.05	=	0.82	0.11	0.05	=	0.84	0.31	0.18	=	1.09	0.35	0.18	=	0.52	0.24	0.14	=	-0.11	0.17	0.28	UJ	0.99	0.18	0.3	=	0.00
		SVP263898	872241	1085783	504.3	11/02/2022	0.0	17.5	18.0	-0.01	0.13	0.22	UJ	-0.34	0.50	0.82	UJ	1.09	0.28	0.05	=	0.84	0.11	0.05	=	1.11	0.37	0.16	=	1.92	0.51	0.20	=	1.03	0.36	0.16	=	-0.05	0.17	0.29	UJ	1.09	0.19	0.3	=	0.01
		SVP263899	872241	1085783	504.3	11/02/2022	0.0	18.0	18.5	0.17	0.15	0.27	UJ	-0.09	0.59	0.98	UJ	1.20	0.31	0.06	=	0.93	0.12	0.06	=	1.11	0.34	0.17	=	1.56	0.42	0.17	=	1.01	0.33	0.17	=	-0.06	0.19	0.32	UJ	1.13	0.20	0.3	=	0.00
		SVP263900	872241	1085783	504.3	11/02/2022	0.0	21.0	21.5	0.05	0.14	0.24	UJ	-0.18	0.54	0.88	UJ	1.05	0.26	0.05	=	0.82	0.10	0.05	=	1.10	0.38	0.19	=	1.60	0.46	0.16	=	0.90	0.34	0.20	=	0.07	0.18	0.30	UJ	0.89	0.16	0.3	=	0.00
		SVP263901	872241	1085783	504.3	11/02/2022	0.0	22.5	23.0	0.05	0.14	0.25	UJ	-0.14	0.55	0.93	UJ	1.10	0.28	0.06	=	0.84	0.10	0.05	=	1.11	0.37	0.19	=	1.76	0.48	0.19	=	1.37	0.41	0.19	=	0.03	0.18	0.30	UJ	1.09	0.19	0.3	=	0.00
		SVP263902	872241	1085783	504.3	11/02/2022	0.0	25.5	26.0	-0.01	0.14	0.24	UJ	-0.11	0.54	0.89	UJ	1.07	0.27	0.06	=	0.98	0.12	0.05	=	1.32	0.39	0.14	=	1.14	0.36	0.18	=	0.95	0.32	0.18	=	0.12	0.19	0.31	UJ	1.33	0.21	0.3	=	0.00
		SVP263902-1	872241	1085783	504.3	11/02/2022	0.0	25.5	26.0	-0.07	0.15	0.24	UJ	0.46	0.29	0.68	UJ	1.06	0.27	0.06	=	1.03	0.12	0.06	=	1.12	0.35	0.13	=	1.47	0.41	0.17	=	1.25	0.37	0.13	=	0.19	0.20	0.34	UJ	1.02	0.19	0.3	=	0.00
		SVP263902-2	872241	1085783	504.3	11/02/2022	0.0	25.5	26.0	-0.03	0.61	1.07	UJ	-1.73	6.39	10.70	UJ	1.05	0.26	0.19	=	1.44	0.33	0.13	=	0.92	0.23	0.13	=	0.88	0.23	0.14	=	0.89	0.21	0.07	=	0.10	0.25	1.04	UJ	-0.98	1.86	4.9	UJ	0.00
		SVP263903	872241	1085783	504.3	11/02/2022	0.0	27.0	27.5	0.01	0.14	0.23	UJ	0.13	0.51	0.87	UJ	1.01	0.26	0.06	=	0.96	0.11	0.06	=	1.31	0.38	0.24	=	1.38	0.38	0.13	J	0.96	0.31	0.15	=	0.01	0.17	0.28	UJ	1.17	0.20	0.3	=	0.00
2	SVP263904	SVP263904	872356	1085986	499.0	11/02/2022	0.0	0.0	0.5	0.10	0.19	0.34	UJ	0.08	0.70	1.20	UJ	1.16	0.31	0.07	=	0.97	0.14	0.08	=	1.49	0.43	0.18	=	1.65	0.46	0.14	J	1.03	0.35	0.18	=	-0.09	0.23	0.39	UJ	1.18	0.23	0.42	=	0.06
		SVP263905	872356	1085986	499.0	11/02/2022	0.0	1.5	2.0	0.15	0.16	0.28	UJ	-0.07	0.55	0.92	UJ	1.25	0.32	0.07	=	0.89	0.12	0.06	=	1.24	0.36	0.16	=	1.35	0.38	0.15	J	1.01	0.32	0.16	=	0.09	0.19	0.32	UJ	1.41	0.23	0.3	=	0.01
		SVP263906	872356	1085986	499.0	11/02/2022	0.0	2.5	3.0	0.15	0.13	0.24	UJ	-0.21	0.49	0.81	UJ	1.19	0.30	0.05	=	0.93	0.12	0.05	=	1.31	0.39	0.17	=	1.52	0.42	0.17	J	1.11	0.35	0.16	=	0.18	0.18	0.30	UJ	1.23	0.21	0.3	=	0.00
		SVP263907	872356	1085986	499.0	11/02/2022	0.0	4.5	5.0	-0.04	0.14	0.22	UJ	-0.38	0.51	0.82	UJ	1.32	0.33	0.05	=	0.98	0.12	0.06	=	1.14	0.36	0.17	=	2.05	0.50	0.17	=	1.18	0.36	0.17	=	0.18	0.17	0.30	UJ	1.23	0.21	0.3	=	0.03
		SVP263908	872356	1085986	499.0	11/02/2022	0.0	7.5	8.0	0.02	0.20	0.35	UJ	0.30	0.75	1.31	UJ	1.46	0.38	0.09	=	0.89	0.12	0.08	=	1.33	0.39	0.18	=	1.52	0.43	0.18	J	1.12	0.36	0.18	=	-0.09	0.25	0.41	UJ	0.93	0.20	0.4	=	0.02
		SVP263909	872356	1085986	499.0	11/02/2022	0.0	9.0	9.5	0.09	0.14	0.24	UJ	-0.15	0.50	0.83	UJ	1.20	0.30	0.05	=	0.92	0.11	0.05	=	1.00	0.35	0.19	=	1.39	0.42	0.19	J	1.12	0.37	0.15	=	0.00	0.17	0.28	UJ	1.04	0.19	0.3	=	0.00
		SVP263910	872356	1085986	499.0	11/02/2022	0.0	10.5	11.0	-0.03	0.13	0.22	UJ	0.16	0.48	0.83	UJ	1.09	0.28	0.05	=	0.89	0.11	0.05	=	0.93	0.31	0.13	=	1.05	0.33	0.16	J	0.91	0.30	0.13	=	0.06	0.17	0.28	UJ	1.10	0.19	0.3	=	0.00
		SVP263911	872356	1085986	499.0	11/02/2022	0.0	13.0	13.5	0.05	0.13	0.23	UJ	0.15	0.47	0.80	UJ	1.08	0.27	0.05	=	0.86	0.10	0.05	=	0.78	0.29	0.17	=	1.12	0.35	0.17	J	1.23	0.37	0.17	=	0.04	0.16	0.27	UJ	0.87	0.16	0.3	=	0.00
		SVP263912	872356	1085986	499.0	11/02/2022	0.0	14.5	15.0	0.01	0.13	0.23	UJ	-0.23	0.47	0.78	UJ	0.98	0.25	0.05	=	0.85	0.10	0.05	=	0.91	0.31	0.16	=	1.12	0.35	0.13	J	0.93	0.31	0.17	=	0.18	0.16	0.28	UJ	0.93	0.17	0.3	=	0.00
		SVP263913	872356	1085986	499.0	11/02/2022	0.0	17.5	18.0	-0.08	0.14	0.22	UJ	-0.39	0.49	0.80	UJ	1.35	0.34	0.06	=	0.92	0.12	0.06	=	1.20	0.38	0.18	=	0.95	0.34	0.19	J	1.30	0.40	0.18	=	0.08	0.18	0.30	UJ	0.90	0.18	0.3	=	0.01
		SVP263914	872356	1085986	499.0	11/02/2022	0.0	19.0	19.5	0.10	0.14	0.24	UJ	-0.13	0.51	0.85	UJ	1.05	0.26	0.06	=	0.93	0.12	0.06	=	1.36	0.37	0.16	=	1.42	0.38	0.15	J	1.03	0.32	0.15	=	0.04	0.16	0.28	UJ	1.21	0.20	0.3	=	0.00
		SVP263915	872356	1085986	499.0	11/02/2022	0.0	21.5	22.0	0.08	0.08	0.13	UJ	-0.44	0.47	0.76	UJ	1.08	0.27	0.05	=	0.96	0.12	0.06	=	1.47	0.40	0.17	=	1.24	0.36	0.15	J	1.16	0.35	0.16	=	0.07	0.16	0.26	UJ	1.11	0.19	0.3	=	0.00
		SVP263916	872356	1085986	499.0	11/02/2022	0.0	23.0	23.5	0.10	0.13	0.23	UJ	0.00	0.47	0.79	UJ	1.01	0.26	0.05	=	0.88	0.11	0.06	=	1.68	0.44	0.16	=	1.40	0.40	0.17	J	0.99	0.33	0.17	=	0.10	0.16	0.27	UJ	1.27	0.20	0.3	=	0.00
		SVP263917	872356	1085986	499.0	11/02/2022	0.0	25.0	25.5	0.00	0.13	0.22	UJ	-0.19	0.47	0.78	UJ	0.99	0.25	0.05	=	1.05	0.13	0.06	=	1.31	0.37	0.16	=	1.39	0.38	0.13	J	1.16	0.35	0.16	=	0.10	0.16	0.27	UJ	1.27	0.20	0.3	=	0.00
		SVP263918	872356	1085986	499.0	11/02/2022	0.0	26.0	26.5	-0.13	0.13	0.21	UJ	0.19	0.47	0.81	UJ	1.00	0.26	0.05	=	1.02	0.13	0.05	=	1.70	0.45	0.17	=	1.89	0.48	0.17	=	1.22	0.37	0.17	=	0.12	0.12	0.18	UJ	1.18	0.20	0.3	=	0.00
2	SVP264071	SVP264071	872240	1085986	506.0	11/01/2022	0.0	0.0	0.5	0.19	0.22	0.40	UJ	0.46	0.74	1.31	UJ	1.25	0.33	0.09	=	0.96	0.14	0.08	=	1.35	0.39	0.13	=	2.02	0.49	0.13	J	1.54	0.42	0.17	=	-0.07	0.25	0.41	UJ	1.04	0.20	0.5	=	0.10
		SVP264072	872240	1085986	506.0	11/01/2022	0.0	1.5	2.0	0.08	0.14	0.24	UJ	0.28	0.50	0.85	UJ	1.35	0.34	0.05	=	0.97	0.12	0.05	=	1.12	0.35	0.17	=	1.77	0.46	0.13	J	0.91	0.31	0.17	=	0.02	0.18	0.29	UJ	1.20	0.20	0.3	=	0.01
		SVP264073	872240	1085986	506.0	11/01/2022	0.0	2.5	3.0	-0.05	0.13	0.22	UJ	0.11	0.50	0.84	UJ	1.31	0.33	0.06	=	0.95	0.11	0.05	=	1.06	0.33	0.18	=	1.57	0.41	0.15	J	0.79	0.28	0.15	=	0.11	0.17	0.29	UJ	1.15	0.19	0.3	=	0.01
		SVP264074	872240	1085986	506.0	11/01/2022	0.0	5.5	6.0	-0.03	0.14	0.23	UJ	0.05	0.48	0.82	UJ	1.26	0.32	0.06	=	1.00	0.12	0.05	=	1.43	0.40	0.16	=	1.93	0.48	0.17	J	1.09	0.34	0.17	=	0.09	0.17	0.29	UJ	1.23	0.20	0.3	=	0.01
		SVP264075	872240	1085986	506.0	11/01/2022	0.0	6.0	6.5	-0.01	0.13	0.22	UJ	-0.24	0.49	0.80	UJ	1.27	0.32	0.05	=	1.00	0.12	0.05	=	1.11	0.38	0.19	=	2.11	0.55	0.19	J	1.10	0.38	0.20	=	0.14	0.17	0.29	UJ	1.14	0.20	0.3	=	0.03
		SVP264076	872240	1085986	506.0	11/01/2022	0.0	8.5	9.0	0.11	0.13	0.22	UJ	0.29	0.48	0.82	UJ	1.25	0.31	0.05	=	0.90	0.12	0.05	=	1.84	0.50	0.22	=	1.92	0.52	0.20	J	1.20	0.39	0.20	=	-0.03	0.17	0.27	UJ	1.15	0.19	0.3	=	0.01
		SVP264077	872240	1085986	506.0	11/01/2022	0.0	11.5	12.0	-0.07	0.15	0.24	UJ	0.12	0.54	0.92	UJ	1.22	0.31	0.06	=	0.94	0.11	0.06	=	1.60	0.46	0.19	=	1.46	0.43	0.18	J	1.03	0.36	0.19	=	0.20	0.18	0.31	UJ	1.43	0.24	0.3	=	0.01
		SVP264078	872240	1085986	506.0	11/01/2022	0.0	12.5	13.0	0.06	0.13	0.22	UJ	0.07	0.47	0.79	UJ	1.01	0.26	0.05	=	0.88	0.10	0.05	=	1.44	0.40	0.18	=	1.71	0.45	0.17	J	0.95	0.32	0.17	=	0.10	0.16	0.27	UJ	0.98	0.17	0.3	=	0.00
		SVP264079	872240	1085986	506.0	11/01/2022	0.0	15.0	15.5	-0.08	0.14	0.23	UJ	-0.16	0.52	0.87	UJ	1.04	0.27	0.06	=	0.77	0.10	0.05	=	1.31	0.38	0.19	=	1.91	0.48	0.16	J	1.21	0.37	0.17	=	0.03	0.17	0.29	UJ	1.05	0.21	0.3	=	0.01

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
2	SVP264089	SVP264089	872298	1085885	504.9	11/02/2022	0.0	0.0	0.5	-0.07	0.21	0.36	UJ	-0.01	0.79	1.35	UJ	1.31	0.34	0.08	=	1.05	0.14	0.08	=	1.14	0.35	0.13	=	1.86	0.47	0.17	J	1.02	0.33	0.13	=	0.00	0.25	0.42	UJ	1.09	0.21	0.4	=	0.10
		SVP264090	872298	1085885	504.9	11/02/2022	0.0	1.5	2.0	-0.03	0.16	0.26	UJ	0.01	0.55	0.93	UJ	1.44	0.36	0.07	=	1.04	0.13	0.06	=	1.40	0.38	0.12	=	1.74	0.43	0.12	J	1.22	0.35	0.15	=	0.10	0.20	0.33	UJ	1.32	0.22	0.4	=	0.02
		SVP264091	872298	1085885	504.9	11/02/2022	0.0	2.5	3.0	0.01	0.16	0.27	UJ	0.02	0.56	0.95	UJ	1.47	0.37	0.06	=	1.00	0.12	0.07	=	1.34	0.40	0.18	=	1.86	0.48	0.14	J	1.29	0.39	0.18	=	-0.15	0.19	0.31	UJ	1.22	0.20	0.3	=	0.02
		SVP264092	872298	1085885	504.9	11/02/2022	0.0	5.0	5.5	-0.07	0.13	0.21	UJ	-0.06	0.49	0.81	UJ	1.14	0.29	0.05	=	0.80	0.10	0.05	=	0.93	0.29	0.17	=	1.37	0.36	0.14	J	0.98	0.30	0.14	=	0.07	0.15	0.26	UJ	0.97	0.17	0.3	=	0.00
		SVP264093	872298	1085885	504.9	11/02/2022	0.0	7.5	8.0	0.06	0.15	0.26	UJ	0.09	0.52	0.89	UJ	1.26	0.32	0.06	=	0.91	0.11	0.05	=	1.05	0.32	0.15	=	1.11	0.33	0.15	J	1.02	0.31	0.15	=	0.02	0.18	0.31	UJ	1.05	0.18	0.3	=	0.01
		SVP264094	872298	1085885	504.9	11/02/2022	0.0	8.0	8.5	0.12	0.13	0.23	UJ	-0.11	0.46	0.76	UJ	1.22	0.31	0.05	=	0.81	0.10	0.05	=	0.95	0.32	0.16	=	1.53	0.42	0.16	J	0.83	0.30	0.17	=	-0.05	0.16	0.26	UJ	1.02	0.17	0.3	=	0.00
		SVP264095	872298	1085885	504.9	11/02/2022	0.0	11.0	11.5	0.05	0.13	0.23	UJ	0.65	0.49	0.84	UJ	1.17	0.29	0.05	=	0.85	0.10	0.05	=	1.19	0.37	0.21	=	1.69	0.45	0.17	J	0.82	0.30	0.17	=	0.22	0.17	0.28	UJ	0.89	0.25	0.3	=	0.00
		SVP264096	872298	1085885	504.9	11/02/2022	0.0	13.0	13.5	0.07	0.12	0.21	UJ	-0.11	0.46	0.76	UJ	1.14	0.29	0.05	=	0.75	0.10	0.05	=	1.14	0.34	0.16	=	1.97	0.47	0.16	J	0.89	0.30	0.16	=	0.18	0.15	0.26	UJ	0.89	0.16	0.3	=	0.01
		SVP264097	872298	1085885	504.9	11/02/2022	0.0	14.5	15.0	0.06	0.12	0.21	UJ	0.32	0.45	0.78	UJ	1.01	0.26	0.05	=	0.72	0.09	0.05	=	1.05	0.33	0.18	=	1.54	0.41	0.17	J	0.80	0.29	0.16	=	0.13	0.16	0.26	UJ	0.77	0.14	0.3	=	0.00
		SVP264098	872298	1085885	504.9	11/02/2022	0.0	17.5	18.0	0.04	0.14	0.24	UJ	-0.09	0.51	0.85	UJ	1.17	0.30	0.06	=	0.85	0.10	0.05	=	1.07	0.33	0.17	=	1.28	0.36	0.15	J	0.75	0.27	0.15	=	-0.11	0.17	0.28	UJ	0.78	0.14	0.3	=	0.00
		SVP264099	872298	1085885	504.9	11/02/2022	0.0	18.5	19.0	-0.01	0.13	0.21	UJ	0.03	0.47	0.79	UJ	1.10	0.28	0.05	=	0.83	0.10	0.05	=	1.16	0.37	0.18	=	1.41	0.42	0.19	J	1.03	0.35	0.19	=	0.04	0.16	0.26	UJ	0.86	0.16	0.3	=	0.00
		SVP264100	872298	1085885	504.9	11/02/2022	0.0	20.5	21.0	-0.05	0.12	0.20	UJ	-0.28	0.45	0.74	UJ	1.03	0.26	0.05	=	0.76	0.09	0.05	=	1.00	0.31	0.15	=	1.06	0.32	0.12	J	0.94	0.30	0.15	=	0.01	0.15	0.26	UJ	0.82	0.15	0.3	=	0.00
		SVP264101	872298	1085885	504.9	11/02/2022	0.0	23.0	23.5	-0.08	0.14	0.22	UJ	-0.10	0.49	0.81	UJ	1.11	0.28	0.05	=	0.87	0.12	0.05	=	0.99	0.32	0.13	=	1.13	0.35	0.16	J	0.86	0.30	0.16	=	0.00	0.17	0.28	UJ	1.08	0.19	0.3	=	0.00
		SVP264102	872298	1085885	504.9	11/02/2022	0.0	25.3	25.8	0.02	0.13	0.22	UJ	-0.34	0.47	0.76	UJ	1.01	0.26	0.05	=	0.87	0.11	0.05	=	1.10	0.34	0.13	=	1.33	0.38	0.16	J	0.97	0.32	0.13	=	-0.01	0.16	0.26	UJ	0.95	0.17	0.3	=	0.00
		SVP264103	872298	1085885	504.9	11/02/2022	0.0	26.5	27.0	0.02	0.13	0.22	UJ	-0.03	0.46	0.78	UJ	0.96	0.25	0.05	=	0.88	0.11	0.05	=	0.98	0.33	0.13	=	1.42	0.40	0.13	J	1.58	0.43	0.13	=	-0.02	0.16	0.27	UJ	0.91	0.16	0.3	=	0.00
2	SVP264104	SVP264104	872357	1085785	496.2	11/02/2022	0.0	0.0	0.5	0.08	0.20	0.35	UJ	-0.49	0.68	1.10	UJ	1.16	0.30	0.08	=	0.74	0.10	0.08	=	0.83	0.30	0.18	=	1.15	0.36	0.18	J	1.05	0.34	0.18	=	-0.11	0.23	0.38	UJ	1.03	0.21	0.4	=	0.04
		SVP264104-1	872357	1085785	496.2	11/02/2022	0.0	0.0	0.5	-0.11	0.15	0.25	UJ	-0.27	0.55	0.90	UJ	1.28	0.33	0.06	=	0.87	0.12	0.06	=	1.78	0.50	0.20	=	2.08	0.55	0.16	=	1.33	0.43	0.20	=	0.09	0.17	0.30	UJ	1.07	0.18	0.3	=	0.11
		SVP264104-2	872357	1085785	496.2	11/02/2022	0.0	0.0	0.5	0.09	0.33	1.09	UJ	0.68	3.02	12.70	UJ	1.36	0.29	0.16	=	1.39	0.29	0.16	=	0.94	0.23	0.13	=	0.79	0.22	0.14	=	0.89	0.21	0.07	=	-0.03	0.49	1.07	UJ	2.45	1.49	2.5	UJ	0.11
		SVP264105	872357	1085785	496.2	11/02/2022	0.0	1.5	2.0	-0.08	0.15	0.24	UJ	0.02	0.52	0.88	UJ	1.31	0.32	0.06	=	1.00	0.13	0.06	=	1.12	0.37	0.19	=	1.87	0.49	0.15	=	1.06	0.36	0.19	=	0.15	0.17	0.29	UJ	1.30	0.20	0.3	=	0.01
		SVP264106	872357	1085785	496.2	11/02/2022	0.0	3.5	4.0	0.00	0.20	0.34	UJ	-0.98	0.75	1.16	UJ	1.18	0.31	0.09	=	0.96	0.14	0.08	=	1.27	0.38	0.14	=	1.92	0.49	0.18	=	1.16	0.36	0.18	=	0.03	0.23	0.39	UJ	0.92	0.19	0.4	=	0.01
		SVP264107	872357	1085785	496.2	11/02/2022	0.0	5.5	6.0	0.03	0.13	0.22	UJ	-0.38	0.48	0.78	UJ	1.04	0.27	0.05	=	0.74	0.10	0.05	=	1.01	0.35	0.19	=	1.51	0.44	0.15	J	0.85	0.31	0.15	=	0.00	0.15	0.25	UJ	0.84	0.15	0.3	=	0.00
		SVP264108	872357	1085785	496.2	11/02/2022	0.0	6.0	6.5	0.04	0.13	0.22	UJ	0.30	0.48	0.83	UJ	1.11	0.28	0.06	=	0.87	0.11	0.05	=	1.15	0.36	0.18	=	1.66	0.45	0.18	=	1.29	0.39	0.18	=	-0.05	0.16	0.27	UJ	0.87	0.15	0.3	=	0.00
		SVP264109	872357	1085785	496.2	11/02/2022	0.0	9.5	10.0	-0.06	0.13	0.21	UJ	-0.61	0.47	0.73	UJ	0.96	0.25	0.05	=	0.81	0.11	0.06	=	0.94	0.34	0.19	=	1.40	0.42	0.19	J	1.11	0.37	0.15	=	0.11	0.16	0.27	UJ	0.84	0.16	0.3	=	0.00
		SVP264110	872357	1085785	496.2	11/02/2022	0.0	11.0	11.5	0.20	0.14	0.26	UJ	0.17	0.50	0.86	UJ	1.01	0.26	0.06	=	0.90	0.12	0.06	=	1.35	0.39	0.17	=	1.77	0.46	0.17	=	0.89	0.31	0.17	=	0.06	0.17	0.28	UJ	0.91	0.17	0.3	=	0.00
		SVP264111	872357	1085785	496.2	11/02/2022	0.0	12.5	13.0	-0.12	0.13	0.21	UJ	0.06	0.47	0.81	UJ	0.86	0.22	0.05	=	0.77	0.09	0.05	=	0.96	0.32	0.13	J	0.99	0.33	0.17	J	1.04	0.33	0.17	=	0.02	0.17	0.28	UJ	0.79	0.16	0.3	=	0.00
		SVP264112	872357	1085785	496.2	11/02/2022	0.0	15.0	15.5	0.05	0.04	0.10	UJ	0.01	0.47	0.79	UJ	0.93	0.24	0.05	=	0.82	0.10	0.05	=	1.14	0.36	0.14	J	1.83	0.48	0.18	J	0.97	0.33	0.14	=	-0.02	0.16	0.27	UJ	0.86	0.17	0.3	=	0.00
		SVP264113	872357	1085785	496.2	11/02/2022	0.0	17.0	17.5	0.10	0.14	0.24	UJ	-0.03	0.47	0.78	UJ	0.91	0.23	0.05	=	0.93	0.12	0.05	=	1.15	0.36	0.14	J	1.27	0.38	0.14	J	1.48	0.42	0.14	=	-0.02	0.16	0.27	UJ	1.04	0.18	0.3	=	0.00
		SVP264114	872357	1085785	496.2	11/02/2022	0.0	19.0	19.5	0.07	0.12	0.22	UJ	0.00	0.44	0.75	UJ	0.87	0.23	0.05	=	1.00	0.12	0.05	=	1.35	0.39	0.16	J	1.21	0.36	0.16	J	0.96	0.32	0.16	=	0.12	0.16	0.27	UJ	1.04	0.19	0.3	=	0.00
		SVP264115	872357	1085785	496.2	11/02/2022	0.0	20.5	21.0	-0.01	0.13	0.22	UJ	0.06	0.46	0.79	UJ	0.89	0.23	0.05	=	1.00	0.12	0.06	=	1.51	0.43	0.18	J	1.40	0.41	0.18	J	1.19	0.37	0.17	=	0.05	0.16	0.27	UJ	1.14	0.20	0.3	=	0.00
		SVP264116	872357	1085785	496.2	11/02/2022	0.0	23.0	23.5	0.05	0.03	0.10	UJ	0.36	0.45	0.79	UJ	0.93	0.24	0.05	=	0.95	0.11	0.05	=	1.39	0.37	0.14	J	1.36	0.37	0.15	J	0.97	0.30	0.12	=	0.12	0.16	0.28	UJ	1.14	0.19	0.3	=	0.00
3	HTZ250127	HTZ250127	872032	1085861	508.9	11/07/2022	0.0	0.0	0.5	0.04	0.12	0.21	UJ	-0.26	0.46	0.75	UJ	0.92	0.23	0.05	=	0.65	0.09	0.05	=	0.89	0.34	0.20	J	2.14	0.56	0.21	=	0.53	0.26	0.20	=	0.04	0.14	0.24	UJ	0.95	0.17	0.3	=	0.05
3	SVP263644	SVP263644	871834	1085683	505.1	10/26/2022	0.0	0.0	0.5	-0.02	0.20	0.34	UJ	-0.74	0.78	1.24	UJ	0.99	0.27	0.08	=	0.83	0.12	0.07	=	1.00	0.33	0.17	=	1.56	0.43	0.11	J	0.86	0.31	0.17	=	-0.01	0.25	0.42	UJ	1.07	0.21	0.4	=	0.01
		SVP263645	871834	1085683	505.1	10/26/2022	0.0	1.0	1.5	-0.07	0.15	0.24	UJ	-0.75	0.55	0.86	UJ	1.09	0.27	0.06	=	0.87	0.11	0.06	=	1.49	0.44	0.19	=	1.69	0.47	0.15	J	1.46	0.44	0.19	=	0.03	0.19	0.31	UJ	1.36	0.23	0.3	=	0.00
		SVP263646	871834	1085683	505.1	10/26/2022	0.0	3.3	3.8	-0.06	0.16	0.26	UJ	-0.12	0.58	0.97	UJ	1.10	0.28	0.06	=	1.03	0.12	0.06	=	1.53	0.44	0.18	=	1.90	0.50	0.19	=	1.08	0.35	0.12	=	0.20	0.20	0.35	UJ	1.20	0.20	0.3	=	0.00
		SVP263647	871834	1085683	505.1	10/26/2022	0.0	4.5	5.0	0.05	0.14	0.24	UJ	-0.51	0.51	0.82	UJ	1.07	0.27	0.05	=	1.00	0.13	0.05	=	1.26	0.38	0.17	=	1.40	0.40	0.11	J	1.10	0.35	0.17	=	0.02	0.17	0.29	UJ	1.17	0.21	0.3	=	0.00
		SVP263648	871834	1085683	505.1	10/26/2022	0.0	7.2	7.7	-0.06	0.14	0.22	UJ	-0.03	0.52	0.87	UJ	1.09	0.27	0.05	=	0.93	0.12	0.05	=	1.35	0.41	0.19	=	1.61	0.46	0.12	J	1.35	0.41	0.19	=	0.10	0.18	0.30	UJ	1.13	0.18	0.3	=	0.00
		SVP263649	871834	1085683	505.1	10/26/2022	0.0	9.5	10.0	-0.08	0.13	0.21	UJ	0.07	0.49	0.83	UJ	0.93	0.24	0.05	=	0.78	0.09	0.05	=	1.42	0.43	0.17	=	1.46	0.44	0.20	J	0.56	0.26	0.13	=	0.22	0.17	0.29	UJ	1.02	0.17	0.3	=	0.00
		SVP263650	871834	1085683	505.1	10/26/2022	0.0	11.0	11.5	0.13	0.09	0.14	UJ	-0.27	0.46	0.76	UJ	0.95	0.24	0.05	=	0.79	0.09	0.05	=	1.04	0.34	0.12	=	1.31	0.39	0.18	J	1.21	0.38	0.18	=	0.02	0.16	0.27	UJ	0.94	0.17	0.3	=	0.00
		SVP263651	871834	1085683	505.1	10/26/2022	0.0	13.5	14.0	0.07	0.13	0.22	UJ	-0.15	0.47	0.78	UJ	0.98	0.25	0.05	=	0.74	0.10	0.04	=	0.88	0.34	0.20	=	1.21	0.40	0.20	J	1.29	0.41	0.16	=	-0.04	0.17	0.28	UJ	0.85	0.15	0.3	=	0.00
		SVP263652	871834	1085683	505.1	10/26/2022	0.0	14.5	15.0	-0.06	0.12	0.20	UJ	0.09	0.46	0.78	UJ	0.85	0.22	0.05	=	0.75	0.09	0.05	=	1.05	0.36	0.19	=	1.63	0.47	0.13	J	0.87	0.33	0.19	=	0.03	0.16	0.27	UJ	1.00	0.17	0.3	=	0.00

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
3	SVP263817	SVP263817	871769	1085790	506.4	10/31/2022	0.0	0.0	0.5	-0.10	0.20	0.33	UJ	-0.15	0.72	1.21	UJ	0.91	0.24	0.07	=	0.75	0.11	0.08	=	0.99	0.32	0.18	J	1.20	0.35	0.13	J	1.09	0.33	0.14	=	-0.06	0.22	0.36	UJ	0.93	0.19	0.4	=	0.00
		SVP263817-1	871769	1085790	506.4	10/31/2022	0.0	0.0	0.5	-0.07	0.20	0.33	UJ	-0.97	0.68	1.01	UJ	0.86	0.24	0.08	=	0.63	0.09	0.08	=	1.14	0.35	0.18	J	1.28	0.37	0.11	J	1.19	0.36	0.11	=	0.14	0.22	0.38	UJ	0.72	0.17	0.4	=	0.00
		SVP263817-2	871769	1085790	506.4	10/31/2022	0.0	0.0	0.5	-0.07	0.20	0.33	UJ	-0.97	0.68	1.01	UJ	0.86	0.24	0.08	=	0.63	0.09	0.08	=	1.14	0.35	0.18	J	1.28	0.37	0.11	J	1.19	0.36	0.11	=	0.14	0.22	0.38	UJ	0.72	0.17	0.4	=	0.00
		SVP263818	871769	1085790	506.4	10/31/2022	0.0	1.5	2.0	0.09	0.14	0.24	UJ	-0.57	0.54	0.85	UJ	1.03	0.26	0.06	=	1.02	0.13	0.06	=	1.41	0.37	0.17	J	1.79	0.43	0.13	J	1.27	0.35	0.11	=	-0.08	0.17	0.27	UJ	1.35	0.22	0.3	=	0.00
		SVP263819	871769	1085790	506.4	10/31/2022	0.0	3.0	3.5	0.00	0.20	0.34	UJ	0.09	0.71	1.22	UJ	0.98	0.26	0.08	=	0.80	0.11	0.08	=	1.28	0.36	0.13	J	1.98	0.46	0.15	=	1.12	0.33	0.10	=	0.10	0.22	0.37	UJ	1.03	0.21	0.4	=	0.01
		SVP263820	871769	1085790	506.4	10/31/2022	0.0	5.5	6.0	-0.04	0.14	0.24	UJ	-0.26	0.52	0.85	UJ	1.06	0.27	0.06	=	0.90	0.12	0.06	=	1.27	0.37	0.14	J	1.69	0.44	0.15	J	1.01	0.33	0.11	=	-0.06	0.17	0.28	UJ	1.32	0.21	0.3	=	0.00
		SVP263821	871769	1085790	506.4	10/31/2022	0.0	6.5	7.0	0.13	0.13	0.23	UJ	0.27	0.47	0.81	UJ	1.02	0.26	0.06	=	0.84	0.10	0.05	=	0.87	0.30	0.18	J	1.34	0.37	0.10	J	1.26	0.36	0.15	=	0.15	0.16	0.27	UJ	0.89	0.16	0.3	=	0.00
		SVP263822	871769	1085790	506.4	10/31/2022	0.0	9.0	9.5	-0.05	0.13	0.21	UJ	0.08	0.44	0.75	UJ	0.90	0.23	0.05	=	0.68	0.09	0.05	=	1.22	0.36	0.18	J	1.49	0.41	0.11	J	0.77	0.28	0.12	=	-0.02	0.15	0.25	UJ	0.87	0.15	0.3	=	0.00
		SVP263823	871769	1085790	506.4	10/31/2022	0.0	10.5	11.0	0.05	0.13	0.23	UJ	-0.12	0.46	0.77	UJ	1.10	0.27	0.05	=	0.83	0.11	0.05	=	1.28	0.37	0.18	J	1.96	0.47	0.16	=	1.09	0.33	0.12	=	0.05	0.15	0.26	UJ	1.14	0.19	0.3	=	0.01
		SVP263824	871769	1085790	506.4	10/31/2022	0.0	13.0	13.5	0.05	0.04	0.10	UJ	0.44	0.47	0.82	UJ	0.90	0.23	0.05	=	0.79	0.10	0.05	=	0.98	0.33	0.19	J	1.31	0.38	0.13	J	0.86	0.30	0.17	=	0.07	0.15	0.25	UJ	1.03	0.17	0.3	=	0.00
		SVP263825	871769	1085790	506.4	10/31/2022	0.0	14.7	15.2	-0.03	0.14	0.23	UJ	0.18	0.52	0.89	UJ	1.08	0.27	0.06	=	0.84	0.11	0.06	=	0.96	0.36	0.24	J	1.63	0.49	0.22	J	1.48	0.46	0.14	=	-0.06	0.17	0.29	UJ	1.06	0.18	0.3	=	0.00
3	SVP263826	SVP263826	871882	1085771	506.8	10/31/2022	0.0	0.0	0.5	0.22	0.19	0.36	UJ	-0.06	0.70	1.18	UJ	0.94	0.25	0.08	=	0.74	0.11	0.07	=	1.41	0.40	0.15	=	1.82	0.47	0.17	=	0.87	0.31	0.11	=	0.05	0.23	0.38	UJ	0.92	0.18	0.4	=	0.02
		SVP263826-1	871882	1085771	506.8	10/31/2022	0.0	0.0	0.5	-0.18	0.20	0.32	UJ	-0.01	0.67	1.14	UJ	0.97	0.26	0.08	=	0.69	0.10	0.07	=	1.20	0.36	0.16	=	1.17	0.36	0.17	=	0.97	0.32	0.13	=	0.05	0.23	0.39	UJ	0.80	0.28	0.4	=	0.00
		SVP263826-2	871882	1085771	506.8	10/31/2022	0.0	0.0	0.5	0.08	0.28	1.11	UJ	-1.28	4.31	7.22	UJ	1.07	0.22	0.13	=	0.73	0.30	0.26	=	0.60	0.18	0.14	=	0.89	0.22	0.13	=	0.77	0.19	0.06	=	0.07	0.45	0.76	UJ	1.45	0.66	0.9	=	0.03
		SVP263827	871882	1085771	506.8	10/31/2022	0.0	1.5	2.0	0.01	0.14	0.23	UJ	-0.12	0.50	0.84	UJ	1.12	0.28	0.05	=	0.98	0.12	0.06	=	1.37	0.40	0.20	=	1.30	0.38	0.11	=	1.28	0.38	0.17	=	0.20	0.17	0.29	UJ	1.26	0.21	0.3	=	0.00
		SVP263828	871882	1085771	506.8	10/31/2022	0.0	3.5	4.0	0.03	0.14	0.24	UJ	-0.16	0.50	0.83	UJ	1.32	0.33	0.05	=	0.91	0.12	0.05	=	1.03	0.33	0.20	=	1.98	0.48	0.17	=	1.45	0.40	0.11	=	-0.02	0.17	0.28	UJ	1.20	0.20	0.3	=	0.02
		SVP263829	871882	1085771	506.8	10/31/2022	0.0	5.5	6.0	-0.12	0.14	0.23	UJ	0.14	0.52	0.89	UJ	1.20	0.30	0.06	=	0.92	0.11	0.06	=	1.32	0.37	0.12	=	1.65	0.42	0.12	=	1.18	0.34	0.10	=	0.05	0.18	0.30	UJ	1.06	0.19	0.3	=	0.00
		SVP263830	871882	1085771	506.8	10/31/2022	0.0	7.5	8.0	-0.08	0.14	0.23	UJ	0.08	0.48	0.82	UJ	1.16	0.30	0.05	=	0.88	0.11	0.05	=	1.30	0.36	0.18	=	1.64	0.41	0.15	=	1.15	0.34	0.12	=	0.10	0.17	0.28	UJ	1.42	0.26	0.3	=	0.00
		SVP263831	871882	1085771	506.8	10/31/2022	0.0	9.0	9.5	0.04	0.13	0.22	UJ	0.10	0.44	0.75	UJ	0.99	0.25	0.04	=	0.83	0.10	0.04	=	1.42	0.41	0.16	=	1.69	0.45	0.13	=	1.05	0.34	0.11	=	-0.11	0.16	0.25	UJ	1.02	0.18	0.3	=	0.00
		SVP263832	871882	1085771	506.8	10/31/2022	0.0	11.0	11.5	0.01	0.12	0.21	UJ	-0.16	0.46	0.77	UJ	1.02	0.26	0.05	=	0.81	0.10	0.05	=	1.04	0.35	0.12	=	1.55	0.44	0.19	=	0.89	0.32	0.19	=	0.11	0.15	0.26	UJ	1.10	0.18	0.3	=	0.00
		SVP263833	871882	1085771	506.8	10/31/2022	0.0	13.5	14.0	0.05	0.12	0.21	UJ	0.12	0.44	0.76	UJ	0.98	0.25	0.05	=	0.70	0.09	0.05	=	1.07	0.38	0.21	=	2.07	0.55	0.18	=	0.95	0.35	0.16	=	0.03	0.15	0.25	UJ	0.83	0.16	0.3	=	0.02
		SVP263834	871882	1085771	506.8	10/31/2022	0.0	14.5	15.0	0.10	0.12	0.20	UJ	-0.03	0.46	0.78	UJ	0.90	0.23	0.05	=	0.76	0.09	0.04	=	0.96	0.35	0.17	=	2.17	0.55	0.13	=	0.68	0.29	0.20	=	-0.02	0.16	0.26	UJ	0.94	0.16	0.3	=	0.02
3	SVP263835	SVP263835	871781	1085994	510.5	10/31/2022	0.0	0.0	0.5	0.15	0.21	0.37	UJ	-0.50	0.80	1.31	UJ	0.97	0.27	0.09	=	0.85	0.12	0.09	=	1.53	0.48	0.15	=	2.61	0.67	0.15	J	1.44	0.47	0.23	=	0.02	0.26	0.43	UJ	0.96	0.22	0.4	=	0.08
		SVP263836	871781	1085994	510.5	10/31/2022	0.0	1.0	1.5	0.05	0.22	0.38	UJ	-0.11	0.81	1.38	UJ	1.14	0.31	0.09	=	0.96	0.13	0.09	=	1.19	0.37	0.18	=	1.58	0.44	0.18	J	0.88	0.31	0.11	=	0.09	0.25	0.42	UJ	1.40	0.26	0.4	=	0.00
		SVP263837	871781	1085994	510.5	10/31/2022	0.0	3.2	3.7	0.07	0.15	0.26	UJ	-0.06	0.57	0.95	UJ	1.40	0.36	0.06	=	1.02	0.12	0.06	=	1.21	0.41	0.17	=	2.56	0.65	0.22	J	1.01	0.38	0.22	=	0.15	0.19	0.32	UJ	1.18	0.21	0.3	=	0.07
		SVP263838	871781	1085994	510.5	10/31/2022	0.0	5.5	6.0	0.08	0.13	0.22	UJ	-0.28	0.48	0.79	UJ	1.12	0.29	0.05	=	0.88	0.11	0.05	=	1.17	0.38	0.13	=	1.86	0.50	0.15	J	0.96	0.35	0.20	=	0.07	0.16	0.27	UJ	0.98	0.24	0.3	=	0.00
		SVP263839	871781	1085994	510.5	10/31/2022	0.0	6.0	6.5	0.10	0.09	0.14	UJ	0.31	0.48	0.83	UJ	1.21	0.30	0.06	=	0.86	0.10	0.06	=	1.24	0.38	0.18	=	1.77	0.47	0.14	J	1.39	0.41	0.15	=	0.10	0.16	0.27	UJ	1.09	0.19	0.3	=	0.00
		SVP263840	871781	1085994	510.5	10/31/2022	0.0	9.5	10.0	0.04	0.13	0.22	UJ	0.26	0.48	0.82	UJ	1.04	0.26	0.05	=	0.83	0.10	0.05	=	1.13	0.36	0.17	=	1.27	0.38	0.11	J	0.87	0.31	0.17	=	0.09	0.16	0.27	UJ	0.99	0.18	0.3	=	0.00
		SVP263841	871781	1085994	510.5	10/31/2022	0.0	11.0	11.5	0.00	0.13	0.22	UJ	0.30	0.46	0.79	UJ	1.01	0.26	0.05	=	0.84	0.10	0.05	=	0.91	0.33	0.19	=	1.37	0.41	0.19	J	1.09	0.36	0.19	=	-0.01	0.16	0.26	UJ	0.96	0.17	0.3	=	0.00
		SVP263842	871781	1085994	510.5	10/31/2022	0.0	12.5	13.0	0.01	0.13	0.21	UJ	0.20	0.45	0.78	UJ	0.89	0.23	0.05	=	0.75	0.09	0.05	=	0.91	0.34	0.15	=	1.67	0.48	0.13	J	1.10	0.37	0.13	=	-0.06	0.16	0.26	UJ	0.97	0.18	0.3	=	0.00
		SVP263843	871781	1085994	510.5	10/31/2022	0.0	14.5	15.0	0.14	0.13	0.23	UJ	0.19	0.46	0.79	UJ	0.91	0.23	0.06	=	0.79	0.10	0.05	=	1.09	0.38	0.20	=	1.78	0.50	0.20	J	0.82	0.32	0.20	=	0.06	0.16	0.27	UJ	1.02	0.18	0.3	=	0.00
3	SVP263984	SVP263984	871945	1085739	506.0	11/03/2022	0.0	0.0	0.5	-0.06	0.21	0.36	UJ	-0.17	0.78	1.32	UJ	1.10	0.30	0.09	=	0.72	0.11	0.08	=	1.39	0.40	0.19	=	1.72	0.5	0.16	=	0.80	0.29	0.17	=	-0.04	0.24	0.40	UJ	1.07	0.23	0.4	=	0.05
		SVP263985	871945	1085739	506.0	11/03/2022	0.0	1.0	1.5	0.01	0.15	0.25	UJ	-0.17	0.54	0.89	UJ	1.24	0.32	0.06	=	0.93	0.12	0.06	=	1.57	0.45	0.19	=	1.63	0.5	0.19	=	1.08	0.37	0.19	=	0.12	0.18	0.31	UJ	1.25	0.21	0.3	=	0.01
3	SVP264000	SVP264000	871665	1085778	504.6	10/31/2022	0.5	0.5	1.0	-0.05	0.09	0.14	UJ	0.32	0.33	0.59	UJ	0.80	0.21	0.04	=	0.07	0.02	0.03	=	0.20	0.14	0.14	J	0.77	0.28	0.16	J	0.06	0.07	0.12	UJ	0.12	0.11	0.19	UJ	0.55	0.12	0.2	J	0.00
		SVP264001	871665	1085778	504.6	10/31/2022	0.5	1.0	1.5	-0.07	0.13	0.21	UJ	-0.48	0.47	0.74	UJ	1.17	0.30	0.06	=	0.77	0.09	0.05	=	0.85	0.31	0.20	=	1.31	0.39	0.11	J	0.81	0.30	0.18	=	0.13	0.16	0.27	UJ	1.29	0.20	0.3	=	0.00
		SVP264002	871665	1085778	504.6	10/31/2022	0.5	2.0	2.5	0.12	0.15	0.26	UJ	0.39	0.53	0.93	UJ	1.25	0.32	0.06	=	1.02	0.13	0.06	=	1.21	0.35	0.16	=	1.72	0.43	0.15	J	1.55	0.40	0.10	=	0.08	0.18	0.31	UJ	1.14	0.20	0.3	=	0.01
		SVP264003	871665	1085778	504.6	10/31/2022	0.5	5.0	5.5	0.01	0.13	0.23	UJ	0.26	0.49	0.84	UJ	1.36	0.34	0.05	=	0.98	0.12	0.06	=	1.35	0.39	0.13	=	1.92	0.48	0.13	J	1.24	0.37	0.11	=	0.06	0.18	0.30	UJ	1.20	0.20	0.3	=	0.02
		SVP264004	871665	1085778	504.6	10/31/2022	0.5	7.0	7.5	-0.02	0.13	0.22	UJ	0.11	0.46	0.79	UJ	1.09	0.28	0.05	=	0.87	0.11	0.05	=	1.46	0.38	0.17	=	1.61	0.40	0.14	J	1.13	0.33	0.11	=	0.14	0.12	0.23	UJ	1.26	0.21	0.3	=	0.00
		SVP264005	871665	1085778	504.6	10/31/2022	0.5	8.5	9.0	0.08	0.08	0.12	UJ	-0.12	0.46	0.76	UJ	0.98	0.25	0.05	=	0.76	0.10	0.05	=	0.97	0.31	0.17	=	1.36	0.37	0.11	J	0.84	0.28	0.15	=	-0.05	0.16	0.26	UJ	0.94	0.16	0.3	=	0.00
		SVP264006	871665	1085778	504.6	10/31/2022	0.5	10.5	11.0	0.09	0.14	0.24	UJ	0.30	0.51	0.89	UJ	1.12	0.29	0.06	=	0.86	0.11	0.06	=	1.30	0.41	0.21	=	1.61	0.46	0.12	J	0.97	0.34	0.19	=	0.09	0.17	0.29	UJ	1.03	0.19	0.3	=	0.00
		SVP264007	871665	1085778	504.6	10/31/2022	0.5	12.5	13.0	0.09	0.15	0.26	UJ	-0.05	0.55	0.92	UJ	1.12	0.29	0.06	=	0.94	0.12	0.06	=	1.22	0.37	0.11	=	1.54	0.43	0.15	J	0.68	0.27	0.17	=	-0.01	0.19	0.32	UJ	0.98	0.21	0.4	=	0.00
		SVP264007-1	871665	1085778	504.6	10/31/2022	0.5	12.5	13.0	0.08	0.20	0.36	UJ	0.06	0.68	1.17	UJ	1.05	0.28	0.08	=	0.86	0.12	0.08	=	1.01	0.31	0.16	=	1.72	0.42	0.11	J	0.81	0.27	0.09	=	0.14	0.22	0.39	UJ	1.02	0.21	0.4	=	0.00
		SVP264007-2	871665	1085778	504.6	10/31/2022	0.5	12.5	13.0	-0.45	0.95	1.23	UJ	0.00	0.41	7.47	UJ	1.19	0.26	0.15	=	0.61	0.25	0.53	=	0.86	0.21	0.13	=	0.76	0.21	0.14	=	1.00	0.22	0.07	=	0.14	0.38	1.44	UJ	1.62	0.83	1.5	J	0.01
		SVP264008	871665	1085778	504.6	10/31/2022	0.5	14.0	14.5	0.00	0.13	0.22	UJ	-0.10	0.42	0.70	UJ	1.00	0.25	0.05	=	0.70	0.09	0.05	=	0.93	0.32	0.18	=	1.46	0.41	0.11	J	1.06	0.34	0.15	=	0.13	0.16	0.27	UJ	1.06	0.18	0.3	=	0.00

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
3	SVP264009	SVP264009	871722	1085882	507.3	10/31/2022	1.0	1.0	1.5	0.10	0.15	0.26	UJ	0.06	0.59	0.99	UJ	1.22	0.31	0.06	=	1.02	0.13	0.06	=	1.47	0.44	0.15	=	2.21	0.56	0.13	=	1.02	0.35	0.13	=	-0.08	0.20	0.33	UJ	1.45	0.24	0.4	=	0.03
		SVP264010	871722	1085882	507.3	10/31/2022	1.0	1.5	2.0	0.04	0.15	0.25	UJ	0.01	0.54	0.91	UJ	1.20	0.31	0.06	=	1.03	0.13	0.06	=	1.35	0.40	0.18	=	1.80	0.48	0.18	=	1.11	0.36	0.18	=	-0.15	0.19	0.31	UJ	1.22	0.21	0.3	=	0.00
		SVP264011	871722	1085882	507.3	10/31/2022	1.0	2.5	3.0	0.06	0.14	0.25	UJ	0.07	0.55	0.94	UJ	1.18	0.30	0.06	=	0.93	0.11	0.06	=	1.41	0.46	0.19	=	2.22	0.60	0.15	=	1.22	0.42	0.22	=	0.03	0.20	0.33	UJ	1.14	0.21	0.3	=	0.03
		SVP264012	871722	1085882	507.3	10/31/2022	1.0	5.5	6.0	-0.02	0.13	0.22	UJ	0.10	0.49	0.83	UJ	1.03	0.26	0.05	=	0.85	0.10	0.05	=	0.96	0.33	0.12	=	1.88	0.49	0.14	=	0.88	0.31	0.14	=	0.08	0.17	0.29	UJ	1.11	0.18	0.3	=	0.00
		SVP264013	871722	1085882	507.3	10/31/2022	1.0	6.5	7.0	-0.08	0.13	0.21	UJ	0.07	0.46	0.79	UJ	0.96	0.25	0.05	=	0.74	0.10	0.05	=	1.17	0.39	0.13	=	1.47	0.44	0.13	J	0.75	0.30	0.20	=	0.11	0.17	0.28	UJ	0.94	0.17	0.3	=	0.00
		SVP264014	871722	1085882	507.3	10/31/2022	1.0	9.0	9.5	0.05	0.12	0.21	UJ	0.07	0.50	0.86	UJ	0.99	0.25	0.05	=	0.83	0.11	0.05	=	1.07	0.33	0.17	=	1.83	0.44	0.10	=	1.00	0.31	0.12	=	0.14	0.17	0.28	UJ	1.00	0.17	0.3	=	0.00
		SVP264015	871722	1085882	507.3	10/31/2022	1.0	10.5	11.0	0.04	0.13	0.22	UJ	-0.09	0.49	0.82	UJ	0.94	0.24	0.05	=	0.75	0.10	0.05	=	1.32	0.39	0.18	=	1.89	0.48	0.11	=	0.96	0.32	0.15	=	0.05	0.16	0.28	UJ	1.00	0.17	0.3	=	0.00
		SVP264016	871722	1085882	507.3	10/31/2022	1.0	12.0	12.5	0.00	0.14	0.24	UJ	-0.08	0.54	0.91	UJ	1.08	0.28	0.06	=	0.88	0.11	0.06	=	1.12	0.35	0.17	=	1.59	0.43	0.13	J	0.66	0.26	0.11	=	-0.06	0.18	0.30	UJ	1.08	0.18	0.3	=	0.00
		SVP264017	871722	1085882	507.3	10/31/2022	1.0	14.0	14.5	0.05	0.13	0.22	UJ	-0.08	0.48	0.81	UJ	0.98	0.25	0.05	=	0.76	0.09	0.05	=	0.89	0.31	0.20	=	1.64	0.44	0.11	=	1.09	0.35	0.17	=	0.14	0.16	0.27	UJ	0.90	0.17	0.3	=	0.00
3	SVP264018	SVP264018	871834	1085885	507.7	10/31/2022	1.0	1.0	1.5	-0.02	0.13	0.22	UJ	-0.07	0.47	0.80	UJ	1.09	0.28	0.05	=	0.87	0.10	0.05	=	0.80	0.30	0.20	=	1.56	0.42	0.11	J	1.16	0.36	0.17	=	0.00	0.16	0.27	UJ	0.96	0.17	0.3	=	0.00
		SVP264019	871834	1085885	507.7	10/31/2022	1.0	1.5	2.0	0.00	0.13	0.22	UJ	0.09	0.47	0.79	UJ	1.17	0.30	0.05	=	0.91	0.11	0.05	=	1.31	0.40	0.22	=	2.04	0.51	0.18	J	1.47	0.42	0.12	=	0.11	0.16	0.28	UJ	1.10	0.19	0.3	=	0.02
		SVP264020	871834	1085885	507.7	10/31/2022	1.0	2.0	2.5	0.08	0.13	0.22	UJ	0.38	0.47	0.81	UJ	1.32	0.33	0.05	=	0.86	0.10	0.05	=	1.01	0.31	0.12	=	1.86	0.44	0.12	J	1.04	0.31	0.10	=	-0.04	0.16	0.27	UJ	1.23	0.20	0.3	=	0.01
		SVP264021	871834	1085885	507.7	10/31/2022	1.0	5.5	6.0	-0.07	0.13	0.21	UJ	-0.30	0.47	0.76	UJ	0.99	0.25	0.05	=	0.82	0.10	0.05	=	1.22	0.35	0.18	=	1.60	0.41	0.15	J	0.99	0.31	0.12	=	0.00	0.16	0.26	UJ	0.74	0.13	0.3	=	0.00
		SVP264022	871834	1085885	507.7	10/31/2022	1.0	6.5	7.0	0.02	0.13	0.22	UJ	0.15	0.45	0.78	UJ	1.11	0.28	0.05	=	0.86	0.10	0.05	=	1.12	0.35	0.19	=	1.54	0.42	0.13	J	1.33	0.39	0.17	=	0.03	0.16	0.27	UJ	0.98	0.23	0.3	=	0.00
		SVP264023	871834	1085885	507.7	10/31/2022	1.0	9.0	9.5	0.00	0.13	0.21	UJ	-0.42	0.45	0.73	UJ	0.97	0.25	0.05	=	0.78	0.09	0.05	=	1.14	0.35	0.18	=	1.60	0.43	0.11	J	1.03	0.33	0.17	=	0.09	0.15	0.26	UJ	0.96	0.16	0.3	=	0.00
		SVP264024	871834	1085885	507.7	10/31/2022	1.0	11.5	12.0	0.05	0.13	0.22	UJ	0.65	0.48	0.84	UJ	0.99	0.25	0.05	=	0.81	0.10	0.05	=	1.38	0.40	0.12	=	1.62	0.45	0.16	J	1.04	0.35	0.18	=	0.00	0.16	0.27	UJ	0.92	0.16	0.3	=	0.00
		SVP264025	871834	1085885	507.7	10/31/2022	1.0	12.5	13.0	0.03	0.13	0.22	UJ	0.21	0.45	0.77	UJ	0.98	0.25	0.04	=	0.83	0.10	0.05	=	1.35	0.38	0.18	=	1.57	0.41	0.10	J	0.92	0.30	0.12	=	0.04	0.16	0.26	UJ	0.85	0.16	0.3	=	0.00
		SVP264026	871834	1085885	507.7	10/31/2022	1.0	15.0	15.5	0.04	0.12	0.21	UJ	-0.09	0.44	0.75	UJ	0.87	0.22	0.05	=	0.70	0.09	0.04	=	1.29	0.37	0.17	=	1.15	0.35	0.11	J	0.81	0.29	0.14	=	0.05	0.15	0.26	UJ	0.59	0.17	0.3	J	0.00
4	SVP190223	SVP190223	872066	1085481	497.1	06/04/2019	0.0	0.0	0.5	-1.10	0.28	0.33	UJ	-0.40	1.19	1.98	UJ	1.14	0.32	0.14	=	0.76	0.12	0.14	=	1.37	0.52	0.16	=	2.02	0.67	0.26	=	0.85	0.38	0.14	=	-0.14	0.37	0.61	UJ	0.88	0.27	0.7	=	0.08
		SVP190224	872066	1085481	497.1	06/04/2019	0.0	0.5	1.0	-0.87	0.24	0.33	UJ	0.67	1.14	2.00	UJ	1.17	0.32	0.12	=	0.74	0.12	0.12	=	1.44	0.55	0.24	=	2.06	0.69	0.24	=	0.77	0.38	0.28	=	-0.03	0.35	0.59	UJ	1.13	0.36	0.6	=	0.02
		SVP190225	872066	1085481	497.1	06/04/2019	0.0	2.0	2.5	-1.07	0.28	0.34	UJ	0.44	1.13	1.96	UJ	1.30	0.35	0.12	=	0.83	0.13	0.11	=	1.30	0.51	0.17	=	1.72	0.61	0.17	=	1.08	0.45	0.16	=	0.45	0.35	0.61	UJ	1.09	0.28	0.6	=	0.01
		SVP190226	872066	1085481	497.1	06/04/2019	0.0	5.5	6.0	-1.27	0.30	0.33	UJ	-0.21	1.08	1.81	UJ	1.33	0.36	0.13	=	0.92	0.15	0.13	=	1.39	0.49	0.15	=	2.09	0.65	0.12	=	1.29	0.47	0.14	=	-0.23	0.34	0.55	UJ	1.29	0.29	0.6	=	0.03
		SVP211117	872066	1085481	497.1	06/04/2019	0.0	4.0	4.5	-0.98	0.26	0.34	UJ	0.34	1.18	2.04	UJ	1.25	0.34	0.14	=	0.89	0.13	0.13	=	1.39	0.54	0.19	=	2.25	0.74	0.15	=	1.32	0.53	0.29	=	0.28	0.37	0.63	UJ	1.06	0.27	0.7	=	0.03
4	SVP190227	SVP190227	872182	1085481	497.3	06/04/2019	0.0	0.0	0.5	-0.85	0.25	0.34	UJ	0.86	1.22	2.14	UJ	1.23	0.34	0.12	=	0.87	0.14	0.12	=	1.42	0.55	0.28	=	1.87	0.66	0.21	=	1.00	0.44	0.15	=	0.09	0.36	0.62	UJ	0.88	0.26	0.7	=	0.08
		SVP190228	872182	1085481	497.3	06/04/2019	0.0	1.0	1.5	-0.79	0.22	0.32	UJ	-0.03	1.04	1.77	UJ	1.18	0.32	0.12	=	0.80	0.11	0.11	=	1.40	0.50	0.12	=	2.26	0.68	0.12	=	0.67	0.32	0.12	=	0.03	0.32	0.55	UJ	1.05	0.27	0.6	=	0.03
		SVP211115	872182	1085481	497.3	06/04/2019	0.0	3.0	3.5	-1.09	0.27	0.34	UJ	0.43	1.16	2.01	UJ	1.32	0.36	0.13	=	0.93	0.14	0.13	=	1.08	0.45	0.18	=	2.05	0.68	0.17	=	0.89	0.40	0.19	=	0.22	0.36	0.62	UJ	1.00	0.27	0.6	=	0.03
		SVP211116	872182	1085481	497.3	06/04/2019	0.0	4.5	5.0	-1.00	0.27	0.33	UJ	-0.84	1.08	1.75	UJ	1.29	0.35	0.12	=	0.95	0.14	0.11	=	1.50	0.58	0.18	=	1.71	0.64	0.30	=	1.10	0.49	0.30	=	0.05	0.34	0.58	UJ	1.10	0.27	0.6	=	0.01
4	SVP190247	SVP190247	872299	1085683	495.9	08/16/2018	0.0	0.0	0.5	-0.75	0.15	0.13	UJ	-0.41	0.49	0.79	UJ	1.33	0.33	0.06	=	0.84	0.10	0.06	=	1.62	0.55	0.19	=	1.56	0.54	0.15	J	0.96	0.41	0.25	=	0.00	0.16	0.27	UJ	0.99	0.18	0.3	=	0.08
		SVP190248	872299	1085683	495.9	08/16/2018	0.0	1.0	1.5	-0.90	0.18	0.12	UJ	0.49	0.45	0.79	UJ	1.24	0.31	0.05	=	0.70	0.09	0.05	=	1.02	0.37	0.12	=	1.37	0.45	0.13	J	0.83	0.33	0.12	=	0.05	0.16	0.26	UJ	1.02	0.17	0.3	=	0.01
4	SVP201660	SVP201660	872237	1085625	496.0	08/08/2018	0.0	0.0	0.5	-1.65	0.31	0.19	UJ	-0.21	0.66	1.10	UJ	1.33	0.34	0.07	=	0.80	0.11	0.08	=	1.63	0.56	0.19	=	1.70	0.58	0.18	=	1.09	0.44	0.16	=	0.00	0.23	0.38	UJ	1.05	0.23	0.5	=	0.09
		SVP201661	872237	1085625	496.0	08/08/2018	0.0	0.5	1.0	-0.80	0.17	0.19	UJ	-0.48	0.61	0.99	UJ	1.35	0.35	0.07	=	0.87	0.13	0.07	=	1.22	0.44	0.20	=	1.18	0.43	0.16	=	1.09	0.41	0.12	=	0.15	0.22	0.37	UJ	1.08	0.22	0.5	=	0.01
4	SVP263662	SVP263662	871950	1085683	503.3	10/26/2022	0.0	0.0	0.5	-0.05	0.17	0.29	UJ	0.02	0.65	1.12	UJ	0.97	0.26	0.08	=	0.70	0.10	0.07	=	1.41	0.42	0.18	J	1.34	0.40	0.19	J	0.95	0.33	0.12	=	0.08	0.22	0.38	UJ	1.05	0.21	0.4	=	0.00
		SVP263662-1	871950	1085683	503.3	10/26/2022	0.0	0.0	0.5	0.08	0.20	0.36	UJ	0.36	0.68	1.19	UJ	1.05	0.28	0.08	=	0.79	0.12	0.07	=	1.01	0.35	0.14	J	1.60	0.45	0.12	J	0.66	0.28	0.19	=	-0.06	0.22	0.37	UJ	1.11	0.23	0.4	=	0.03
		SVP263662-2	871950	1085683	503.3	10/26/2022	0.0	0.0	0.5	0.23	0.55	0.85	UJ	1.01	2.73	6.13	UJ	1.33	0.27	0.13	=	1.12	0.26	0.17	=	0.76	0.20	0.12	=	0.85	0.22	0.14	=	0.83	0.20	0.07	=	0.00	0.28	1.08	UJ	0.60	0.73	1.2	UJ	0.08
		SVP263663	871950	1085683	503.3	10/26/2022	0.0	1.0	1.5	-0.01	0.13	0.23	UJ	-0.34	0.48	0.78	UJ	1.02	0.26	0.05	=	0.90	0.11	0.05	=	1.62	0.46	0.19	J	2.03	0.53	0.12	J	1.21	0.39	0.19	=	0.00	0.16	0.27	UJ	1.18	0.19	0.3	=	0.01
		SVP263664	871950	1085683	503.3	10/26/2022	0.0	3.0	3.5	0.01	0.14	0.24	UJ	0.35	0.49	0.86	UJ	1.01	0.26	0.06	=	1.01	0.13	0.06	=	1.40	0.43	0.17	J	2.13	0.56	0.20	J	1.47	0.44	0.13	=	0.00	0.17	0.28	UJ	1.15	0.20	0.3	=	0.02
		SVP263665	871950	1085683	503.3	10/26/2022	0.0	5.5	6.0	0.05	0.13	0.22	UJ	0.50	0.47	0.82	UJ	0.99	0.25	0.05	=	0.90	0.11	0.05	=	1.62	0.43	0.11	=	2.21	0.52	0.17	=	1.01	0.33	0.11	=	-0.06	0.16	0.26	UJ	1.17	0.19	0.3	=	0.03
		SVP263666	871950	1085683	503.3	10/26/2022	0.0	7.0	7.5	0.10	0.08	0.13	UJ	-0.25	0.46	0.76	UJ	1.04	0.27	0.05	=	0.84	0.11	0.05	=	1.06	0.36	0.19	J	1.59	0.45	0.19	J	1.17	0.38	0.15	=	0.05	0.16	0.28	UJ	1.16	0.23	0.3	=	0.00
		SVP263667	871950	1085683	503.3	10/26/2022	0.0	8.8	9.3	0.00	0.12	0.21	UJ	-0.21	0.45	0.75	UJ	0.93	0.24	0.05	=	0.73	0.09	0.05	=	0.88	0.30	0.16	J	1.29	0.37	0.10	J	0.67	0.26	0.16	=	0.12	0.15	0.26	UJ	0.89	0.16	0.3	=	0.00
		SVP263668	871950	1085683	503.3	10/26/2022	0.0	11.0	11.5	0.06	0.04	0.10	UJ	0.05	0.46	0.78	UJ	0.98	0.25	0.05	=	0.84	0.10	0.05	=	1.22	0.37	0.16	J	1.46	0.41	0.17	J	1.04	0.34	0.11	=	0.12	0.16	0.27	UJ	0.94	0.17	0.3	=	0.00
		SVP263669	871950	1085683	503.3	10/26/2022	0.0	12.5	13.0	0.07	0.04	0.10	UJ	0.12	0.45	0.77	UJ	0.91	0.23	0.05	=	0.83	0.10	0.05	=	1.26	0.38	0.17	J	1.21	0.37	0.17	J	0.91	0.31	0.17	=	-0.14	0.16	0.25	UJ	1.05	0.18	0.3	=	0.00
		SVP263670	871950	1085683	503.3	10/26/2022	0.0	15.5	16.0	0.08	0.13	0.23	UJ	-0.01	0.45	0.76	UJ	0.99	0.25	0.05	=	0.78	0.09	0.05	=	0.74	0.27	0.16	J	1.07	0.33	0.16	J	0.89	0.30	0.10	=	0.17	0.16	0.27	UJ	1.14	0.19	0.3	=	0.00

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
4	SVP263671	SVP263671	872008	1085582	498.1	10/27/2022	0.0	0.0	0.5	-0.15	0.20	0.33	UJ	-0.57	0.74	1.19	UJ	1.08	0.29	0.08	=	0.82	0.11	0.08	=	1.32	0.42	0.13	J	1.78	0.50	0.16	J	1.23	0.40	0.13	=	0.03	0.23	0.39	UJ	1.04	0.21	0.4	=	0.05
		SVP263672	872008	1085582	498.1	10/27/2022	0.0	1.0	1.5	-0.15	0.20	0.33	UJ	-0.20	0.71	1.19	UJ	1.08	0.29	0.08	=	0.88	0.12	0.08	=	1.15	0.36	0.17	J	2.00	0.49	0.14	J	0.94	0.32	0.11	=	0.27	0.24	0.42	UJ	1.17	0.22	0.5	=	0.01
		SVP263673	872008	1085582	498.1	10/27/2022	0.0	3.0	3.5	-0.02	0.14	0.24	UJ	-0.12	0.52	0.86	UJ	0.97	0.25	0.05	=	0.94	0.11	0.06	=	1.07	0.33	0.16	J	1.54	0.41	0.10	J	0.92	0.30	0.10	=	0.06	0.17	0.29	UJ	1.33	0.21	0.3	=	0.00
		SVP263674	872008	1085582	498.1	10/27/2022	0.0	4.5	5.0	-0.02	0.13	0.22	UJ	0.07	0.46	0.78	UJ	0.96	0.25	0.05	=	0.87	0.10	0.05	=	1.18	0.37	0.16	J	1.40	0.40	0.15	J	0.91	0.31	0.11	=	0.07	0.16	0.26	UJ	1.20	0.19	0.3	=	0.00
		SVP263675	872008	1085582	498.1	10/27/2022	0.0	7.5	8.0	-0.03	0.13	0.22	UJ	-0.39	0.48	0.77	UJ	1.06	0.27	0.05	=	0.92	0.11	0.05	=	1.21	0.38	0.12	J	1.48	0.43	0.18	J	1.18	0.38	0.18	=	0.10	0.16	0.27	UJ	1.08	0.19	0.3	=	0.00
		SVP263676	872008	1085582	498.1	10/27/2022	0.0	8.5	9.0	-0.01	0.12	0.20	UJ	0.08	0.45	0.77	UJ	0.91	0.23	0.05	=	0.77	0.09	0.05	=	1.23	0.41	0.21	J	2.01	0.55	0.18	J	1.33	0.43	0.16	=	-0.01	0.15	0.25	UJ	0.98	0.17	0.3	=	0.01
		SVP263677	872008	1085582	498.1	10/27/2022	0.0	11.5	12.0	0.13	0.20	0.36	UJ	0.00	0.69	1.18	UJ	0.91	0.25	0.08	=	0.80	0.11	0.08	=	1.17	0.38	0.17	J	1.18	0.39	0.13	J	0.92	0.34	0.19	=	-0.08	0.22	0.37	UJ	0.74	0.17	0.4	=	0.00
		SVP263678	872008	1085582	498.1	10/27/2022	0.0	13.5	14.0	0.02	0.12	0.21	UJ	-0.41	0.47	0.76	UJ	0.89	0.23	0.05	=	0.79	0.09	0.05	=	1.01	0.36	0.17	J	1.67	0.48	0.20	J	1.32	0.42	0.20	=	0.00	0.15	0.25	UJ	0.94	0.16	0.3	=	0.00
		SVP263679	872008	1085582	498.1	10/27/2022	0.0	15.0	15.5	-0.07	0.13	0.21	UJ	-0.05	0.45	0.75	UJ	0.91	0.23	0.05	=	0.74	0.09	0.05	=	1.07	0.36	0.12	J	1.42	0.42	0.12	J	0.70	0.28	0.14	=	-0.02	0.15	0.26	UJ	0.97	0.17	0.3	=	0.00
4	SVP263693	SVP263693	872124	1085582	498.3	10/27/2022	0.0	0.0	0.5	0.22	0.19	0.35	UJ	0.10	0.76	1.30	UJ	1.00	0.27	0.07	=	0.87	0.11	0.08	=	1.40	0.42	0.16	=	1.35	0.41	0.12	J	1.15	0.38	0.19	=	0.06	0.24	0.41	UJ	1.17	0.22	0.4	=	0.01
		SVP263693-1	872124	1085582	498.3	10/27/2022	0.0	0.0	0.5	0.01	0.20	0.35	UJ	0.01	0.74	1.27	UJ	1.06	0.28	0.08	=	0.85	0.12	0.08	=	1.30	0.41	0.17	=	1.82	0.50	0.19	=	0.97	0.35	0.19	=	-0.06	0.24	0.40	UJ	0.95	0.20	0.4	=	0.05
		SVP263693-2	872124	1085582	498.3	10/27/2022	0.0	0.0	0.5	0.23	0.64	0.93	UJ	-1.22	4.24	7.09	UJ	1.04	0.24	0.18	=	1.12	0.25	0.19	=	0.76	0.20	0.13	=	0.85	0.22	0.14	=	0.90	0.21	0.07	=	-0.04	0.07	1.25	UJ	-0.59	1.94	3.2	UJ	0.02
		SVP263694	872124	1085582	498.3	10/27/2022	0.0	1.0	1.5	0.01	0.14	0.24	UJ	0.50	0.53	0.92	UJ	1.12	0.28	0.06	=	0.93	0.12	0.05	=	1.24	0.40	0.13	=	2.32	0.58	0.13	=	1.66	0.48	0.15	=	0.14	0.19	0.32	UJ	1.44	0.23	0.3	=	0.04
		SVP263695	872124	1085582	498.3	10/27/2022	0.0	3.0	3.5	-0.09	0.14	0.22	UJ	0.24	0.53	0.90	UJ	1.06	0.26	0.05	=	0.94	0.12	0.06	=	1.42	0.39	0.18	=	2.24	0.51	0.12	=	1.21	0.35	0.10	=	-0.02	0.18	0.29	UJ	1.25	0.21	0.3	=	0.03
		SVP263696	872124	1085582	498.3	10/27/2022	0.0	5.0	5.5	-0.08	0.14	0.22	UJ	0.67	0.54	0.95	UJ	0.99	0.25	0.06	=	0.85	0.11	0.05	=	1.25	0.39	0.12	=	1.58	0.45	0.19	=	1.05	0.35	0.12	=	-0.02	0.18	0.30	UJ	1.17	0.20	0.3	=	0.00
		SVP263697	872124	1085582	498.3	10/27/2022	0.0	6.0	6.5	0.05	0.13	0.22	UJ	-0.18	0.48	0.80	UJ	0.93	0.23	0.05	=	0.81	0.10	0.05	=	1.02	0.34	0.12	=	1.26	0.38	0.12	J	1.02	0.34	0.18	=	0.00	0.16	0.27	UJ	0.97	0.26	0.3	=	0.00
		SVP263698	872124	1085582	498.3	10/27/2022	0.0	9.5	10.0	-0.01	0.13	0.21	UJ	-0.15	0.48	0.80	UJ	0.85	0.22	0.05	=	0.79	0.09	0.05	=	0.93	0.32	0.17	=	1.40	0.40	0.17	J	0.90	0.31	0.11	=	0.03	0.16	0.27	UJ	1.11	0.18	0.3	=	0.00
		SVP263699	872124	1085582	498.3	10/27/2022	0.0	10.8	11.3	-0.10	0.13	0.20	UJ	-0.43	0.48	0.77	UJ	0.96	0.25	0.05	=	0.81	0.10	0.05	=	0.97	0.32	0.13	=	1.00	0.33	0.17	J	0.43	0.21	0.17	=	0.08	0.16	0.27	UJ	1.11	0.18	0.3	=	0.00
		SVP263700	872124	1085582	498.3	10/27/2022	0.0	13.0	13.5	0.09	0.12	0.21	UJ	-0.22	0.45	0.75	UJ	0.85	0.22	0.05	=	0.76	0.09	0.05	=	1.04	0.35	0.12	=	1.59	0.45	0.14	=	1.04	0.35	0.19	=	-0.16	0.16	0.26	UJ	0.89	0.16	0.3	=	0.00
		SVP263701	872124	1085582	498.3	10/27/2022	0.0	14.0	14.5	-0.01	0.12	0.21	UJ	0.00	0.46	0.78	UJ	0.90	0.23	0.05	=	0.73	0.09	0.05	=	0.86	0.30	0.17	=	1.51	0.41	0.13	=	0.83	0.29	0.14	=	-0.01	0.15	0.26	UJ	0.91	0.16	0.2	=	0.00
		SVP263702	872124	1085582	498.3	10/27/2022	0.0	17.1	17.6	0.00	0.13	0.22	UJ	0.05	0.48	0.81	UJ	0.95	0.24	0.05	=	0.82	0.10	0.05	=	1.70	0.48	0.20	=	1.89	0.51	0.13	=	0.89	0.33	0.20	=	-0.16	0.17	0.27	UJ	0.99	0.17	0.3	=	0.00
		SVP263703	872124	1085582	498.3	10/27/2022	0.0	18.0	18.5	-0.07	0.13	0.22	UJ	-0.08	0.49	0.83	UJ	0.98	0.25	0.05	=	0.79	0.10	0.05	=	0.87	0.33	0.19	=	1.58	0.46	0.19	=	1.08	0.37	0.19	=	0.06	0.17	0.28	UJ	0.97	0.17	0.3	=	0.00
		SVP263704	872124	1085582	498.3	10/27/2022	0.0	20.5	21.0	-0.05	0.13	0.21	UJ	-0.49	0.50	0.80	UJ	1.19	0.30	0.05	=	0.77	0.10	0.05	=	0.55	0.25	0.14	=	1.45	0.43	0.12	J	0.94	0.33	0.12	=	-0.02	0.17	0.28	UJ	0.91	0.17	0.3	=	0.00
		SVP263705	872124	1085582	498.3	10/27/2022	0.0	22.5	23.0	-0.05	0.13	0.22	UJ	0.39	0.46	0.81	UJ	1.00	0.25	0.05	=	0.77	0.10	0.05	=	1.16	0.37	0.18	=	1.33	0.40	0.18	J	1.11	0.36	0.18	=	0.06	0.16	0.28	UJ	0.90	0.16	0.3	=	0.00
4	SVP263706	SVP263706	872066	1085683	504.5	10/27/2022	0.0	0.0	0.5	0.07	0.05	0.15	UJ	-0.07	0.71	1.21	UJ	1.06	0.28	0.08	=	0.88	0.13	0.08	=	1.51	0.43	0.17	=	1.86	0.49	0.16	=	0.76	0.29	0.12	=	0.22	0.23	0.40	UJ	1.21	0.24	0.4	=	0.05
		SVP263707	872066	1085683	504.5	10/27/2022	0.0	1.0	1.5	-0.06	0.16	0.25	UJ	-0.33	0.55	0.89	UJ	1.03	0.27	0.06	=	0.97	0.12	0.06	=	1.49	0.44	0.12	=	1.94	0.51	0.19	=	0.93	0.33	0.19	=	0.14	0.19	0.32	UJ	1.28	0.22	0.3	=	0.01
		SVP263708	872066	1085683	504.5	10/27/2022	0.0	3.0	3.5	0.07	0.15	0.26	UJ	-0.17	0.56	0.94	UJ	1.21	0.31	0.06	=	1.04	0.12	0.06	=	1.52	0.44	0.19	=	1.94	0.51	0.16	=	1.38	0.41	0.14	=	0.12	0.19	0.32	UJ	1.32	0.23	0.3	=	0.01
		SVP263708-1	872066	1085683	504.5	10/27/2022	0.0	3.0	3.5	0.04	0.13	0.23	UJ	0.00	0.50	0.84	UJ	1.19	0.30	0.05	=	0.99	0.12	0.06	=	1.17	0.38	0.12	=	2.14	0.54	0.15	=	1.43	0.43	0.15	=	-0.01	0.17	0.28	UJ	1.25	0.20	0.3	=	0.02
		SVP263708-2	872066	1085683	504.5	10/27/2022	0.0	3.0	3.5	0.07	0.27	1.23	UJ	0.00	0.71	8.28	UJ	1.54	0.29	0.19	=	1.42	0.34	0.49	=	0.98	0.23	0.13	=	0.77	0.22	0.16	=	0.98	0.22	0.07	=	0.00	0.90	1.52	UJ	1.12	1.02	1.6	UJ	0.03
		SVP263709	872066	1085683	504.5	10/27/2022	0.0	5.5	6.0	-0.06	0.13	0.21	UJ	0.02	0.49	0.83	UJ	1.06	0.27	0.05	=	0.92	0.11	0.05	=	1.12	0.36	0.12	=	1.75	0.47	0.12	=	1.05	0.35	0.18	=	-0.01	0.17	0.28	UJ	0.95	0.17	0.3	=	0.00
		SVP263710	872066	1085683	504.5	10/27/2022	0.0	6.5	7.0	-0.05	0.13	0.22	UJ	0.02	0.46	0.79	UJ	1.10	0.28	0.05	=	0.92	0.11	0.05	=	1.48	0.44	0.16	=	1.85	0.50	0.13	=	0.99	0.35	0.19	=	0.11	0.16	0.28	UJ	0.97	0.17	0.3	=	0.00
		SVP263711	872066	1085683	504.5	10/27/2022	0.0	9.0	9.5	0.07	0.13	0.23	UJ	0.07	0.47	0.79	UJ	1.02	0.26	0.05	=	0.89	0.11	0.05	=	1.36	0.41	0.12	=	2.39	0.57	0.14	=	1.33	0.40	0.12	=	0.17	0.17	0.28	UJ	0.99	0.17	0.3	=	0.04
		SVP263712	872066	1085683	504.5	10/27/2022	0.0	10.0	10.5	0.08	0.04	0.10	UJ	0.09	0.46	0.79	UJ	0.97	0.25	0.05	=	0.88	0.10	0.05	=	1.16	0.36	0.17	=	1.69	0.45	0.15	=	1.08	0.35	0.11	=	0.03	0.17	0.28	UJ	1.10	0.19	0.3	=	0.00
		SVP263713	872066	1085683	504.5	10/27/2022	0.0	13.0	13.5	0.04	0.13	0.22	UJ	-0.21	0.46	0.75	UJ	1.09	0.28	0.05	=	0.84	0.11	0.05	=	1.06	0.34	0.17	=	1.24	0.37	0.11	J	0.98	0.32	0.11	=	0.15	0.12	0.22	UJ	0.89	0.17	0.3	=	0.00
		SVP263714	872066	1085683	504.5	10/27/2022	0.0	15.0	15.5	-0.04	0.12	0.20	UJ	-0.21	0.45	0.74	UJ	0.93	0.24	0.05	=	0.79	0.10	0.05	=	0.82	0.29	0.19	=	1.17	0.35	0.16	J	0.74	0.27	0.10	=	0.09	0.15	0.25	UJ	0.94	0.16	0.3	=	0.00

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
4	SVP263715	SVP263715	872181	1085683	501.9	10/28/2022	0.0	0.0	0.5	0.11	0.21	0.37	UJ	0.08	0.73	1.26	UJ	1.05	0.29	0.09	=	0.86	0.12	0.09	=	1.16	0.36	0.20	=	2.00	0.50	0.15	=	1.57	0.43	0.16	=	0.20	0.14	0.34	UJ	1.07	0.23	0.4	=	0.06
		SVP263716	872181	1085683	501.9	10/28/2022	0.0	1.5	2.0	-0.06	0.20	0.33	UJ	0.12	0.73	1.27	UJ	1.00	0.27	0.09	=	0.69	0.10	0.09	=	1.46	0.42	0.20	=	1.96	0.50	0.11	=	1.27	0.38	0.11	=	0.20	0.11	0.28	UJ	1.08	0.23	0.4	=	0.01
		SVP263717	872181	1085683	501.9	10/28/2022	0.0	2.5	3.0	-0.07	0.21	0.35	UJ	-0.37	0.78	1.29	UJ	1.09	0.29	0.09	=	0.90	0.13	0.08	=	1.51	0.40	0.18	=	2.14	0.50	0.15	=	1.25	0.36	0.12	=	0.05	0.24	0.41	UJ	1.09	0.23	0.4	=	0.02
		SVP263718	872181	1085683	501.9	10/28/2022	0.0	4.5	5.0	0.09	0.14	0.25	UJ	-0.31	0.54	0.89	UJ	1.26	0.32	0.06	=	0.97	0.12	0.06	=	1.20	0.37	0.15	=	1.53	0.42	0.17	=	1.41	0.40	0.11	=	-0.11	0.18	0.29	UJ	1.27	0.21	0.3	=	0.01
		SVP263719	872181	1085683	501.9	10/28/2022	0.0	6.0	6.5	-0.01	0.12	0.22	UJ	-0.05	0.48	0.81	UJ	1.13	0.29	0.05	=	0.88	0.11	0.06	=	1.21	0.36	0.16	=	1.78	0.46	0.17	=	1.24	0.37	0.13	=	0.06	0.16	0.27	UJ	1.09	0.19	0.3	=	0.00
		SVP263720	872181	1085683	501.9	10/28/2022	0.0	9.5	10.0	-0.07	0.12	0.19	UJ	-0.02	0.46	0.78	UJ	0.96	0.24	0.05	=	0.75	0.09	0.05	=	0.76	0.28	0.19	=	1.13	0.34	0.10	J	0.85	0.29	0.16	=	0.07	0.15	0.26	UJ	0.99	0.18	0.3	=	0.00
		SVP263721	872181	1085683	501.9	10/28/2022	0.0	11.0	11.5	0.01	0.13	0.22	UJ	-0.04	0.46	0.77	UJ	0.97	0.25	0.05	=	0.79	0.10	0.05	=	0.99	0.32	0.19	=	1.13	0.34	0.16	J	0.78	0.28	0.10	=	0.01	0.16	0.26	UJ	1.04	0.19	0.3	=	0.00
		SVP263722	872181	1085683	501.9	10/28/2022	0.0	13.5	14.0	-0.01	0.12	0.20	UJ	-0.47	0.45	0.71	UJ	0.85	0.22	0.05	=	0.73	0.09	0.05	=	1.30	0.37	0.12	=	1.23	0.36	0.12	J	1.01	0.32	0.11	=	-0.04	0.15	0.25	UJ	0.91	0.17	0.3	=	0.00
		SVP263723	872181	1085683	501.9	10/28/2022	0.0	15.0	15.5	0.07	0.20	0.34	UJ	-0.47	0.64	1.04	UJ	0.81	0.22	0.08	=	0.71	0.10	0.07	=	0.99	0.32	0.16	=	1.51	0.41	0.16	J	0.81	0.28	0.10	=	0.06	0.21	0.36	UJ	0.84	0.19	0.4	=	0.00
		SVP263724	872181	1085683	501.9	10/28/2022	0.0	16.5	17.0	-0.04	0.13	0.22	UJ	0.15	0.49	0.83	UJ	0.88	0.23	0.05	=	0.78	0.11	0.05	=	0.89	0.33	0.14	=	1.55	0.45	0.19	J	1.16	0.38	0.19	=	0.06	0.15	0.26	UJ	1.03	0.22	0.3	=	0.00
		SVP263725	872181	1085683	501.9	10/28/2022	0.0	18.5	19.0	-0.01	0.12	0.21	UJ	0.06	0.44	0.75	UJ	0.78	0.21	0.05	=	0.71	0.09	0.05	=	1.22	0.39	0.12	=	1.49	0.44	0.14	J	0.97	0.34	0.19	=	-0.02	0.14	0.24	UJ	0.85	0.16	0.3	=	0.00
		SVP263726	872181	1085683	501.9	10/28/2022	0.0	21.5	22.0	0.10	0.19	0.34	UJ	0.15	0.70	1.21	UJ	0.80	0.22	0.08	=	0.77	0.10	0.08	=	1.27	0.38	0.17	=	1.77	0.46	0.13	J	0.90	0.31	0.15	=	0.06	0.20	0.35	UJ	0.83	0.32	0.4	J	0.00
		SVP263726-1	872181	1085683	501.9	10/28/2022	0.0	21.5	22.0	-0.06	0.19	0.32	UJ	-0.05	0.65	1.10	UJ	0.86	0.23	0.08	=	0.79	0.11	0.08	=	1.10	0.35	0.17	=	1.54	0.42	0.11	J	0.97	0.32	0.17	=	0.23	0.22	0.38	UJ	1.02	0.21	0.4	=	0.00
		SVP263726-2	872181	1085683	501.9	10/28/2022	0.0	21.5	22.0	-0.26	0.73	0.90	UJ	0.45	1.67	5.38	UJ	0.94	0.18	0.08	=	1.32	0.25	0.08	=	1.01	0.23	0.13	=	0.81	0.22	0.14	=	1.00	0.22	0.06	=	-0.02	0.03	1.02	UJ	0.60	0.77	2.4	UJ	0.00
		SVP263727	872181	1085683	501.9	10/28/2022	0.0	23.0	23.5	0.02	0.12	0.21	UJ	0.22	0.45	0.77	UJ	0.82	0.21	0.05	=	0.86	0.10	0.05	=	1.35	0.42	0.20	=	1.41	0.43	0.20	J	1.08	0.37	0.20	=	0.01	0.15	0.25	UJ	1.14	0.21	0.2	=	0.00
		SVP263728	872181	1085683	501.9	10/28/2022	0.0	25.5	26.0	0.00	0.13	0.21	UJ	-0.34	0.37	0.75	UJ	0.89	0.23	0.05	=	0.88	0.11	0.06	=	1.27	0.40	0.14	=	1.22	0.39	0.12	J	1.45	0.43	0.12	=	0.04	0.15	0.26	UJ	0.96	0.18	0.3	=	0.00
		SVP263729	872181	1085683	501.9	10/28/2022	0.0	27.0	27.5	-0.07	0.13	0.21	UJ	0.31	0.48	0.82	UJ	0.91	0.24	0.06	=	0.95	0.12	0.06	=	1.52	0.46	0.20	=	1.83	0.51	0.20	J	1.08	0.38	0.20	=	0.14	0.16	0.26	UJ	1.19	0.20	0.3	=	0.00
4	SVP263844	SVP263844	872008	1085784	506.5	11/01/2022	0.0	0.0	0.5	-0.02	0.20	0.34	UJ	0.23	0.69	1.19	UJ	1.00	0.27	0.08	=	0.84	0.12	0.08	=	1.07	0.36	0.15	=	1.73	0.48	0.19	J	1.05	0.36	0.15	=	0.01	0.23	0.39	UJ	0.91	0.20	0.4	=	0.03
		SVP263844-1	872008	1085784	506.5	11/01/2022	0.0	0.0	0.5	0.03	0.18	0.32	UJ	-0.07	0.64	1.09	UJ	0.97	0.26	0.08	=	0.80	0.11	0.07	=	1.04	0.35	0.18	=	1.50	0.43	0.18	J	0.99	0.34	0.18	=	-0.03	0.22	0.37	UJ	0.98	0.30	0.4	=	0.00
		SVP263844-2	872008	1085784	506.5	11/01/2022	0.0	0.0	0.5	0.15	0.29	1.27	UJ	-1.24	4.38	7.34	UJ	1.13	0.24	0.13	=	1.39	0.32	0.12	=	0.92	0.22	0.11	=	0.88	0.22	0.14	=	0.90	0.21	0.07	=	-0.28	0.77	1.29	UJ	1.93	0.78	1.2	=	0.05
		SVP263845	872008	1085784	506.5	11/01/2022	0.0	1.5	2.0	-0.01	0.14	0.23	UJ	0.08	0.49	0.85	UJ	1.10	0.28	0.06	=	0.95	0.11	0.05	=	1.12	0.35	0.16	=	1.67	0.44	0.13	J	1.49	0.41	0.16	=	0.24	0.18	0.30	UJ	1.26	0.21	0.3	=	0.00
		SVP263846	872008	1085784	506.5	11/01/2022	0.0	3.5	4.0	0.05	0.20	0.35	UJ	0.11	0.73	1.25	UJ	1.05	0.28	0.08	=	0.88	0.12	0.08	=	1.48	0.43	0.19	=	2.01	0.52	0.19	J	1.40	0.42	0.18	=	0.01	0.23	0.39	UJ	1.08	0.23	0.4	=	0.01
		SVP263847	872008	1085784	506.5	11/01/2022	0.0	5.5	6.0	-0.04	0.14	0.23	UJ	0.57	0.48	0.84	UJ	1.14	0.29	0.06	=	0.88	0.11	0.05	=	1.24	0.38	0.14	=	1.83	0.48	0.18	J	1.13	0.36	0.18	=	0.17	0.17	0.29	UJ	0.90	0.18	0.3	=	0.00
		SVP263848	872008	1085784	506.5	11/01/2022	0.0	7.0	7.5	-0.01	0.20	0.35	UJ	-0.24	0.65	1.08	UJ	1.01	0.27	0.09	=	0.91	0.12	0.07	=	1.11	0.35	0.14	=	1.59	0.43	0.17	J	0.99	0.33	0.14	=	-0.14	0.22	0.36	UJ	0.99	0.21	0.4	=	0.00
		SVP263849	872008	1085784	506.5	11/01/2022	0.0	9.0	9.5	0.05	0.14	0.24	UJ	-0.34	0.48	0.78	UJ	1.11	0.28	0.06	=	0.94	0.11	0.05	=	1.42	0.42	0.15	=	1.88	0.50	0.15	J	1.29	0.40	0.15	=	0.02	0.17	0.28	UJ	1.16	0.20	0.3	=	0.00
		SVP263850	872008	1085784	506.5	11/01/2022	0.0	11.0	11.5	0.08	0.13	0.23	UJ	-0.21	0.47	0.78	UJ	0.96	0.25	0.05	=	0.81	0.10	0.05	=	1.56	0.44	0.18	=	1.48	0.43	0.18	J	1.20	0.38	0.18	=	-0.02	0.16	0.27	UJ	0.86	0.16	0.3	=	0.00
		SVP263851	872008	1085784	506.5	11/01/2022	0.0	13.5	14.0	0.00	0.12	0.21	UJ	-0.14	0.47	0.78	UJ	0.93	0.24	0.04	=	0.78	0.09	0.05	=	1.14	0.35	0.16	=	1.25	0.37	0.16	J	0.81	0.29	0.16	=	-0.08	0.16	0.26	UJ	0.97	0.17	0.3	=	0.00
		SVP263852	872008	1085784	506.5	11/01/2022	0.0	15.5	16.0	0.15	0.13	0.24	UJ	-0.05	0.51	0.86	UJ	0.93	0.24	0.05	=	0.79	0.10	0.05	=	1.20	0.34	0.15	=	0.89	0.29	0.15	J	0.93	0.30	0.15	=	0.14	0.17	0.29	UJ	0.93	0.17	0.3	=	0.00
4	SVP264080	SVP264080	872124	1085785	505.6	11/02/2022	0.0	0.0	0.5	0.15	0.20	0.37	UJ	-0.17	0.75	1.26	UJ	1.00	0.28	0.09	=	0.80	0.11	0.09	=	1.57	0.49	0.33	=	2.05	0.57	0.17	J	1.59	0.49	0.21	=	-0.18	0.24	0.39	UJ	1.13	0.23	0.4	=	0.05
		SVP264080-1	872124	1085785	505.6	11/02/2022	0.0	0.0	0.5	-0.12	0.22	0.36	UJ	0.13	0.75	1.29	UJ	1.09	0.29	0.09	=	0.91	0.12	0.08	=	1.08	0.33	0.13	=	1.57	0.42	0.16	J	1.10	0.34	0.13	=	0.17	0.24	0.42	UJ	1.06	0.23	0.4	=	0.03
		SVP264080-2	872124	1085785	505.6	11/02/2022	0.0	0.0	0.5	0.25	0.56	0.99	UJ	0.00	1.21	12.90	UJ	1.33	0.29	0.16	=	1.61	0.41	0.15	=	1.09	0.24	0.13	=	0.99	0.24	0.13	=	1.01	0.22	0.06	=	0.14	0.50	1.00	UJ	0.92	1.18	2.8	UJ	0.08
		SVP264081	872124	1085785	505.6	11/02/2022	0.0	1.5	2.0	0.15	0.21	0.38	UJ	-0.41	0.75	1.24	UJ	1.17	0.31	0.09	=	0.90	0.13	0.09	=	1.27	0.37	0.13	=	2.05	0.49	0.13	J	1.21	0.36	0.16	=	-0.12	0.25	0.41	UJ	1.12	0.24	0.4	=	0.02
		SVP264082	872124	1085785	505.6	11/02/2022	0.0	3.0	3.5	0.09	0.13	0.23	UJ	0.13	0.48	0.81	UJ	1.19	0.30	0.06	=	0.88	0.10	0.06	=	1.51	0.40	0.15	=	1.58	0.41	0.12	J	1.20	0.35	0.15	=	-0.02	0.16	0.27	UJ	1.00	0.18	0.3	=	0.00
		SVP264083	872124	1085785	505.6	11/02/2022	0.0	5.0	5.5	-0.10	0.13	0.21	UJ	-0.31	0.49	0.79	UJ	1.22	0.30	0.05	=	0.87	0.10	0.05	=	0.91	0.29	0.17	=	1.37	0.36	0.14	J	1.03	0.31	0.14	=	-0.05	0.16	0.27	UJ	1.04	0.18	0.3	=	0.00
		SVP264084	872124	1085785	505.6	11/02/2022	0.0	6.5	7.0	0.02	0.13	0.23	UJ	-0.14	0.50	0.82	UJ	1.20	0.30	0.06	=	0.89	0.11	0.06	=	1.13	0.32	0.14	=	1.51	0.38	0.14	J	1.05	0.31	0.14	=	0.12	0.12	0.20	UJ	0.92	0.17	0.3	=	0.00
		SVP264085	872124	1085785	505.6	11/02/2022	0.0	8.5	9.0	0.03	0.13	0.23	UJ	-0.14	0.51	0.84	UJ	1.24	0.31	0.05	=	0.94	0.11	0.05	=	1.16	0.37	0.18	=	1.47	0.43	0.18	J	1.58	0.45	0.19	=	0.11	0.17	0.28	UJ	1.10	0.19	0.3	=	0.01
		SVP264086	872124	1085785	505.6	11/02/2022	0.0	11.0	11.5	0.03	0.14	0.24	UJ	-0.09	0.52	0.86	UJ	1.07	0.27	0.06	=	0.86	0.10	0.06	=	1.44	0.40	0.20	=	1.36	0.39	0.16	J	1.02	0.33	0.16	=	0.01	0.17	0.29	UJ	0.94	0.16	0.3	=	0.00
		SVP264087	872124	1085785	505.6	11/02/2022	0.0	13.5	14.0	0.13	0.12	0.21	UJ	-0.43	0.47	0.76	UJ	1.03	0.26	0.06	=	0.73	0.09	0.05	=	1.35	0.38	0.16	=	1.14	0.35	0.16	J	0.98	0.32	0.16	=	-0.01	0.16	0.27	UJ	0.96	0.17	0.3	=	0.00
		SVP264088	872124	1085785	505.6	11/02/2022	0.0	14.0	14.5	-0.04	0.12	0.21	UJ	0.15	0.45	0.77	UJ	0.99	0.25	0.05	=	0.67	0.08	0.05	=	0.95	0.30	0.16	=	1.25	0.35	0.15	J	0.66	0.25	0.15	=	0.09	0.15	0.26	UJ	0.93	0.17	0.3	=	0.00
5	SVP190163	SVP190163	871834	1085279	491.4	06/03/2019	0.0	0.0	0.5	-1.26	0.33	0.27	UJ	0.35	1.06	1.86	UJ	1.30	0.36	0.14	=	0.84	0.13	0.13	=	0.79	0.34	0.22	=	1.38	0.47	0.22	=	1.14	0.42	0.22	=	0.33	0.35	0.62	UJ	-0.28	0.21	1.1	UJ	0.07
		SVP190164	871834	1085279	491.4	06/03/2019	0.0	1.5	2.0	-1.26	0.33	0.29	UJ	-1.29	1.11	1.74	UJ	1.52	0.41	0.12	=	0.96	0.14	0.12	=	1.12	0.42	0.22	=	1.37	0.47	0.17	=	1.56	0.51	0.12	=	-0.05	0.34	0.57	UJ	0.71	0.30	0.5	=	0.02
		SVP190165	871834	1085279	491.4	06/03/2019	0.0	3.5	4.0	-1.32	0.34	0.26	UJ	-0.96	1.13	1.82	UJ	1.29	0.35	0.13	=	0.86	0.13	0.11	=	1.29	0.44	0.16	=	1.55	0.49	0.13	=	0.91	0.35	0.12	=	-0.08	0.34	0.56	UJ	0.87	0.33	0.5	=	0.01
		SVP190166	871834	1085279	491.4	06/03/2019	0.0	4.0	4.5	-2.15	0.52	0.29	UJ	-0.44	1.18	1.98	UJ	1.29	0.36	0.14	=	0.97	0.15	0.13	=	1.45	0.48	0.16	=	1.39	0.47	0.14	=	1.22	0.43	0.11	=	0.32	0.36	0.63	UJ	1.70	0.70	1.2	UJ	0.02

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
5	SVP190167	SVP190167	871950	1085279	492.3	06/03/2019	0.0	0.0	0.5	-1.68	0.40	0.32	UJ	0.16	1.03	1.78	UJ	1.22	0.34	0.12	=	0.80	0.12	0.12	=	1.18	0.44	0.14	=	1.41	0.50	0.24	=	1.05	0.41	0.13	=	0.12	0.33	0.56	UJ	0.86	0.22	0.5	=	0.05
		SVP190168	871950	1085279	492.3	06/03/2019	0.0	1.0	1.5	-1.36	0.30	0.29	UJ	-0.76	0.97	1.57	UJ	1.34	0.36	0.10	=	0.96	0.13	0.10	=	1.60	0.57	0.14	=	1.96	0.65	0.17	=	1.52	0.56	0.27	=	0.14	0.30	0.51	UJ	1.21	0.25	0.5	=	0.02
		SVP211098	871950	1085279	492.3	06/03/2019	0.0	2.5	3.0	-1.44	0.32	0.31	UJ	-0.13	1.00	1.69	UJ	1.54	0.41	0.11	=	0.95	0.14	0.10	=	1.34	0.47	0.13	=	1.46	0.50	0.13	=	1.03	0.40	0.22	=	0.19	0.32	0.55	UJ	0.95	0.22	0.5	=	0.03
		SVP211099	871950	1085279	492.3	06/03/2019	0.0	4.5	5.0	-2.35	0.48	0.30	UJ	0.21	1.00	1.71	UJ	1.74	0.46	0.10	=	1.00	0.14	0.11	=	1.31	0.49	0.17	=	2.06	0.66	0.16	=	1.05	0.43	0.25	=	-0.04	0.33	0.55	UJ	1.18	0.26	0.5	=	0.05
5	SVP190177	SVP190177	871776	1085380	496.6	06/03/2019	0.0	0.0	0.5	-1.34	0.34	0.27	UJ	0.18	1.20	2.06	UJ	1.49	0.41	0.15	=	0.95	0.14	0.13	=	1.21	0.49	0.24	=	1.51	0.6	0.24	=	1.15	0.47	0.19	=	-0.19	0.36	0.59	UJ	1.16	0.35	0.6	=	0.11
		SVP190178	871776	1085380	496.6	06/03/2019	0.0	1.0	1.5	-1.22	0.32	0.30	UJ	-0.94	1.21	1.95	UJ	1.40	0.39	0.14	=	0.93	0.14	0.12	=	0.92	0.38	0.20	=	1.81	0.6	0.16	=	1.21	0.45	0.15	=	0.09	0.37	0.63	UJ	1.03	0.36	0.6	=	0.02
		SVP211092	871776	1085380	496.6	06/03/2019	0.0	2.5	3.0	-1.81	0.44	0.30	UJ	-0.21	1.06	1.79	UJ	1.41	0.39	0.13	=	0.93	0.14	0.12	=	1.10	0.41	0.17	=	1.16	0.4	0.18	=	0.86	0.36	0.15	=	0.14	0.35	0.60	UJ	1.02	0.34	0.6	=	0.02
5	SVP190179	SVP190179	871892	1085380	492.2	06/03/2019	0.0	0.0	0.5	-1.98	0.42	0.29	UJ	-0.86	0.97	1.55	UJ	1.26	0.34	0.10	=	0.90	0.12	0.10	=	0.89	0.39	0.24	=	1.71	0.6	0.13	=	1.15	0.44	0.15	=	0.28	0.31	0.52	UJ	1.02	0.23	0.5	=	0.08
		SVP190180	871892	1085380	492.2	06/03/2019	0.0	0.5	1.0	-2.01	0.44	0.33	UJ	-0.32	1.03	1.73	UJ	1.38	0.37	0.12	=	1.02	0.14	0.10	=	1.30	0.46	0.15	=	1.31	0.5	0.12	=	1.06	0.41	0.22	=	0.38	0.35	0.60	UJ	1.12	0.25	0.5	=	0.02
		SVP211093	871892	1085380	492.2	06/03/2019	0.0	3.0	3.5	-1.80	0.37	0.29	UJ	-0.54	1.01	1.66	UJ	1.64	0.43	0.11	=	0.97	0.13	0.11	=	1.13	0.44	0.16	=	1.90	0.62	0.17	=	0.76	0.35	0.16	=	0.25	0.31	0.53	UJ	1.25	0.27	0.5	=	0.04
		SVP211094	871892	1085380	492.2	06/03/2019	0.0	4.0	4.5	-1.53	0.34	0.29	UJ	0.32	0.97	1.67	UJ	1.19	0.32	0.11	=	0.92	0.13	0.11	=	1.39	0.51	0.15	=	1.70	0.58	0.25	=	1.22	0.47	0.13	=	0.12	0.31	0.53	UJ	1.21	0.26	0.5	=	0.00
		SVP211100	871892	1085380	492.2	06/03/2019	0.0	5.0	5.5	-2.01	0.41	0.29	UJ	0.44	0.97	1.67	UJ	1.42	0.38	0.10	=	0.91	0.13	0.10	=	1.35	0.46	0.13	=	1.38	0.47	0.15	=	1.41	0.48	0.21	=	0.14	0.30	0.51	UJ	0.96	0.22	0.5	=	0.02
5	SVP190181	SVP190181	872008	1085380	494.0	06/04/2019	0.0	0.0	0.5	-2.05	0.47	0.27	UJ	0.38	1.13	1.95	UJ	1.23	0.34	0.13	=	0.86	0.13	0.13	=	1.23	0.45	0.24	=	1.27	0.46	0.19	=	0.95	0.39	0.23	=	0.15	0.34	0.58	UJ	1.02	0.33	0.5	=	0.06
		SVP190182	872008	1085380	494.0	06/04/2019	0.0	1.0	1.5	-1.04	0.25	0.33	UJ	-0.45	1.06	1.76	UJ	1.50	0.40	0.13	=	0.89	0.13	0.12	=	1.04	0.41	0.12	=	1.95	0.62	0.15	=	0.98	0.40	0.23	=	0.32	0.35	0.59	UJ	1.32	0.29	0.6	=	0.03
		SVP211101	872008	1085380	494.0	06/04/2019	0.0	3.5	4.0	-1.28	0.33	0.30	UJ	-0.14	1.19	2.02	UJ	1.51	0.41	0.15	=	0.99	0.17	0.13	=	1.10	0.42	0.22	=	1.74	0.56	0.18	J	1.28	0.46	0.12	J	0.08	0.34	0.59	UJ	0.96	0.35	0.6	=	0.02
		SVP211102	872008	1085380	494.0	06/04/2019	0.0	4.5	5.0	-1.27	0.32	0.28	UJ	0.18	1.13	1.94	UJ	1.53	0.41	0.14	=	0.95	0.14	0.13	=	0.78	0.31	0.19	=	1.50	0.46	0.16	J	0.75	0.30	0.11	J	0.22	0.34	0.58	UJ	0.60	0.31	0.6	J	0.03
		SVP211103	872008	1085380	494.0	06/04/2019	0.0	5.0	5.5	-1.32	0.32	0.26	UJ	0.52	1.08	1.87	UJ	1.85	0.48	0.13	=	0.94	0.15	0.13	=	1.12	0.40	0.18	=	0.94	0.36	0.17	J	0.98	0.37	0.11	J	-0.03	0.34	0.57	UJ	1.18	0.34	0.5	=	0.05
5	SVP190221	SVP190221	871950	1085481	497.2	06/04/2019	0.0	0.0	0.5	-1.05	0.27	0.34	UJ	0.69	1.18	2.06	UJ	1.12	0.31	0.12	=	0.81	0.12	0.13	=	1.24	0.48	0.17	=	1.69	0.58	0.26	=	0.55	0.30	0.25	J	0.15	0.34	0.59	UJ	1.12	0.28	0.7	=	0.05
		SVP190222	871950	1085481	497.2	06/04/2019	0.0	0.5	1.0	-1.14	0.29	0.33	UJ	-0.36	1.10	1.83	UJ	1.14	0.31	0.13	=	0.83	0.14	0.13	=	1.78	0.70	0.20	=	2.47	0.87	0.23	=	1.19	0.55	0.34	=	0.16	0.33	0.57	UJ	0.82	0.25	0.6	=	0.04
		SVP211118	871950	1085481	497.2	06/04/2019	0.0	3.5	4.0	-0.99	0.27	0.36	UJ	-0.55	1.15	1.90	UJ	1.26	0.34	0.12	=	0.91	0.14	0.14	=	1.41	0.59	0.22	=	1.27	0.55	0.23	=	0.82	0.42	0.20	J	-0.04	0.36	0.61	UJ	1.00	0.51	0.6	J	0.01
		SVP211119	871950	1085481	497.2	06/04/2019	0.0	4.5	5.0	-1.48	0.33	0.32	UJ	0.26	1.11	1.91	UJ	1.36	0.36	0.13	=	1.01	0.14	0.13	=	1.20	0.48	0.16	=	2.18	0.70	0.20	=	0.58	0.31	0.17	J	-0.02	0.34	0.56	UJ	1.50	0.31	0.6	=	0.04
5	SVP263653	SVP263653	871892	1085582	500.2	10/26/2022	0.0	0.0	0.5	0.15	0.21	0.38	UJ	-1.44	0.79	1.16	UJ	1.06	0.28	0.08	=	0.83	0.12	0.09	=	1.31	0.42	0.13	=	1.93	0.53	0.21	=	0.94	0.35	0.13	=	-0.08	0.24	0.39	UJ	1.09	0.24	0.4	=	0.05
		SVP263654	871892	1085582	500.2	10/26/2022	0.0	0.5	1.0	-0.04	0.14	0.24	UJ	-0.18	0.51	0.84	UJ	1.02	0.26	0.06	=	0.91	0.11	0.06	=	1.22	0.38	0.18	=	1.97	0.50	0.18	=	1.39	0.41	0.18	=	0.12	0.17	0.29	UJ	1.21	0.21	0.3	=	0.01
		SVP263655	871892	1085582	500.2	10/26/2022	0.0	3.5	4.0	0.08	0.13	0.22	UJ	-0.09	0.50	0.83	UJ	1.10	0.28	0.06	=	0.93	0.12	0.06	=	1.15	0.39	0.16	=	2.25	0.59	0.14	=	1.36	0.44	0.21	=	0.16	0.17	0.28	UJ	1.06	0.18	0.3	=	0.03
		SVP263656	871892	1085582	500.2	10/26/2022	0.0	4.0	4.5	-0.02	0.13	0.22	UJ	0.09	0.51	0.87	UJ	1.18	0.29	0.06	=	0.93	0.12	0.06	=	1.20	0.38	0.18	=	1.64	0.45	0.12	J	1.22	0.38	0.18	=	0.17	0.17	0.29	UJ	1.13	0.19	0.3	=	0.00
		SVP263657	871892	1085582	500.2	10/26/2022	0.0	6.0	6.5	0.07	0.13	0.22	UJ	0.17	0.49	0.83	UJ	1.01	0.26	0.05	=	0.80	0.10	0.05	=	1.20	0.38	0.18	=	1.72	0.46	0.12	=	1.07	0.36	0.18	=	-0.08	0.16	0.26	UJ	0.90	0.16	0.3	=	0.00
		SVP263658	871892	1085582	500.2	10/26/2022	0.0	9.5	10.0	-0.04	0.12	0.20	UJ	0.58	0.48	0.84	UJ	1.00	0.26	0.05	=	0.84	0.10	0.05	=	0.83	0.32	0.13	=	1.83	0.50	0.20	=	1.40	0.43	0.20	=	0.02	0.16	0.26	UJ	1.17	0.19	0.3	=	0.00
		SVP263659	871892	1085582	500.2	10/26/2022	0.0	10.0	10.5	0.00	0.13	0.22	UJ	-0.04	0.46	0.77	UJ	0.98	0.25	0.05	=	0.82	0.11	0.05	=	1.13	0.36	0.12	=	1.10	0.36	0.14	J	1.08	0.36	0.19	=	0.17	0.16	0.27	UJ	1.09	0.20	0.3	=	0.00
		SVP263660	871892	1085582	500.2	10/26/2022	0.0	13.5	14.0	0.06	0.12	0.20	UJ	0.05	0.45	0.76	UJ	0.86	0.22	0.05	=	0.71	0.09	0.05	=	1.14	0.36	0.17	=	1.49	0.41	0.11	J	0.92	0.32	0.17	=	0.14	0.16	0.27	UJ	0.76	0.14	0.3	=	0.00
		SVP263661	871892	1085582	500.2	10/26/2022	0.0	14.0	14.5	0.00	0.13	0.21	UJ	0.01	0.48	0.81	UJ	1.01	0.25	0.05	=	0.79	0.09	0.05	=	1.33	0.40	0.18	=	1.67	0.46	0.14	J	0.98	0.34	0.18	=	0.06	0.16	0.27	UJ	0.95	0.18	0.3	=	0.00
5	SVP263680	SVP263680	872049	1085480	497.1	10/27/2022	0.0	0.0	0.5	0.22	0.19	0.36	UJ	-0.24	0.72	1.21	UJ	0.78	0.22	0.08	=	0.63	0.09	0.08	=	1.16	0.39	0.20	J	1.21	0.39	0.13	J	0.94	0.35	0.20	=	0.14	0.24	0.41	UJ	0.82	0.19	0.4	=	0.00
		SVP263681	872049	1085480	497.1	10/27/2022	0.0	1.0	1.5	0.10	0.20	0.35	UJ	0.40	0.71	1.25	UJ	0.93	0.25	0.08	=	0.65	0.10	0.08	=	1.23	0.39	0.17	J	1.85	0.50	0.20	J	1.08	0.36	0.13	=	0.07	0.23	0.39	UJ	0.81	0.19	0.4	=	0.00
		SVP263682	872049	1085480	497.1	10/27/2022	0.0	2.5	3.0	-0.01	0.21	0.36	UJ	-0.38	0.70	1.16	UJ	0.87	0.24	0.09	=	0.70	0.10	0.09	=	1.85	0.50	0.12	=	2.53	0.60	0.19	J	1.08	0.36	0.19	=	0.04	0.23	0.40	UJ	1.07	0.23	0.4	=	0.05
		SVP263683	872049	1085480	497.1	10/27/2022	0.0	5.5	6.0	0.10	0.14	0.24	UJ	0.00	0.51	0.86	UJ	0.82	0.22	0.06	=	0.91	0.11	0.06	=	0.74	0.30	0.19	J	1.74	0.48	0.19	J	1.15	0.38	0.15	=	0.19	0.17	0.28	UJ	1.13	0.21	0.3	=	0.00
		SVP263684	872049	1085480	497.1	10/27/2022	0.0	6.0	6.5	-0.02	0.13	0.22	UJ	0.35	0.50	0.87	UJ	0.86	0.23	0.05	=	0.88	0.11	0.06	=	1.31	0.41	0.19	J	2.00	0.52	0.12	J	1.23	0.39	0.19	=	0.11	0.17	0.28	UJ	1.08	0.19	0.3	=	0.01
		SVP263685	872049	1085480	497.1	10/27/2022	0.0	9.5	10.0	-0.07	0.13	0.22	UJ	0.31	0.48	0.83	UJ	1.08	0.28	0.06	=	0.83	0.10	0.05	=	1.11	0.36	0.17	J	1.81	0.48	0.19	J	1.07	0.36	0.12	=	-0.02	0.16	0.27	UJ	1.12	0.19	0.3	=	0.00
		SVP263686	872049	1085480	497.1	10/27/2022	0.0	11.0	11.5	0.12	0.14	0.26	UJ	-0.10	0.53	0.90	UJ	1.10	0.28	0.06	=	0.90	0.11	0.05	=	1.05	0.38	0.21	J	1.61	0.48	0.21	J	1.07	0.38	0.21	=	0.03	0.18	0.30	UJ	0.97	0.26	0.3	=	0.00
		SVP263687	872049	1085480	497.1	10/27/2022	0.0	12.5	13.0	-0.01	0.12	0.20	UJ	0.01	0.45	0.77	UJ	0.88	0.22	0.05	=	0.81	0.10	0.05	=	1.30	0.43	0.21	J	1.70	0.50	0.21	J	1.03	0.37	0.14	=	0.12	0.15	0.26	UJ	0.96	0.17	0.3	=	0.00
		SVP263688	872049	1085480	497.1	10/27/2022	0.0	14.8	15.3	-0.12	0.13	0.22	UJ	-0.30	0.49	0.80	UJ	0.88	0.23	0.05	=	0.76	0.09	0.05	=	1.21	0.39	0.15	J	1.87	0.50	0.13	J	1.16	0.38	0.19	=	0.04	0.16	0.27	UJ	0.91	0.17	0.3	=	0.00
		SVP263689	872049	1085480	497.1	10/27/2022	0.0	16.7	17.2	0.13	0.12	0.21	UJ	-0.15	0.47	0.78	UJ	0.87	0.23	0.05	=	0.82	0.10	0.05	=	1.16	0.39	0.13	J	1.49	0.45	0.20	J	1.08	0.37	0.20	=	-0.04	0.16	0.26	UJ	0.83	0.16	0.3	=	0.00
		SVP263690	872049	1085480	497.1	10/27/2022	0.0	18.1	18.6	0.07	0.08	0.14	UJ	-0.36	0.45	0.72	UJ	0.82	0.21	0.05	=	0.74	0.09	0.05	=	0.95	0.34	0.19	J	1.31	0.40	0.19	J	0.74	0.30	0.19	=	0.14	0.15	0.26	UJ	0.75	0.15	0.3	=	0.00
		SVP263691	872049	1085480	497.1	10/27/2022	0.0	21.0	21.5	0.17	0.13	0.23	UJ	0.13	0.46	0.79	UJ	0.94	0.24	0.05	=	0.81	0.10	0.06	=	0.99	0.33	0.14	J	1.54	0.43	0.15	J	0.87	0.31	0.14	=	-0.12	0.16	0.26	UJ	1.14	0.19	0.3	=	0.00
		SVP263692	872049	1085480	497.1	10/27/2022	0.0	21.5	22.0	-0.04	0.12	0.20	UJ	-0.29	0.47	0.77	UJ	1.00	0.25	0.05	=	0.78	0.10	0.05	=	1.52	0.47	0.14	J	2.09	0.57	0.14	J	0.99	0.37	0.22	=	-0.03	0.15	0.25	UJ	0.97	0.23	0.3	=	0.02

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
5	SVP263808	SVP263808	871718	1085683	504.8	10/31/2022	0.0	0.0	0.5	0.04	0.13	0.23	UJ	0.38	0.50	0.86	UJ	0.95	0.24	0.06	=	0.80	0.10	0.06	=	0.93	0.33	0.12	=	1.51	0.4	0.2	J	1.06	0.36	0.19	=	0.16	0.17	0.29	UJ	1.00	0.18	0.3	=	0.00
		SVP263809	871718	1085683	504.8	10/31/2022	0.0	1.5	2.0	-0.07	0.21	0.36	UJ	-0.33	0.77	1.29	UJ	1.07	0.28	0.10	=	0.81	0.11	0.09	=	1.43	0.44	0.20	=	2.31	0.6	0.2	J	1.09	0.37	0.16	=	0.10	0.25	0.43	UJ	1.17	0.23	0.4	=	0.03
		SVP263810	871718	1085683	504.8	10/31/2022	0.0	3.5	4.0	-0.01	0.13	0.22	UJ	-0.34	0.50	0.81	UJ	1.07	0.27	0.05	=	0.86	0.10	0.06	=	0.82	0.29	0.15	=	1.55	0.4	0.11	J	0.92	0.32	0.17	=	0.03	0.16	0.27	UJ	1.25	0.21	0.3	=	0.00
		SVP263811	871718	1085683	504.8	10/31/2022	0.0	5.5	6.0	-0.03	0.22	0.37	UJ	0.54	0.76	1.34	UJ	1.15	0.30	0.09	=	0.93	0.12	0.09	=	1.48	0.43	0.16	=	2.02	0.5	0.19	J	1.02	0.35	0.19	=	0.00	0.26	0.44	UJ	0.82	0.20	0.4	=	0.01
		SVP263812	871718	1085683	504.8	10/31/2022	0.0	7.5	8.0	-0.05	0.13	0.21	UJ	0.44	0.49	0.85	UJ	1.07	0.27	0.05	=	0.86	0.11	0.05	=	1.15	0.38	0.13	=	2.27	0.6	0.13	J	1.27	0.40	0.15	=	0.04	0.16	0.26	UJ	1.21	0.20	0.3	=	0.03
		SVP263813	871718	1085683	504.8	10/31/2022	0.0	9.0	9.5	-0.02	0.12	0.20	UJ	-0.31	0.46	0.74	UJ	0.93	0.23	0.05	=	0.68	0.08	0.05	=	0.86	0.31	0.20	=	1.64	0.4	0.15	J	1.16	0.36	0.16	=	-0.09	0.15	0.25	UJ	0.92	0.16	0.2	=	0.00
		SVP263814	871718	1085683	504.8	10/31/2022	0.0	10.0	10.5	0.02	0.11	0.19	UJ	0.32	0.43	0.75	UJ	0.86	0.22	0.05	=	0.69	0.09	0.05	=	1.12	0.37	0.13	=	1.89	0.5	0.19	J	0.84	0.31	0.13	=	0.04	0.15	0.25	UJ	0.85	0.16	0.3	=	0.00
		SVP263815	871718	1085683	504.8	10/31/2022	0.0	13.5	14.0	-0.03	0.12	0.21	UJ	-0.07	0.47	0.78	UJ	0.99	0.25	0.05	=	0.76	0.10	0.05	=	1.45	0.45	0.14	=	1.45	0.5	0.14	J	1.33	0.44	0.22	=	0.15	0.09	0.22	UJ	1.01	0.18	0.3	=	0.00
		SVP263816	871718	1085683	504.8	10/31/2022	0.0	15.0	15.5	0.00	0.12	0.21	UJ	-0.04	0.46	0.77	UJ	1.00	0.25	0.05	=	0.76	0.09	0.05	=	0.78	0.28	0.16	=	1.39	0.4	0.16	J	0.84	0.29	0.10	=	-0.05	0.16	0.26	UJ	0.96	0.17	0.3	=	0.00
6	SVP190125	SVP190125	871948	1085078	490.1	08/06/2018	0.0	0.0	0.5	-0.45	0.11	0.15	UJ	0.61	0.51	0.88	UJ	1.19	0.31	0.05	=	0.75	0.09	0.05	=	1.32	0.50	0.20	=	1.82	0.61	0.15	J	1.01	0.43	0.26	=	0.12	0.18	0.30	UJ	1.06	0.29	0.3	=	0.07
		SVP190126	871948	1085078	490.1	08/06/2018	0.0	1.5	2.0	-0.87	0.17	0.14	UJ	-0.09	0.51	0.86	UJ	1.20	0.31	0.05	=	0.77	0.09	0.05	=	1.10	0.41	0.15	=	1.77	0.55	0.17	=	1.11	0.41	0.21	=	0.02	0.18	0.30	UJ	0.91	0.17	0.3	=	0.00
		SVP190127	871948	1085078	490.1	08/06/2018	0.0	3.5	4.0	-0.47	0.11	0.14	UJ	-0.04	0.51	0.86	UJ	1.19	0.30	0.06	=	0.82	0.11	0.05	=	0.78	0.36	0.26	=	1.30	0.49	0.23	J	0.89	0.39	0.23	=	0.13	0.18	0.30	UJ	0.85	0.17	0.3	=	0.00
		SVP190128	871948	1085078	490.1	08/06/2018	0.0	5.5	6.0	-1.47	0.27	0.14	UJ	-0.07	0.51	0.86	UJ	1.17	0.30	0.06	=	0.80	0.11	0.05	=	0.95	0.38	0.18	=	1.71	0.55	0.16	=	0.99	0.39	0.14	=	0.09	0.18	0.30	UJ	1.07	0.19	0.3	=	0.00
6	SVP190129	SVP190129	872070	1085086	495.6	09/18/2018	0.0	0.0	0.5	-1.17	0.24	0.15	UJ	0.05	0.57	0.97	UJ	1.31	0.33	0.07	=	0.91	0.12	0.06	=	0.98	0.39	0.16	=	1.11	0.43	0.14	J	1.17	0.44	0.12	=	0.05	0.18	0.31	UJ	1.21	0.21	0.3	=	0.07
		SVP190130	872070	1085086	495.6	09/18/2018	0.0	1.0	1.5	-0.93	0.20	0.15	UJ	0.38	0.60	1.04	UJ	1.33	0.34	0.07	=	0.90	0.12	0.07	=	0.96	0.42	0.18	=	1.67	0.59	0.16	J	1.15	0.47	0.27	=	0.12	0.19	0.32	UJ	1.05	0.19	0.3	=	0.01
		SVP190131	872070	1085086	495.6	09/18/2018	0.0	2.0	2.5	-0.90	0.20	0.17	UJ	-0.21	0.66	1.09	UJ	1.44	0.37	0.07	=	0.99	0.12	0.07	=	0.68	0.31	0.17	=	1.62	0.53	0.22	J	0.87	0.36	0.22	=	0.21	0.20	0.35	UJ	1.17	0.20	0.4	=	0.02
		SVP190132	872070	1085086	495.6	09/18/2018	0.0	5.5	6.0	-0.87	0.20	0.17	UJ	-0.47	0.67	1.09	UJ	1.35	0.35	0.08	=	0.92	0.12	0.07	=	0.89	0.36	0.20	=	1.53	0.49	0.13	J	0.68	0.30	0.11	=	-0.05	0.20	0.33	UJ	1.06	0.19	0.4	=	0.01
6	SVP190149	SVP190149	872009	1085178	496.2	08/06/2018	0.0	0.0	0.5	-0.35	0.10	0.20	UJ	0.05	0.66	1.12	UJ	1.25	0.33	0.07	=	0.77	0.10	0.07	=	1.19	0.43	0.16	=	1.72	0.55	0.11	=	1.14	0.42	0.22	=	0.24	0.22	0.38	UJ	0.88	0.38	0.4	=	0.08
		SVP190150	872009	1085178	496.2	08/06/2018	0.0	1.5	2.0	-0.99	0.20	0.19	UJ	0.02	0.65	1.10	UJ	1.23	0.32	0.07	=	0.84	0.11	0.07	=	1.10	0.41	0.13	=	1.25	0.44	0.14	J	1.07	0.40	0.13	=	-0.20	0.23	0.37	UJ	1.23	0.26	0.5	=	0.01
		SVP190151	872009	1085178	496.2	08/06/2018	0.0	2.5	3.0	-1.44	0.27	0.20	UJ	-0.18	0.64	1.06	UJ	1.34	0.34	0.07	=	0.92	0.12	0.07	=	0.80	0.33	0.16	=	1.41	0.46	0.15	J	1.16	0.41	0.13	=	-0.15	0.22	0.35	UJ	1.28	0.25	0.5	=	0.01
		SVP190152	872009	1085178	496.2	08/06/2018	0.0	4.0	4.5	-1.16	0.22	0.19	UJ	-0.18	0.64	1.07	UJ	1.40	0.35	0.06	=	0.98	0.12	0.07	=	1.34	0.42	0.15	=	1.44	0.43	0.13	J	1.03	0.35	0.09	=	0.14	0.22	0.37	UJ	1.28	0.25	0.5	=	0.02
6	SVP190153	SVP190153	872128	1085179	494.7	08/06/2018	0.0	0.0	0.5	-1.19	0.23	0.15	UJ	-0.49	0.54	0.87	UJ	1.23	0.31	0.05	=	0.79	0.10	0.06	=	1.32	0.47	0.24	=	1.44	0.49	0.16	J	1.13	0.42	0.14	=	-0.06	0.18	0.30	UJ	1.06	0.19	0.3	=	0.06
		SVP190153-1	872128	1085179	494.7	08/06/2018	0.0	0.0	0.5	-1.24	0.23	0.15	UJ	-0.26	0.52	0.85	UJ	1.30	0.33	0.06	=	0.86	0.10	0.05	=	1.58	0.49	0.18	=	1.49	0.47	0.10	J	0.72	0.30	0.19	=	-0.04	0.19	0.31	UJ	1.20	0.21	0.3	=	0.07
		SVP190153-2	872128	1085179	494.7	08/06/2018	0.0	0.0	0.5	-0.46	1.23	1.59	UJ	-1.42	5.36	9.00	UJ	1.17	0.28	0.20	=	1.14	0.39	0.27	=	0.64	0.17	0.10	=	2.21	0.35	0.13	=	0.88	0.19	0.07	=	0.22	0.58	1.12	UJ	1.32	1.11	1.8	UJ	0.10
		SVP190154	872128	1085179	494.7	08/06/2018	0.0	1.5	2.0	0.07	0.04	0.11	UJ	0.35	0.53	0.91	UJ	1.34	0.33	0.06	=	0.86	0.10	0.05	=	1.25	0.46	0.21	=	1.54	0.53	0.21	J	0.65	0.31	0.18	=	0.13	0.19	0.32	UJ	1.15	0.20	0.3	=	0.01
		SVP190155	872128	1085179	494.7	08/06/2018	0.0	2.0	2.5	-0.64	0.14	0.14	UJ	-0.07	0.52	0.86	UJ	1.21	0.31	0.06	=	0.80	0.10	0.06	=	2.25	0.70	0.17	=	1.80	0.61	0.19	J	1.45	0.53	0.17	=	0.08	0.18	0.31	UJ	1.01	0.18	0.3	=	0.00
		SVP190156	872128	1085179	494.7	08/06/2018	0.0	5.0	5.5	-0.51	0.12	0.16	UJ	-0.23	0.56	0.93	UJ	1.62	0.40	0.06	=	1.06	0.12	0.06	=	1.43	0.50	0.18	=	1.65	0.54	0.18	J	1.50	0.51	0.12	=	-0.20	0.20	0.32	UJ	1.07	0.21	0.3	=	0.03
6	SVP190169	SVP190169	872066	1085279	493.3	06/04/2019	0.0	0.0	0.5	-0.99	0.26	0.32	UJ	-0.32	1.13	1.90	UJ	1.29	0.35	0.12	=	0.85	0.12	0.12	=	1.40	0.51	0.25	=	2.18	0.68	0.25	=	0.88	0.38	0.13	=	0.29	0.34	0.59	UJ	1.03	0.26	0.6	=	0.12
		SVP190170	872066	1085279	493.3	06/04/2019	0.0	0.5	1.0	-0.95	0.25	0.34	UJ	0.03	1.09	1.86	UJ	1.28	0.35	0.12	=	0.84	0.13	0.12	=	0.92	0.41	0.16	=	1.93	0.66	0.27	=	0.82	0.38	0.15	=	0.05	0.35	0.59	UJ	0.85	0.25	0.7	=	0.02
		SVP211104	872066	1085279	493.3	06/04/2019	0.0	2.0	2.5	-1.34	0.32	0.34	UJ	-0.82	1.25	2.05	UJ	1.56	0.41	0.13	=	0.91	0.13	0.14	=	1.40	0.48	0.13	=	1.84	0.58	0.21	=	0.72	0.32	0.11	=	0.15	0.36	0.62	UJ	1.14	0.30	0.7	=	0.03
		SVP211105	872066	1085279	493.3	06/04/2019	0.0	4.0	4.5	-1.24	0.29	0.35	UJ	-0.43	1.11	1.84	UJ	2.04	0.52	0.12	=	1.04	0.14	0.12	=	1.71	0.61	0.17	=	2.82	0.85	0.17	=	1.11	0.47	0.28	=	-0.02	0.35	0.58	UJ	0.79	0.24	0.6	=	0.13
		SVP211106	872066	1085279	493.3	06/04/2019	0.0	4.5	5.0	-1.25	0.29	0.35	UJ	-0.21	1.17	1.96	UJ	2.05	0.53	0.13	=	1.04	0.14	0.14	=	1.07	0.43	0.17	=	2.64	0.77	0.16	=	0.81	0.37	0.25	=	-0.02	0.37	0.62	UJ	1.12	0.30	0.7	=	0.11
6	SVP190171	SVP190171	872182	1085279	496.9	06/04/2019	0.0	0.0	0.5	-1.41	0.36	0.29	UJ	0.21	1.15	1.99	UJ	1.18	0.33	0.14	=	0.75	0.13	0.12	=	1.23	0.51	0.31	=	2.22	0.74	0.18	J	0.99	0.44	0.16	J	0.14	0.34	0.59	UJ	0.90	0.42	0.6	=	0.10
		SVP190172	872182	1085279	496.9	06/04/2019	0.0	1.0	1.5	-1.76	0.42	0.28	UJ	-0.87	1.15	1.86	UJ	1.29	0.36	0.14	=	0.72	0.13	0.13	=	0.84	0.36	0.23	=	1.60	0.53	0.12	J	1.22	0.45	0.12	J	0.20	0.35	0.60	UJ	1.06	0.40	0.5	=	0.01
		SVP211107	872182	1085279	496.9	06/04/2019	0.0	3.5	4.0	-1.12	0.31	0.29	UJ	0.26	1.24	2.14	UJ	1.20	0.34	0.13	=	0.84	0.15	0.13	=	1.32	0.47	0.20	=	1.86	0.59	0.18	J	1.24	0.45	0.18	J	0.05	0.35	0.60	UJ	1.15	0.34	0.5	=	0.01
		SVP211108	872182	1085279	496.9	06/04/2019	0.0	4.0	4.5	-1.11	0.31	0.27	UJ	0.28	1.15	2.00	UJ	1.24	0.35	0.14	=	0.74	0.12	0.13	=	0.85	0.34	0.12	=	0.95	0.36	0.16	J	0.62	0.28	0.14	J	0.19	0.34	0.60	UJ	0.70	0.32	0.6	=	0.01
		SVP211109	872182	1085279	496.9	06/04/2019	0.0	6.5	7.0	-1.28	0.34	0.29	UJ	-0.54	1.21	1.99	UJ	1.52	0.41	0.13	=	0.88	0.14	0.13	=	1.00	0.38	0.19	=	1.04	0.38	0.14	J	1.02	0.38	0.20	J	0.01	0.35	0.60	UJ	0.82	0.32	0.6	=	0.02
		SVP211110	872182	1085279	496.9	06/04/2019	0.0	8.0	8.5	-1.17	0.30	0.28	UJ	-0.69	1.08	1.76	UJ	1.20	0.34	0.14	=	1.02	0.15	0.12	=	1.24	0.45	0.21	=	1.65	0.53	0.17	J	1.29	0.46	0.14	J	-0.23	0.35	0.58	UJ	0.92	0.34	0.6	=	0.00

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
6	SVP190183	SVP190183	872124	1085380	497.2	06/04/2019	0.0	0.0	0.5	-0.66	0.14	0.18	UJ	0.23	0.54	0.94	UJ	1.28	0.33	0.06	=	0.71	0.09	0.06	=	0.89	0.42	0.29	=	1.90	0.66	0.17	=	1.04	0.45	0.17	=	0.22	0.19	0.33	UJ	1.04	0.19	0.3	=	0.10
		SVP190183-1	872124	1085380	497.2	06/04/2019	0.0	0.0	0.5	-0.85	0.18	0.19	UJ	-0.73	0.63	0.99	UJ	1.36	0.34	0.06	=	0.72	0.09	0.06	=	1.03	0.42	0.16	=	1.84	0.61	0.13	=	0.80	0.37	0.25	=	0.17	0.20	0.34	UJ	0.88	0.18	0.4	=	0.11
		SVP190183-2	872124	1085380	497.2	06/04/2019	0.0	0.0	0.5	0.09	0.30	1.39	UJ	1.13	3.55	6.02	UJ	1.19	0.32	0.23	=	1.14	0.36	0.53	=	0.57	0.15	0.10	=	0.78	0.19	0.11	=	0.48	0.13	0.06	=	0.35	0.31	0.43	UJ	0.54	0.83	1.4	UJ	0.05
		SVP190184	872124	1085380	497.2	06/04/2019	0.0	1.0	1.5	-1.04	0.26	0.36	UJ	-0.67	1.18	1.94	UJ	1.35	0.37	0.12	=	0.81	0.12	0.13	=	1.64	0.57	0.14	=	1.91	0.63	0.18	=	0.66	0.33	0.17	J	0.23	0.38	0.65	UJ	0.82	0.26	0.7	=	0.02
		SVP190185	872124	1085380	497.2	06/04/2019	0.0	3.5	4.0	-0.96	0.25	0.35	UJ	-1.16	1.16	1.85	UJ	1.42	0.38	0.12	=	0.90	0.12	0.13	=	0.71	0.35	0.20	=	1.98	0.66	0.17	=	0.78	0.37	0.19	=	-0.14	0.36	0.59	UJ	1.07	0.27	0.6	=	0.03
		SVP190186	872124	1085380	497.2	06/04/2019	0.0	5.5	6.0	-1.90	0.43	0.33	UJ	0.56	1.15	1.99	UJ	1.51	0.40	0.13	=	1.00	0.14	0.12	=	0.98	0.45	0.20	=	3.19	0.97	0.21	=	1.34	0.54	0.20	=	0.05	0.36	0.61	UJ	1.38	0.31	0.7	=	0.12
		SVP211111	872124	1085380	497.2	06/04/2019	0.0	6.0	6.5	-1.60	0.45	0.50	UJ	0.71	1.63	2.88	UJ	1.97	0.54	0.19	=	1.12	0.18	0.18	=	1.04	0.42	0.14	=	1.73	0.58	0.16	=	0.98	0.41	0.24	=	-0.29	0.48	0.79	UJ	0.95	0.36	0.9	=	0.05
		SVP211112	872124	1085380	497.2	06/04/2019	0.0	7.0	7.5	-1.08	0.26	0.33	UJ	0.10	1.14	1.94	UJ	1.61	0.42	0.13	=	1.03	0.14	0.13	=	0.94	0.40	0.16	=	2.10	0.66	0.15	=	1.19	0.46	0.25	=	0.41	0.36	0.62	UJ	0.96	0.25	0.6	=	0.05
6	SVP190187	SVP190187	872240	1085380	496.9	06/04/2019	0.0	0.0	0.5	-1.06	0.29	0.27	UJ	-0.29	1.09	1.84	UJ	1.25	0.35	0.13	=	0.67	0.12	0.14	=	1.11	0.44	0.20	=	1.99	0.63	0.15	J	0.79	0.36	0.13	J	-0.05	0.34	0.57	UJ	1.00	0.33	0.6	=	0.10
		SVP190188	872240	1085380	496.9	06/04/2019	0.0	1.5	2.0	-1.40	0.36	0.28	UJ	0.44	1.07	1.87	UJ	1.21	0.34	0.13	=	0.82	0.13	0.12	=	1.08	0.47	0.25	=	1.48	0.58	0.26	J	0.84	0.41	0.21	J	0.66	0.36	0.62	UJ	1.02	0.39	0.5	=	0.00
		SVP211113	872240	1085380	496.9	06/04/2019	0.0	2.0	2.5	-1.93	0.45	0.27	UJ	-0.36	1.09	1.83	UJ	1.23	0.34	0.13	=	0.83	0.12	0.13	=	1.59	0.51	0.19	=	1.26	0.45	0.22	J	0.82	0.34	0.13	J	0.10	0.33	0.57	UJ	0.91	0.32	0.5	=	0.01
		SVP211114	872240	1085380	496.9	06/04/2019	0.0	4.5	5.0	-1.43	0.38	0.31	UJ	-1.25	1.26	1.90	UJ	1.29	0.36	0.14	=	0.83	0.14	0.14	=	1.47	0.52	0.22	=	1.62	0.55	0.18	J	0.94	0.39	0.16	J	0.29	0.37	0.62	UJ	0.83	0.32	0.6	=	0.01
6	SVP190353	SVP190353	871952	1085035	478.0	10/11/2018	0.0	0.0	0.5	-0.46	0.11	0.15	UJ	-0.26	0.54	0.88	UJ	1.44	0.36	0.05	=	0.87	0.11	0.06	=	1.05	0.39	0.14	=	1.66	0.52	0.11	J	0.97	0.37	0.14	=	-0.03	0.18	0.30	UJ	1.15	0.20	0.3	=	0.11
		SVP190354	871952	1085035	478.0	10/11/2018	0.0	1.0	1.5	-0.5	0.11	0.16	UJ	0.10	0.57	0.96	UJ	1.74	0.43	0.06	=	0.96	0.11	0.06	=	1.24	0.45	0.19	=	1.53	0.52	0.14	J	0.74	0.33	0.15	=	0.0	0.19	0.32	UJ	1.34	0.23	0.4	=	0.04
6	SVP190365	SVP190365	872054	1085024	478.7	10/11/2018	0.0	0.0	0.5	-0.58	0.13	0.14	UJ	-0.16	0.52	0.86	UJ	1.67	0.41	0.05	=	0.51	0.06	0.05	=	0.65	0.38	0.26	J	1.11	0.51	0.23	J	0.36	0.27	0.18	J	0.09	0.18	0.3	UJ	0.88	0.17	0.3	=	0.14
		SVP190366	872054	1085024	478.7	10/11/2018	0.0	0.5	1.0	-0.92	0.18	0.15	UJ	0.32	0.54	0.93	UJ	1.81	0.45	0.06	=	0.69	0.09	0.05	=	1.15	0.44	0.24	=	1.09	0.42	0.16	J	0.93	0.38	0.15	=	0.01	0.19	0.3	UJ	0.93	0.17	0.3	=	0.04
6	SVP207127	SVP207127	872022	1085072	497.8	06/11/2019	0.0	0.0	0.5	-0.91	0.18	0.18	UJ	-0.23	0.56	0.93	UJ	1.25	0.31	0.06	=	0.77	0.10	0.06	=	1.18	0.51	0.19	=	2.67	0.87	0.19	=	0.97	0.5	0.19	=	0.16	0.19	0.3	UJ	1.09	0.19	0.3	=	0.14
		SVP207127-1	872022	1085072	497.8	06/11/2019	0.0	0.0	0.5	-0.69	0.14	0.17	UJ	-0.17	0.53	0.88	UJ	1.23	0.31	0.05	=	0.80	0.10	0.05	=	0.79	0.37	0.17	=	1.52	0.55	0.14	=	0.79	0.4	0.16	=	-0.01	0.18	0.3	UJ	1.15	0.20	0.3	=	0.06
		SVP207127-2	872022	1085072	497.8	06/11/2019	0.0	0.0	0.5	0.14	0.58	1.10	UJ	0.00	1.39	7.53	UJ	1.06	0.27	0.19	J	1.09	0.31	0.42	J	0.74	0.18	0.12	=	0.90	0.21	0.12	J	0.75	0.2	0.06	=	-0.31	0.47	1.0	UJ	0.87	0.81	1.4	UJ	0.02
		SVP207128	872022	1085072	497.8	06/11/2019	0.0	1.0	1.5	-0.50	0.12	0.17	UJ	-0.01	0.53	0.90	UJ	1.27	0.32	0.05	=	0.82	0.10	0.05	=	1.12	0.46	0.14	=	1.76	0.62	0.20	=	0.43	0.3	0.14	J	0.17	0.19	0.3	UJ	1.05	0.18	0.3	=	0.01
		SVP211141	872022	1085072	497.8	06/11/2019	0.0	2.0	2.5	-0.66	0.13	0.17	UJ	0.19	0.54	0.91	UJ	1.26	0.31	0.05	=	0.74	0.10	0.05	=	1.24	0.49	0.19	=	1.91	0.65	0.14	=	1.10	0.5	0.16	=	0.08	0.18	0.3	UJ	1.19	0.21	0.3	=	0.01
6	SVP207129	SVP207129	872029	1085057	488.1	06/11/2019	0.0	0.0	0.5	-0.57	0.13	0.17	UJ	0.13	0.53	0.91	UJ	1.26	0.31	0.05	=	0.81	0.10	0.05	=	1.24	0.51	0.16	=	2.12	0.73	0.16	=	0.88	0.4	0.16	=	0.03	0.19	0.3	UJ	1.25	0.21	0.3	=	0.11
		SVP207130	872029	1085057	488.1	06/11/2019	0.0	1.5	2.0	-0.41	0.10	0.19	UJ	0.34	0.58	1.01	UJ	1.36	0.34	0.06	=	0.93	0.12	0.06	=	1.52	0.57	0.17	=	1.85	0.64	0.16	=	1.12	0.47	0.19	=	0.12	0.20	0.3	UJ	1.27	0.22	0.4	=	0.02
		SVP211142	872029	1085057	488.1	06/11/2019	0.0	2.0	2.5	-0.81	0.16	0.20	UJ	0.56	0.60	1.04	UJ	1.79	0.44	0.06	=	1.03	0.12	0.06	=	1.33	0.53	0.19	=	1.54	0.59	0.29	=	1.26	0.5	0.29	=	0.05	0.21	0.3	UJ	0.86	0.17	0.3	=	0.04
6	SVP207131	SVP207131	872026	1085064	493.7	06/11/2019	0.0	0.0	0.5	-0.64	0.13	0.18	UJ	-0.54	0.53	0.84	UJ	1.21	0.31	0.05	=	0.77	0.09	0.05	=	1.33	0.54	0.18	=	1.99	0.70	0.30	=	0.93	0.4	0.30	=	0.00	0.18	0.3	UJ	1.04	0.18	0.3	=	0.09
		SVP207132	872026	1085064	493.7	06/11/2019	0.0	1.5	2.0	-0.57	0.13	0.19	UJ	-0.41	0.57	0.92	UJ	1.25	0.32	0.06	=	0.84	0.10	0.06	=	2.22	0.82	0.24	=	2.33	0.85	0.19	=	0.79	0.4	0.36	J	0.22	0.20	0.3	UJ	1.22	0.21	0.3	=	0.04
6	SVP263743	SVP263743	872054	1085141	496.6	10/28/2022	0.0	0.0	0.5	0.03	0.21	0.36	UJ	-0.09	0.72	1.22	UJ	1.04	0.28	0.08	=	0.71	0.11	0.08	=	1.30	0.39	0.19	=	1.56	0.43	0.13	J	1.07	0.35	0.17	=	-0.07	0.24	0.40	UJ	0.77	0.18	0.4	=	0.02
		SVP263744	872054	1085141	496.6	10/28/2022	0.0	1.5	2.0	-0.07	0.13	0.23	UJ	0.19	0.54	0.92	UJ	1.00	0.25	0.06	=	0.80	0.10	0.05	=	1.04	0.34	0.19	=	1.18	0.36	0.11	J	0.80	0.29	0.17	=	0.11	0.18	0.31	UJ	1.03	0.18	0.3	=	0.00
		SVP263745	872054	1085141	496.6	10/28/2022	0.0	3.0	3.5	0.10	0.14	0.25	UJ	-0.12	0.55	0.92	UJ	1.08	0.27	0.06	=	0.86	0.10	0.05	=	0.98	0.32	0.11	=	1.25	0.37	0.13	J	0.92	0.31	0.17	=	0.19	0.14	0.24	UJ	1.19	0.20	0.3	=	0.00
		SVP263746	872054	1085141	496.6	10/28/2022	0.0	5.0	5.5	0.10	0.19	0.34	UJ	-0.49	0.80	1.31	UJ	1.10	0.29	0.08	=	0.87	0.12	0.07	=	1.27	0.39	0.18	=	1.97	0.50	0.14	=	1.24	0.38	0.12	=	0.24	0.25	0.43	UJ	1.07	0.24	0.5	=	0.01
		SVP263747	872054	1085141	496.6	10/28/2022	0.0	6.5	7.0	0.10	0.10	0.16	UJ	0.40	0.53	0.92	UJ	1.40	0.34	0.06	=	1.01	0.12	0.05	=	1.22	0.36	0.20	=	1.62	0.43	0.12	J	1.12	0.34	0.16	=	0.21	0.19	0.31	UJ	1.15	0.20	0.3	=	0.02
		SVP263748	872054	1085141	496.6	10/28/2022	0.0	9.0	9.5	-0.03	0.15	0.25	UJ	0.23	0.54	0.93	UJ	1.31	0.32	0.06	=	0.93	0.12	0.06	=	1.30	0.38	0.19	=	1.68	0.44	0.14	J	1.33	0.39	0.16	=	-0.08	0.19	0.32	UJ	1.15	0.20	0.3	=	0.01
		SVP263749	872054	1085141	496.6	10/28/2022	0.0	11.0	11.5	0.03	0.15	0.26	UJ	-0.28	0.56	0.92	UJ	1.26	0.31	0.06	=	1.01	0.12	0.06	=	1.33	0.39	0.19	=	1.89	0.48	0.11	J	1.06	0.34	0.11	=	0.20	0.19	0.33	UJ	1.16	0.20	0.4	=	0.01
		SVP263750	872054	1085141	496.6	10/28/2022	0.0	12.5	13.0	0.05	0.20	0.35	UJ	0.21	0.75	1.31	UJ	1.15	0.31	0.08	=	0.91	0.12	0.08	=	1.48	0.44	0.22	=	2.14	0.54	0.18	=	1.63	0.46	0.14	=	0.03	0.25	0.43	UJ	0.92	0.19	0.4	=	0.02
		SVP263751	872054	1085141	496.6	10/28/2022	0.0	15.0	15.5	0.03	0.14	0.24	UJ	-0.02	0.54	0.91	UJ	1.17	0.30	0.06	=	0.86	0.10	0.06	=	1.62	0.43	0.14	=	1.95	0.49	0.17	=	1.01	0.33	0.11	=	0.11	0.18	0.31	UJ	1.16	0.19	0.3	=	0.01
		SVP263752	872054	1085141	496.6	10/28/2022	0.0	17.0	17.5	-0.03	0.14	0.24	UJ	0.27	0.53	0.92	UJ	1.29	0.32	0.06	=	0.85	0.10	0.06	=	0.97	0.29	0.13	=	1.18	0.33	0.14	J	0.94	0.29	0.10	=	-0.11	0.18	0.29	UJ	1.20	0.20	0.3	=	0.01
		SVP263753	872054	1085141	496.6	10/28/2022	0.0	18.5	19.0	0.03	0.14	0.24	UJ	-0.37	0.53	0.86	UJ	1.30	0.32	0.05	=	0.88	0.10	0.05	=	1.06	0.35	0.20	=	1.46	0.41	0.11	J	0.91	0.31	0.17	=	0.08	0.18	0.30	UJ	1.30	0.22	0.3	=	0.01
		SVP263754	872054	1085141	496.6	10/28/2022	0.0	21.5	22.0	0.02	0.13	0.22	UJ	0.40	0.49	0.85	UJ	1.24	0.31	0.05	=	0.81	0.11	0.05	=	1.18	0.38	0.22	=	1.29	0.40	0.18	J	0.91	0.32	0.12	=	0.11	0.13	0.20	UJ	1.08	0.19	0.3	=	0.01
		SVP263755	872054	1085141	496.6	10/28/2022	0.0	23.5	24.0	-0.09	0.19	0.32	UJ	0.86	0.68	1.25	UJ	1.00	0.27	0.08	=	0.68	0.09	0.06	=	1.23	0.42	0.17	=	1.38	0.45	0.17	J	0.96	0.37	0.14	=	0.10	0.23	0.40	UJ	0.73	0.16	0.4	=	0.00

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
6	SVP263756	SVP263756	872128	1085239	496.4	10/29/2022	0.0	0.0	0.5	-0.12	0.20	0.32	UJ	0.42	0.50	0.82	UJ	1.07	0.29	0.08	=	0.75	0.10	0.08	=	1.13	0.35	0.11	=	2.10	0.50	0.14	J	1.07	0.34	0.16	=	0.09	0.24	0.41	UJ	0.88	0.18	0.4	=	0.07
		SVP263757	872128	1085239	496.4	10/29/2022	0.0	1.5	2.0	-0.05	0.15	0.24	UJ	0.17	0.50	0.86	UJ	1.02	0.26	0.06	=	0.80	0.10	0.06	=	1.23	0.39	0.17	=	1.89	0.50	0.16	J	1.32	0.40	0.12	=	0.03	0.17	0.29	UJ	1.11	0.18	0.3	=	0.00
		SVP263758	872128	1085239	496.4	10/29/2022	0.0	3.0	3.5	-0.08	0.20	0.34	UJ	0.00	0.70	1.19	UJ	1.10	0.29	0.08	=	0.81	0.11	0.07	=	1.24	0.40	0.13	=	1.73	0.49	0.20	J	1.51	0.45	0.20	=	0.09	0.24	0.41	UJ	0.60	0.39	0.7	UJ	0.00
		SVP263759	872128	1085239	496.4	10/29/2022	0.0	4.5	5.0	0.02	0.13	0.22	UJ	0.43	0.47	0.81	UJ	1.06	0.27	0.06	=	0.91	0.12	0.05	=	1.56	0.45	0.19	=	1.80	0.49	0.16	J	0.99	0.34	0.14	=	0.03	0.16	0.27	UJ	1.14	0.19	0.3	=	0.00
		SVP263760	872128	1085239	496.4	10/29/2022	0.0	7.5	8.0	0.09	0.14	0.25	UJ	0.13	0.50	0.85	UJ	1.13	0.29	0.05	=	1.01	0.12	0.05	=	1.08	0.36	0.16	=	1.73	0.47	0.12	J	1.14	0.37	0.19	=	-0.04	0.17	0.29	UJ	0.86	0.24	0.3	=	0.00
		SVP263761	872128	1085239	496.4	10/29/2022	0.0	9.0	9.5	-0.08	0.13	0.22	UJ	-0.05	0.48	0.80	UJ	1.14	0.29	0.05	=	0.88	0.11	0.06	=	1.15	0.38	0.16	=	2.10	0.54	0.19	J	0.98	0.35	0.19	=	0.04	0.16	0.27	UJ	1.21	0.20	0.3	=	0.02
		SVP263762	872128	1085239	496.4	10/29/2022	0.0	11.5	12.0	0.18	0.20	0.36	UJ	-0.01	0.72	1.23	UJ	1.16	0.31	0.09	=	0.99	0.14	0.07	=	1.04	0.36	0.13	=	3.05	0.69	0.13	=	0.82	0.32	0.15	=	0.18	0.24	0.41	UJ	1.03	0.23	0.4	=	0.08
		SVP263763	872128	1085239	496.4	10/29/2022	0.0	13.0	13.5	0.06	0.14	0.24	UJ	-0.2	0.50	0.83	UJ	1.38	0.35	0.06	=	0.92	0.11	0.06	=	1.37	0.39	0.13	=	2.32	0.54	0.13	J	1.12	0.35	0.17	=	0.15	0.17	0.29	UJ	1.12	0.19	0.3	=	0.05
		SVP263764	872128	1085239	496.4	10/29/2022	0.0	15.5	16.0	0.12	0.20	0.36	UJ	-0.15	0.73	1.24	UJ	0.99	0.27	0.08	=	0.77	0.11	0.08	=	1.38	0.42	0.12	=	2.39	0.58	0.19	J	0.84	0.31	0.12	=	0.07	0.24	0.41	UJ	0.80	0.23	0.4	=	0.04
		SVP263765	872128	1085239	496.4	10/29/2022	0.0	17.0	17.5	0.18	0.13	0.23	UJ	-0.12	0.45	0.75	UJ	0.97	0.25	0.05	=	0.83	0.10	0.05	=	0.95	0.33	0.12	=	1.58	0.44	0.12	J	0.98	0.34	0.18	=	0.05	0.15	0.25	UJ	1.03	0.17	0.3	=	0.00
		SVP263766	872128	1085239	496.4	10/29/2022	0.0	19.0	19.5	0.01	0.13	0.22	UJ	-0.08	0.50	0.83	UJ	1.05	0.27	0.05	=	0.84	0.11	0.06	=	1.03	0.35	0.19	=	1.14	0.37	0.19	J	1.05	0.35	0.12	=	0.05	0.16	0.27	UJ	0.92	0.16	0.3	=	0.00
		SVP263767	872128	1085239	496.4	10/29/2022	0.0	21.0	21.5	0.00	0.13	0.21	UJ	-0.20	0.48	0.79	UJ	1.08	0.27	0.05	=	0.81	0.10	0.05	=	1.18	0.39	0.15	=	1.41	0.43	0.20	J	0.90	0.33	0.20	=	-0.03	0.16	0.26	UJ	0.97	0.16	0.3	=	0.00
		SVP263768	872128	1085239	496.4	10/29/2022	0.0	22.5	23.0	0.09	0.12	0.21	UJ	-0.35	0.45	0.72	UJ	1.02	0.26	0.05	=	0.73	0.09	0.05	=	1.19	0.39	0.13	=	2.19	0.56	0.15	J	1.30	0.41	0.20	=	0.07	0.15	0.26	UJ	0.95	0.17	0.3	=	0.02
7	SVP190139	SVP190139	871543	1085173	481.0	10/15/2018	0.0	0.0	0.5	-1.06	0.30	0.28	UJ	-0.75	1.14	1.87	UJ	1.38	0.38	0.16	=	0.73	0.12	0.13	=	1.15	0.45	0.20	=	1.48	0.52	0.17	=	0.96	0.40	0.13	=	0.30	0.36	0.63	UJ	1.22	0.33	0.7	=	0.09
		SVP190140	871543	1085173	481.0	10/15/2018	0.0	0.5	1.0	-1.02	0.20	0.14	UJ	0.39	0.52	0.90	UJ	1.55	0.39	0.06	=	0.71	0.10	0.06	=	1.52	0.60	0.33	=	2.66	0.87	0.22	=	0.71	0.38	0.20	J	-0.06	0.17	0.28	UJ	0.95	0.17	0.3	=	0.08
		SVP190141	871543	1085173	481.0	10/15/2018	0.0	2.0	2.5	-0.84	0.17	0.11	UJ	-0.45	0.44	0.70	UJ	1.39	0.35	0.05	=	0.50	0.07	0.05	=	1.30	0.57	0.24	=	2.77	0.93	0.18	=	1.07	0.50	0.25	=	0.06	0.15	0.25	UJ	0.80	0.14	0.3	=	0.08
7	SVP190143	SVP190143	871672	1085164	492.3	08/06/2018	0.0	0.0	0.5	-1.00	0.20	0.19	UJ	0.63	0.61	1.07	UJ	1.29	0.33	0.07	=	0.87	0.12	0.07	=	1.91	0.66	0.23	=	2.31	0.74	0.15	=	0.79	0.39	0.28	=	0.28	0.22	0.37	UJ	1.21	0.25	0.5	=	0.13
		SVP190144	871672	1085164	492.3	08/06/2018	0.0	0.5	1.0	-1.41	0.27	0.20	UJ	0.03	0.66	1.12	UJ	1.34	0.35	0.07	=	0.85	0.11	0.07	=	1.85	0.58	0.18	=	1.59	0.53	0.16	J	1.41	0.49	0.12	=	-0.05	0.23	0.37	UJ	1.18	0.24	0.5	=	0.01
7	SVP190145	SVP190145	871779	1085175	486.6	08/06/2018	0.0	0.0	0.5	-1.00	0.20	0.19	UJ	-0.23	0.65	1.07	UJ	1.36	0.35	0.07	=	0.84	0.11	0.07	=	1.20	0.42	0.16	=	1.49	0.48	0.12	J	0.74	0.32	0.20	=	-0.05	0.22	0.37	UJ	1.45	0.29	0.5	=	0.09
		SVP190146	871779	1085175	486.6	08/06/2018	0.0	1.0	1.5	-1.04	0.21	0.19	UJ	0.32	0.64	1.09	UJ	1.36	0.35	0.07	=	0.90	0.11	0.07	=	1.24	0.45	0.15	=	1.70	0.55	0.16	J	0.85	0.36	0.16	=	0.02	0.22	0.37	UJ	1.45	0.29	0.5	=	0.02
7	SVP190147	SVP190147	871892	1085178	492.1	06/03/2019	0.0	0.0	0.5	-1.20	0.32	0.30	UJ	0.57	1.16	2.03	UJ	1.30	0.36	0.14	=	0.77	0.12	0.13	=	1.34	0.53	0.23	=	1.88	0.66	0.21	=	1.07	0.46	0.19	=	0.08	0.36	0.62	UJ	0.94	0.34	0.6	=	0.10
		SVP190148	871892	1085178	492.1	06/03/2019	0.0	1.0	1.5	-1.25	0.34	0.29	UJ	-0.26	1.14	1.92	UJ	1.35	0.37	0.13	=	0.86	0.13	0.12	=	0.93	0.37	0.19	=	1.16	0.42	0.26	=	0.80	0.33	0.14	=	-0.20	0.34	0.56	UJ	0.89	0.33	0.5	=	0.01
		SVP211095	871892	1085178	492.1	06/03/2019	0.0	3.0	3.5	-1.31	0.34	0.29	UJ	-0.17	1.12	1.89	UJ	1.44	0.39	0.14	=	0.93	0.14	0.13	=	1.57	0.53	0.19	=	1.92	0.60	0.16	=	1.08	0.42	0.14	=	-0.02	0.35	0.59	UJ	1.08	0.34	0.5	=	0.03
		SVP211096	871892	1085178	492.1	06/03/2019	0.0	4.0	4.5	-1.19	0.32	0.27	UJ	1.44	1.10	1.99	UJ	1.52	0.41	0.12	=	0.88	0.13	0.12	=	1.13	0.42	0.15	=	1.59	0.52	0.13	=	1.22	0.44	0.14	=	0.23	0.34	0.59	UJ	0.65	0.30	0.6	=	0.02
		SVP211097	871892	1085178	492.1	06/03/2019	0.0	5.0	5.5	-1.20	0.32	0.28	UJ	0.86	1.14	2.02	UJ	1.53	0.42	0.14	=	0.86	0.13	0.12	=	1.15	0.43	0.21	=	1.35	0.47	0.13	=	1.17	0.43	0.12	=	-0.02	0.34	0.58	UJ	1.08	0.35	0.6	=	0.03
7	SVP190159	SVP190159	871367	1085285	491.6	10/09/2018	0.0	0.0	0.5	-0.84	0.17	0.12	UJ	-0.24	0.46	0.76	UJ	1.31	0.33	0.05	=	0.72	0.09	0.05	=	1.22	0.48	0.20	=	0.98	0.42	0.14	=	0.68	0.34	0.17	J	0.07	0.16	0.27	UJ	0.89	0.16	0.3	=	0.07
		SVP190159-1	871367	1085285	491.6	10/09/2018	0.0	0.0	0.5	-0.57	0.13	0.12	UJ	0.12	0.47	0.80	UJ	1.33	0.33	0.05	=	0.69	0.08	0.05	=	0.94	0.38	0.20	=	1.37	0.48	0.15	=	0.83	0.35	0.13	=	0.12	0.15	0.26	UJ	0.93	0.16	0.3	=	0.08
		SVP190159-2	871367	1085285	491.6	10/09/2018	0.0	0.0	0.5	-0.69	1.29	1.66	UJ	0.00	0.54	8.42	UJ	1.45	0.37	0.27	=	1.24	0.58	0.55	=	0.67	0.17	0.11	=	0.87	0.20	0.12	=	0.71	0.17	0.07	=	-0.10	0.31	1.75	UJ	1.53	1.13	1.6	UJ	0.11
		SVP190160	871367	1085285	491.6	10/09/2018	0.0	1.0	1.5	-1.23	0.23	0.12	UJ	-0.28	0.49	0.80	UJ	1.37	0.34	0.06	=	0.77	0.09	0.05	=	1.11	0.44	0.17	=	1.38	0.50	0.17	=	1.28	0.48	0.16	=	0.07	0.16	0.27	UJ	0.95	0.16	0.3	=	0.01
		SVP206986	871367	1085285	491.6	10/09/2018	0.0	2.5	3.0	-0.70	0.14	0.12	UJ	-0.03	0.49	0.82	UJ	1.45	0.36	0.05	=	0.77	0.09	0.05	=	0.97	0.37	0.13	=	1.17	0.42	0.11	=	0.69	0.30	0.13	=	-0.05	0.16	0.26	UJ	1.04	0.17	0.3	=	0.02
7	SVP190161	SVP190161	871718	1085279	495.1	06/03/2019	0.0	0.0	0.5	-1.93	0.44	0.31	UJ	0.35	1.02	1.76	UJ	1.11	0.31	0.11	=	0.88	0.13	0.11	=	1.20	0.47	0.19	=	1.59	0.56	0.15	=	0.83	0.37	0.14	=	-0.01	0.32	0.54	UJ	1.24	0.26	0.5	=	0.04
		SVP190162	871718	1085279	495.1	06/03/2019	0.0	1.0	1.5	-1.81	0.40	0.31	UJ	0.15	1.02	1.75	UJ	1.23	0.34	0.11	=	0.73	0.12	0.11	=	1.00	0.41	0.25	=	1.57	0.54	0.25	=	0.90	0.38	0.13	=	0.02	0.31	0.53	UJ	0.82	0.22	0.5	=	0.01
		SVP211090	871718	1085279	495.1	06/03/2019	0.0	3.0	3.5	-1.41	0.32	0.31	UJ	0.69	1.03	1.79	UJ	1.25	0.34	0.11	=	0.83	0.12	0.10	=	1.64	0.60	0.15	=	1.75	0.63	0.20	=	1.12	0.47	0.19	=	0.21	0.32	0.55	UJ	0.95	0.23	0.5	=	0.01
		SVP211091	871718	1085279	495.1	06/03/2019	0.0	5.0	5.5	-2.06	0.43	0.30	UJ	-0.26	0.93	1.56	UJ	1.33	0.36	0.12	=	0.98	0.13	0.11	=	0.75	0.34	0.18	=	1.62	0.54	0.15	=	1.14	0.43	0.17	=	0.09	0.31	0.53	UJ	1.24	0.27	0.5	=	0.01
7	SVP190309	SVP190309	871392	1085225	477.3	10/15/2018	0.0	0.0	0.5	-0.83	0.18	0.16	UJ	0.09	0.59	1.00	UJ	1.53	0.38	0.07	=	0.95	0.12	0.06	=	1.20	0.47	0.23	=	2.24	0.70	0.18	=	0.72	0.35	0.20	=	-0.08	0.19	0.31	UJ	1.39	0.23	0.4	=	0.18
		SVP190310	871392	1085225	477.3	10/15/2018	0.0	1.5	2.0	-0.75	0.16	0.13	UJ	-0.09	0.49	0.82	UJ	1.29	0.32	0.06	=	0.77	0.09	0.05	=	0.79	0.33	0.16	=	1.35	0.46	0.14	=	1.29	0.44	0.15	=	-0.02	0.16	0.26	UJ	0.92	0.17	0.3	=	0.01
7	SVP190337	SVP190337	871800	1085127	478.4	10/11/2018	0.0	0.0	0.5	-0.40	0.14	0.17	UJ	0.15	0.60	1.04	UJ	1.11	0.29	0.06	=	0.18	0.04	0.04	J	0.30	0.36	0.56	UJ	0.69	0.54	0.42	J	0.35	0.37	0.34	UJ	0.10	0.21	0.36	UJ	0.50	0.23	0.4	=	0.03
		SVP190338	871800	1085127	478.4	10/11/2018	0.0	1.0	1.5	-0.66	0.18	0.17	UJ	-0.54	0.65	1.05	UJ	1.24	0.33	0.07	=	0.27	0.06	0.06	J	0.42	0.28	0.27	J	1.05	0.47	0.21	J	0.39	0.27	0.23	J	-0.09	0.22	0.36	UJ	0.41	0.23	0.4	UJ	0.01
		SVP206998	871800	1085127	478.4	10/11/2018	0.0	1.5	2.0	-0.26	0.08	0.12	UJ	0.03	0.44	0.75	UJ	1.34	0.33	0.05	=	0.30	0.05	0.04	J	0.35	0.37	0.52	UJ	0.87	0.57	0.38	J	0.24	0.33	0.59	UJ	0.07	0.15	0.26	UJ	0.55	0.12	0.3	=	0.01

Table F-1. Final Status Survey Soil Sample Analytical Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Elevation	Collect Date	Cover Depth	Start Depth	End Depth	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238				SOR_N
										Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	
			(ft)		(ft amsl)		(ft bgs)			(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				
7	SVP263730	SVP263730	871936	1085160	492.8	10/28/2022	0.0	0.0	0.5	-0.07	0.20	0.33	UJ	0.06	0.73	1.25	UJ	0.95	0.26	0.08	=	0.75	0.11	0.08	=	1.11	0.36	0.12	=	1.85	0.49	0.15	J	1.36	0.4	0.12	=	0.02	0.23	0.4	UJ	0.84	0.17	0.4	=	0.03
		SVP263731	871936	1085160	492.8	10/28/2022	0.0	1.0	1.5	0.04	0.13	0.23	UJ	0.27	0.48	0.83	UJ	1.10	0.28	0.05	=	0.89	0.11	0.06	=	1.18	0.39	0.20	=	1.68	0.47	0.17	J	1.20	0.4	0.13	=	0.06	0.17	0.3	UJ	1.14	0.19	0.3	=	0.00
		SVP263732	871936	1085160	492.8	10/28/2022	0.0	3.5	4.0	0.13	0.22	0.38	UJ	-0.04	0.74	1.27	UJ	1.04	0.28	0.09	=	0.93	0.12	0.08	=	1.19	0.37	0.18	=	1.14	0.36	0.11	J	1.07	0.3	0.11	=	0.01	0.24	0.4	UJ	1.21	0.23	0.4	=	0.00
		SVP263733	871936	1085160	492.8	10/28/2022	0.0	5.5	6.0	-0.02	0.20	0.34	UJ	0.04	0.75	1.28	UJ	1.11	0.29	0.07	=	0.87	0.11	0.07	=	0.96	0.30	0.16	=	1.66	0.40	0.09	J	1.29	0.3	0.11	=	-0.03	0.24	0.4	UJ	1.20	0.25	0.4	=	0.00
		SVP263734	871936	1085160	492.8	10/28/2022	0.0	7.0	7.5	-0.07	0.13	0.22	UJ	0.03	0.47	0.80	UJ	1.06	0.27	0.05	=	0.85	0.10	0.05	=	1.49	0.40	0.17	=	1.48	0.40	0.11	J	1.07	0.3	0.14	=	0.00	0.17	0.3	UJ	1.22	0.20	0.3	=	0.00
		SVP263735	871936	1085160	492.8	10/28/2022	0.0	8.5	9.0	0.13	0.13	0.23	UJ	0.14	0.49	0.84	UJ	1.07	0.27	0.05	=	0.88	0.11	0.06	=	1.32	0.37	0.16	=	1.31	0.37	0.12	J	0.97	0.3	0.10	=	0.09	0.16	0.3	UJ	0.81	0.15	0.3	=	0.00
		SVP263736	871936	1085160	492.8	10/28/2022	0.0	11.0	11.5	0.15	0.20	0.36	UJ	0.77	0.74	1.33	UJ	1.08	0.29	0.08	=	0.85	0.12	0.07	=	1.33	0.38	0.16	=	1.93	0.48	0.13	J	1.16	0.4	0.17	=	0.03	0.23	0.4	UJ	1.14	0.21	0.4	=	0.01
		SVP263737	871936	1085160	492.8	10/28/2022	0.0	13.0	13.5	-0.07	0.12	0.20	UJ	-0.05	0.46	0.77	UJ	1.06	0.27	0.05	=	0.82	0.10	0.05	=	1.11	0.34	0.19	=	2.14	0.50	0.14	J	1.15	0.3	0.15	=	-0.07	0.16	0.26	UJ	0.91	0.16	0.3	=	0.02
		SVP263738	871936	1085160	492.8	10/28/2022	0.0	15.0	15.5	0.09	0.20	0.36	UJ	-0.20	0.71	1.19	UJ	1.24	0.33	0.08	=	0.82	0.12	0.07	=	1.00	0.34	0.20	=	1.84	0.47	0.11	J	0.95	0.3	0.11	=	0.04	0.24	0.40	UJ	1.12	0.21	0.4	=	0.01
		SVP263739	871936	1085160	492.8	10/28/2022	0.0	17.0	17.5	-0.04	0.13	0.21	UJ	0.05	0.45	0.77	UJ	0.96	0.25	0.05	=	0.84	0.11	0.05	=	0.93	0.31	0.18	=	1.61	0.42	0.15	J	0.85	0.29	0.12	=	0.07	0.15	0.26	UJ	1.25	0.23	0.3	=	0.00
		SVP263740	871936	1085160	492.8	10/28/2022	0.0	19.0	19.5	-0.07	0.20	0.33	UJ	0.00	0.67	1.15	UJ	1.08	0.29	0.08	=	0.87	0.12	0.08	=	0.98	0.32	0.14	=	1.48	0.41	0.17	J	1.38	0.39	0.11	=	-0.04	0.22	0.37	UJ	0.95	0.22	0.4	=	0.00
		SVP263741	871936	1085160	492.8	10/28/2022	0.0	21.3	21.8	0.00	0.12	0.21	UJ	-0.04	0.45	0.76	UJ	1.02	0.26	0.05	=	0.79	0.09	0.05	=	0.97	0.33	0.17	=	1.29	0.39	0.18	J	1.13	0.36	0.14	=	0.09	0.15	0.26	UJ	1.09	0.18	0.3	=	0.00
		SVP263742	871936	1085160	492.8	10/28/2022	0.0	22.5	23.0	-0.11	0.14	0.22	UJ	0.28	0.50	0.85	UJ	1.09	0.28	0.05	=	0.88	0.10	0.05	=	1.14	0.37	0.21	=	1.83	0.48	0.12	J	1.17	0.37	0.18	=	0.11	0.16	0.28	UJ	1.07	0.24	0.3	=	0.00
7	SVP264291	SVP264291	871367	1085483	502.1	11/04/2022	0.0	0.0	0.5	0.07	0.20	0.35	UJ	-0.03	0.73	1.25	UJ	1.21	0.32	0.08	=	0.83	0.11	0.08	=	1.11	0.35	0.14	=	2.12	0.52	0.18	=	1.16	0.36	0.14	=	0.05	0.24	0.41	UJ	1.28	0.23	0.4	=	0.10
		SVP264292	871367	1085483	502.1	11/04/2022	0.0	1.5	2.0	-0.07	0.15	0.25	UJ	0.06	0.57	0.96	UJ	1.43	0.36	0.06	=	1.12	0.13	0.06	=	1.47	0.42	0.17	=	2.08	0.51	0.14	=	1.46	0.41	0.14	=	0.42	0.21	0.34	UJ	1.33	0.22	0.3	=	0.04
		SVP264293	871367	1085483	502.1	11/04/2022	0.0	3.5	4.0	0.04	0.14	0.24	UJ	-0.18	0.53	0.88	UJ	1.39	0.34	0.06	=	0.97	0.12	0.05	=	1.49	0.43	0.18	=	1.85	0.49	0.15	J	1.06	0.35	0.19	=	0.03	0.18	0.31	UJ	1.13	0.20	0.3	=	0.02
		SVP264294	871367	1085483	502.1	11/04/2022	0.0	5.5	6.0	0.03	0.15	0.26	UJ	-0.67	0.60	0.95	UJ	1.38	0.34	0.06	=	1.03	0.13	0.06	=	1.27	0.38	0.17	=	1.83	0.47	0.17	J	1.18	0.36	0.17	=	-0.07	0.20	0.33	UJ	1.15	0.20	0.4	=	0.02
		SVP264295	871367	1085483	502.1	11/04/2022	0.0	6.5	7.0	0.10	0.13	0.23	UJ	-0.56	0.54	0.86	UJ	1.30	0.32	0.05	=	0.92	0.11	0.05	=	1.29	0.39	0.14	=	2.05	0.51	0.18	=	1.01	0.34	0.18	=	0.01	0.18	0.30	UJ	1.16	0.20	0.3	=	0.02
		SVP264296	871367	1085483	502.1	11/04/2022	0.0	9.0	9.5	0.03	0.13	0.22	UJ	-0.11	0.53	0.88	UJ	1.26	0.32	0.05	=	0.89	0.11	0.05	=	0.75	0.28	0.13	=	1.50	0.41	0.17	J	0.98	0.32	0.13	=	0.08	0.18	0.30	UJ	1.10	0.18	0.3	=	0.01
		SVP264297	871367	1085483	502.1	11/04/2022	0.0	11.0	11.5	-0.01	0.12	0.20	UJ	-0.26	0.45	0.74	UJ	0.92	0.24	0.05	=	0.79	0.09	0.05	=	1.24	0.37	0.16	=	1.26	0.37	0.17	J	0.89	0.30	0.13	=	0.05	0.16	0.26	UJ	0.87	0.16	0.3	=	0.00
		SVP264298	871367	1085483	502.1	11/04/2022	0.0	13.0	13.5	0.06	0.12	0.21	UJ	0.24	0.45	0.77	UJ	0.89	0.23	0.05	=	0.77	0.10	0.05	=	1.26	0.41	0.21	=	2.38	0.60	0.21	=	0.92	0.35	0.21	=	-0.01	0.15	0.25	UJ	0.95	0.17	0.3	=	0.04
		SVP264299	871367	1085483	502.1	11/04/2022	0.0	14.5	15.0	0.06	0.12	0.21	UJ	-0.08	0.44	0.74	UJ	0.90	0.23	0.05	=	0.76	0.09	0.05	=	0.89	0.31	0.16	=	1.45	0.40	0.13	J	0.93	0.31	0.17	=	0.12	0.16	0.27	UJ	0.96	0.17	0.3	=	0.00
7	SVP264300	SVP264300	871301	1085398	499.6	11/04/2022	0.0	0.0	0.5	-0.02	0.19	0.33	UJ	0.21	0.70	1.21	UJ	1.06	0.28	0.08	=	0.78	0.11	0.08	=	1.33	0.39	0.23	=	1.45	0.41	0.14	J	1.04	0.34	0.19	=	-0.04	0.23	0.38	UJ	0.98	0.28	0.4	=	0.02
		SVP264301	871301	1085398	499.6	11/04/2022	0.0	1.0	1.5	0.07	0.15	0.27	UJ	-0.02	0.52	0.88	UJ	1.24	0.32	0.06	=	0.88	0.11	0.06	=	1.34	0.39	0.14	=	1.79	0.46	0.17	=	1.22	0.37	0.14	=	-0.10	0.19	0.31	UJ	1.25	0.22	0.3	=	0.01
		SVP264302	871301	1085398	499.6	11/04/2022	0.0	3.5	4.0	0.04	0.12	0.21	UJ	-0.17	0.47	0.77	UJ	1.12	0.28	0.05	=	0.83	0.10	0.05	=	1.33	0.42	0.20	J	1.60	0.47	0.20	J	1.32	0.42	0.20	=	0.09	0.16	0.28	UJ	1.12	0.18	0.3	=	0.00
		SVP264303	871301	1085398	499.6	11/04/2022	0.0	5.5	6.0	0.02	0.14	0.24	UJ	0.13	0.49	0.84	UJ	1.15	0.29	0.05	=	0.97	0.11	0.06	=	1.59	0.42	0.17	=	2.29	0.53	0.13	=	1.23	0.37	0.17	=	0.09	0.17	0.30	UJ	1.19	0.21	0.3	=	0.03
		SVP264304	871301	1085398	499.6	11/04/2022	0.0	7.0	7.5	-0.02	0.13	0.21	UJ	0.18	0.46	0.79	UJ	1.06	0.27	0.05	=	0.89	0.11	0.05	=	0.93	0.32	0.20	=	2.66	0.58	0.17	=	1.26	0.37	0.17	=	-0.10	0.16	0.27	UJ	1.41	0.26	0.3	=	0.06
		SVP264305	871301	1085398	499.6	11/04/2022	0.0	9.0	9.5	-0.09	0.15	0.25	UJ	0.31	0.55	0.95	UJ	1.13	0.29	0.06	=	0.90	0.12	0.06	=	1.90	0.49	0.18	=	2.37	0.56	0.18	=	1.19	0.38	0.18	=	0.18	0.19	0.32	UJ	0.94	0.19	0.3	=	0.04
		SVP264306	871301	1085398	499.6	11/04/2022	0.0	11.0	11.5	0.14	0.14	0.24	UJ	0.21	0.47	0.81	UJ	1.16	0.29	0.05	=	0.85	0.10	0.05	=	1.17	0.36	0.17	=	2.37	0.55	0.17	=	0.89	0.31	0.17	=	0.09	0.17	0.28	UJ	1.16	0.20	0.3	=	0.04
		SVP264307	871301	1085398	499.6	11/04/2022	0.0	12.5	13.0	0.05	0.13	0.23	UJ	0.01	0.50	0.84	UJ	1.18	0.30	0.06	=	0.95	0.11	0.05	=	1.63	0.45	0.22	=	2.20	0.53	0.18	=	1.13	0.36	0.18	=	0.15	0.17	0.29	UJ	0.94	0.17	0.3	=	0.03
		SVP264308	871301	1085398	499.6	11/04/2022	0.0	14.0	14.5	0.01	0.12	0.21	UJ	-0.29	0.46	0.75	UJ	1.14	0.29	0.05	=	0.76	0.10	0.05	=	1.28	0.37	0.16	=	1.32	0.37	0.13	J	1.01	0.32	0.16	=	0.12	0.16	0.27	UJ	1.13	0.19	0.3	=	0.00

[a] The radionuclides analyzed by gamma spectroscopy for this biased sample were given the "R" qualifer due to insufficent sample volume. Analytical data for this sample are provided for informational purposes but were not included in the risk and dose assessment contained in Appendix J.

Notes:

Soil samples ending in "-1" are duplicate soil samples.

Soil samples ending in "-2" are split soil samples.

Validation qualifiers (VQ) symbols indicate: "=" for positive results, "U" for not detected above this value, "J" for estimated quantity, "UJ" for not detected above estimated value, and "R" for unusable.

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

SOR_N equations follow.

$$SOR_N^{depth \leq 0.5 ft\ bgs} = \frac{Ra-226_N}{5\ pCi/g} + \frac{Th-230_N}{14\ pCilg} + \frac{U-238_N}{50\ pCi/g} \qquad SOR_N^{depth > 0.5 ft\ bgs} = \frac{Ra-226_N}{15\ pCi/g} + \frac{Th-230_N}{15\ pCilg} + \frac{U-238_N}{50\ pCi/g}$$

Table F-2. Background Reference Surface Soil Data

Background Reference Surface Soil Data Summary (37 Samples)										
Statistic	**Ac-227**	**Pa-231**	**Ra-226**	**Ra-228**	**Th-228**	**Th-230**	**Th-232**	**U-235**	**U-238**	**SOR_G**
	(pCi/g)									
Mean	0.20	0.24	0.95	0.91	1.09	1.49	1.07	0.06	1.08	0.32
Median	0.09	0.20	1.03	0.91	1.05	1.41	1.07	0.06	1.06	0.33
UCL_{95}	0.37	0.37	1.01	0.93	1.18	1.58	1.17	0.08	1.16	0.33
Standard Deviation	0.23	0.48	0.19	0.07	0.32	0.32	0.34	0.06	0.28	0.04
Maximum	0.73	2.17	1.27	1.08	1.95	2.17	1.95	0.22	1.69	0.40
Range	0.78	2.66	0.68	0.30	1.32	1.23	1.42	0.26	1.04	0.20
Background Reference Surface Soil Sample Results										
Sample ID	**Ac-227**	**Pa-231**	**Ra-226**	**Ra-228**	**Th-228**	**Th-230**	**Th-232**	**U-235**	**U-238**	**SOR_G**
	(pCi/g)									
SLA04300	0.05	0.25	1.27	1.08	1.07	1.33	0.81	0.07	0.76	0.36
SLA04302	0.21	0.09	1.11	0.96	0.74	1.41	0.64	0.17	1.38	0.35
SLA04304	0.06	-0.49	1.15	1.01	1.41	1.80	1.18	0.12	1.51	0.39
SLA04306	0.08	-0.14	1.01	0.93	1.11	1.18	0.57	0.06	1.33	0.31
SLA04308	0.09	-0.25	1.16	1.01	1.32	1.21	1.12	0.07	1.21	0.34
SLA04310	-0.02	2.17	1.12	0.91	1.62	1.40	1.58	0.06	1.11	0.35
SLA04312	-0.02	-0.06	1.07	0.87	1.47	1.20	0.83	0.00	1.47	0.33
SLA04314	0.56	0.20	1.17	0.87	0.86	2.01	1.37	0.03	1.16	0.40
SLA04316	0.05	0.38	1.09	0.84	0.98	1.28	1.00	0.05	0.79	0.33
SLA04318	0.01	0.68	1.08	0.91	1.95	1.74	1.34	0.13	0.94	0.36
SLA04320	0.12	-0.37	1.10	0.99	1.71	1.74	1.00	0.06	0.88	0.36
SLA04322	-0.05	0.60	1.08	0.94	1.27	1.68	1.08	0.00	1.06	0.36
SLA04324	0.10	-0.10	1.12	0.96	1.05	1.47	1.34	0.00	1.05	0.35
SLA04326	0.01	0.47	1.07	0.89	0.71	1.93	0.57	0.00	0.92	0.37
SLA04328	0.06	0.05	1.11	0.92	0.67	1.14	1.16	0.00	1.16	0.33
SLA04330	0.03	0.09	0.98	0.85	1.21	1.30	0.55	0.08	0.85	0.31
SLA04332	-0.02	0.10	1.04	0.97	0.96	1.19	1.24	0.05	1.02	0.31
SLA04334	0.20	0.30	1.16	0.91	1.19	1.01	1.02	0.00	1.15	0.33
SLA04336	0.06	0.54	1.03	0.89	0.67	1.16	0.76	0.07	1.06	0.31
SLA04338	0.07	-0.32	0.92	0.85	0.85	1.48	1.07	0.16	0.90	0.31
SLA04340	0.32	0.49	0.92	0.99	0.99	1.95	1.95	0.22	1.38	0.35
SLA04342	0.08	-0.39	0.94	0.86	0.86	1.62	0.86	0.00	0.94	0.32
SLA04344	0.44	0.15	1.10	0.97	0.97	1.75	1.50	0.07	0.65	0.36
SLA04346	0.06	0.46	0.97	0.88	0.88	1.81	1.59	0.00	1.45	0.35
SLA04348	0.08	-0.18	1.04	0.79	0.79	1.34	1.53	0.00	0.74	0.32
SLA04167	0.57	0.48	0.59	0.78	0.96	2.11	0.98	0.08	1.65	0.30
SLA04168	0.47	0.51	0.61	0.86	0.81	1.44	1.17	0.13	0.95	0.24
SLA04169	0.73	0.11	0.69	1.04	1.10	1.61	0.99	-0.02	0.91	0.27
SLA04170	0.50	1.06	0.75	0.91	1.74	2.17	1.36	0.02	1.33	0.33
SLA04179	0.13	0.43	0.71	0.79	0.63	1.27	0.55	-0.04	0.79	0.25
SLA04180	0.15	0.13	0.64	0.80	1.19	1.84	1.43	0.12	1.20	0.28
SLA04181	0.08	0.23	0.60	0.84	1.14	0.94	1.24	0.13	0.66	0.20
SLA04187	0.21	-0.20	0.85	0.97	1.36	1.23	1.10	0.10	1.69	0.29
SLA04182	0.67	0.31	0.74	0.88	0.68	1.40	0.80	0.02	1.40	0.28
SLA04183	0.68	0.59	0.85	0.97	1.05	1.06	0.90	0.16	0.84	0.26
SLA04184	0.56	-0.02	0.77	0.87	1.22	1.51	0.53	0.12	0.73	0.28
SLA04185	0.15	0.52	0.71	0.91	1.30	1.37	0.91	0.10	1.11	0.26

Notes:

UCL_{95} is the 95 percent upper confidence limit of the arithmetic mean.

All samples are surface samples, which were collected in the uppermost 0.5 ft of soil.

Negative results are less than the laboratory system's background level.

These samples were collected between August 21, 1998, and October 21, 1998, from representative native soil at Saint Ann Park, Aubuchon Park, and Howdershell Park. Summary statistics for these data are included in Appendix D, Attachment 1, of the FS (USACE 2003). The mean soil background values for Ra-226, Th-230, and U-238 are listed in the ROD (USACE 2005a).

Table F-3. Background Reference Subsurface Soil Data

Background Reference Subsurface Soil Data Summary (37 Samples)										
Statistic	**Ac-227**	**Pa-231**	**Ra-226**	**Ra-228**	**Th-228**	**Th-230**	**Th-232**	**U-235**	**U-238**	**SOR_G**
	(pCi/g)									
Mean	0.21	0.15	1.15	1.04	1.26	1.83	1.15	0.06	1.27	0.22
Median	0.16	0.18	1.29	1.09	1.11	1.73	1.15	0.05	1.28	0.22
UCL_{95}	0.28	0.25	1.23	1.08	1.36	1.99	1.25	0.08	1.37	0.24
Standard Deviation	0.24	0.35	0.31	0.14	0.35	0.57	0.35	0.07	0.34	0.05
Maximum	0.82	1.13	1.55	1.24	2.15	2.89	1.96	0.25	2.04	0.30
Range	0.98	1.58	0.99	0.52	1.46	1.91	1.43	0.31	1.36	0.17
Background Reference Subsurface Soil Sample Results										
Sample ID	**Ac-227**	**Pa-231**	**Ra-226**	**Ra-228**	**Th-228**	**Th-230**	**Th-232**	**U-235**	**U-238**	**SOR_G**
	(pCi/g)									
SLA04171	0.66	0.29	0.77	0.89	1.25	1.77	1.52	0.04	0.71	0.18
SLA04172	0.74	1.13	0.89	1.02	1.11	1.43	1.28	0.06	1.32	0.18
SLA04173	0.46	0.53	0.80	0.87	0.99	1.28	0.76	0.04	0.89	0.16
SLA04174	0.15	-0.02	0.56	0.72	1.02	1.24	0.93	0.08	1.01	0.14
SLA04175	0.09	0.18	0.60	0.90	1.08	1.55	0.80	0.10	0.75	0.16
SLA04176	0.16	0.10	0.60	0.80	1.38	0.98	1.06	0.07	0.89	0.12
SLA04177	0.18	0.28	0.64	0.84	1.44	1.21	0.96	0.02	1.35	0.15
SLA04178	0.01	-0.39	0.61	0.74	1.12	1.09	0.86	0.05	1.26	0.14
SLA04190	0.57	0.21	0.85	0.84	0.77	2.34	0.53	0.00	0.81	0.23
SLA04191	0.82	-0.21	0.90	0.92	0.69	2.69	0.77	-0.02	0.94	0.26
SLA04192	0.36	0.12	0.91	1.08	1.02	2.89	0.66	0.25	0.68	0.27
SLA04193	0.51	-0.03	0.74	0.92	1.93	2.87	1.15	0.03	1.72	0.28
SLA04301	-0.11	0.71	1.25	1.09	1.37	1.29	0.99	0.07	2.04	0.21
SLA04303	0.32	-0.05	1.39	1.18	1.89	1.81	1.28	-0.02	1.40	0.24
SLA04305	-0.01	0.34	1.51	1.15	1.64	2.07	1.32	0.11	1.10	0.26
SLA04307	0.05	0.75	1.45	1.04	1.50	1.75	1.47	-0.02	1.66	0.25
SLA04309	0.05	0.27	1.29	1.10	1.15	1.59	1.02	-0.05	1.86	0.23
SLA04311	-0.03	0.38	1.55	1.24	1.42	1.23	0.81	0.07	1.37	0.21
SLA04313	0.24	-0.43	1.40	1.10	1.04	1.60	1.25	0.00	1.12	0.22
SLA04315	0.62	0.31	1.50	1.09	1.82	2.00	1.50	0.11	0.97	0.25
SLA04317	0.00	0.39	1.40	1.14	1.73	2.70	1.51	0.05	1.08	0.29
SLA04319	0.14	0.19	1.42	1.21	1.88	2.32	1.86	0.07	1.47	0.28
SLA04321	0.00	-0.45	1.32	1.11	1.08	1.45	1.67	0.03	1.58	0.22
SLA04323	0.14	-0.16	1.31	1.17	2.15	2.73	0.64	0.07	1.04	0.29
SLA04325	0.17	0.46	1.38	1.19	1.08	1.27	1.18	0.18	1.72	0.21
SLA04327	0.23	-0.11	1.33	1.13	0.83	1.42	1.22	0.13	1.32	0.21
SLA04329	0.35	-0.24	1.22	1.03	0.98	2.18	1.42	0.03	1.26	0.25
SLA04331	0.03	0.25	1.29	1.20	1.00	1.33	1.45	0.18	1.25	0.20
SLA04333	0.01	0.51	1.44	1.12	1.09	1.49	1.15	0.15	1.29	0.22
SLA04335	-0.16	-0.40	1.44	1.16	1.48	1.50	0.74	0.07	1.28	0.22
SLA04337	0.20	-0.19	1.12	1.12	1.12	1.89	0.90	0.00	1.75	0.24
SLA04339	0.25	0.23	1.21	1.09	1.09	1.73	1.64	0.00	1.05	0.22
SLA04341	0.09	-0.21	1.30	1.06	1.06	2.24	1.02	0.00	1.66	0.27
SLA04343	0.10	0.06	1.29	1.09	1.09	1.48	0.84	0.00	1.50	0.21
SLA04345	0.27	0.16	1.30	1.08	1.08	2.65	1.96	-0.06	1.72	0.30
SLA04347	0.19	0.12	1.30	1.21	1.21	2.77	1.37	0.22	1.28	0.30
SLA04349	0.07	0.49	1.17	0.98	0.98	1.86	1.19	0.07	1.01	0.22

Notes:

UCL_{95} is the 95 percent upper confidence limit of the arithmetic mean.

Negative results are less than the laboratory system's background level.

These samples were collected between August 21, 1998, and October 21, 1998, from representative native soil at Saint Ann Park, Aubuchon Park, and Howdershell Park. Summary statistics for these data are included in Appendix D, Attachment 1, of the FS (USACE 2003). The mean soil background values for Ra-226, Th-230, and U-238 are listed in the ROD (USACE 2005a).

APPENDIX G

BORING LOGS AND FIELD LOGBOOK ENTRIES FOR SOIL SAMPLES

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COC No.: LE 11072022-05ML

Task Team Members: Z. Matthews, M. Cappatelli, M. Passig, R. Robinson

Sample ID: HTZ250128 Station ID: HTZ250128

Collection Date: 11.7.22 Collection Time: 1355

Property Name: Jana Elementary Sample Location: SE Field

Northing (units): 1086031.08 Easting (units): 872148.87

Cover Depth (ft): — Elevation: 508.07

Sample Collection Method: ☒ Bowl and Trowel ☐ Auger Sample Depth: 0.0-0.5ft

Soil Type: Brown clayey silt, trace sand low plast. rocks (ml) Rad Screen Instrument: 44-9: 4 Cal Due: 3.24.23 44-10: H Cal Due: 6.10.23

Rad Screen Bkg. (cpm): 31/5136 Rad Screen (cpm): 51/5332

Sample Type: Homogenous grab HTZ Area (m^2): 1 HTZ Field Reading: 14K GWS Background Reading: 9.5K

Sample is: ☐ in excavation wall ☐ in excavation floor ☒ measured from original ground surface

Comments:

Recorded by: 11.7.22 QA by: MSteiner Date: 11-9-22

COC No.: LE 11072022-05ML

Task Team Members: Z. Matthews, M. Cappatelli, Robert Robinson, M. Passig

Sample ID: HTZ250127 Station ID: HTZ250127

Collection Date: 11.7.22 Collection Time: 1345

Property Name: Jana Elementary Sample Location: SE Field

Northing (units): 1085860.55 Easting (units): 872031.94

Cover Depth (ft): — Elevation: 508.93

Sample Collection Method: ☒ Bowl and Trowel ☐ Auger Sample Depth: 0.0-0.5ft

Soil Type: Brown clayey silt, trace sand, low (ml) plast. rocks Rad Screen Instrument: 44-9: 4 Cal Due: 3.24.23 44-10: H Cal Due: 6.10.23

Rad Screen Bkg. (cpm): 31/5136 Rad Screen (cpm): 53/5072

Sample Type: Homogenous grab HTZ Area (m^2): 1 HTZ Field Reading: 13.7K GWS Background Reading: 9.5K

Sample is: ☐ in excavation wall ☐ in excavation floor ☒ measured from original ground surface

Comments:

Recorded by: 11.7.22 QA by: MSteiner Date: 11.9.22

COC No.: LE 11072022-05ML

Task Team Members: Z. Matthews, R. Robinson, M. Cappatelli

Sample ID: HTZ250129 Station ID: HTZ250129

Collection Date: 11.7.22 Collection Time: 1405

Property Name: Jana Elementary Sample Location: SE Field

Northing (units): 1086072.44 Easting (units): 872277.74

Cover Depth (ft): — Elevation: 505.29

Sample Collection Method: ☒ Bowl and Trowel ☐ Auger Sample Depth: 0.0-0.5ft

Soil Type: Brown clayey silt, trace sand, low plast., rocks (ml) Rad Screen Instrument: 44-9: 4 Cal Due: 3.24.23 44-10: H Cal Due: 6.10.23

Rad Screen Bkg. (cpm): 31/5136 Rad Screen (cpm): 62/4981

Sample Type: Homogenous grab HTZ Area (m^2): 1 HTZ Field Reading: 14K GWS Background Reading: 9.5K

Sample is: ☐ in excavation wall ☐ in excavation floor ☒ measured from original ground surface

Comments:

Recorded by: 11.7.22 QA by: MSteiner Date: 11-9-22

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SVP19Ø125

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP-743 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: #423

Name of Driller: Zach Mathews / Tori Mack | Station coordinates: E: 871947.8Ø N: 1Ø85Ø77.65

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

Coring Equipment? ☐ Yes ☒ No | Jackhammer? ☐ Yes ☒ No

Surface Elevation: 49Ø.Ø9

Date Start: 8-6-18 | Date Complete: 8-6-18

Depth Water Encountered: N/A

Other Water Measurement(s): N/A

COC #: LEØ8Ø72Ø18-Ø1#

Meter Information / Background | Meter Calibration Due

44-9 B- 39 cpm | 12/13/18

44-10 A- 8589 cpm | 6/4/19

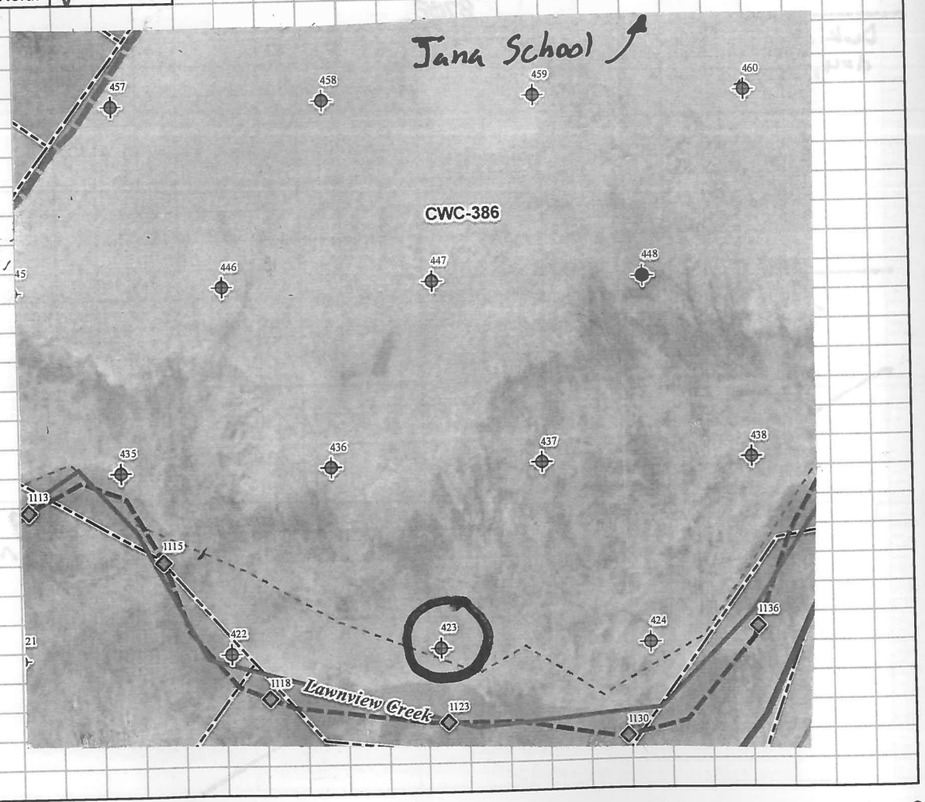
Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	Ø	Ø	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	2'-Surface	6'-2'	—

Additional Notes: NA

Signature of Inspector: David W. Guyan

Approx North | Scale: ☒ Rough ☐ Actual | Location/Sketch



Recorded By: David W. Guyan 8-6-18 QA Check By: MSteiner 8-14-18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 743 | Station ID: SVP19Ø125

Project: CWC: St. Ferdinand Park to Jana School | Inspector: D. Guyan | Sheet 2 of 2 # 423

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown silt, little fine Sand, roots, dry (ML)	56 / 8924	SVP19Ø125 1445	Ø-Ø.5 ft	0.5'
		56 / 8777			1.0'
		54 / 8899			1.5'
		58 / 8937	SVP19Ø126 1451	1.5-2.Ø ft	2.0'
		7Ø / 8742			2.5'
		71 / 8736			3.0'
		66 / 8913			3.5'
		57 / 8969	SVP19Ø127 15ØØ	3.5-4.Ø ft	4.0'
		54 / 882Ø			4.5'
	Dark gray brown silt, tr sand, tr clay dry to sl. moist (ML)	63 / 8917			5.0'
		71 / 8711			5.5'
		6Ø / 91Ø1	SVP19Ø128 152Ø	5.5-6.Ø ft	6.0'
	Terminate boring @ 6.Ø ft bgs				6.5
					7.0'
					7.5'
				SOIL	8.0'
	DUG 8-6-18			Background: 39/8589 cpm	8.5'
					9.0'
					9.5'
					10.0'

Recorded By: David W. Guyan 8-6-18 (sign/date) QA Check By: MSteiner 8-14-18 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE		Station ID: SVP 190129	
Company Name: Leidos	Drilling Subcontractor: Leidos	Logbook ID: FP- 751	Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: 424

Name of Driller: Matt Fakes, Tori Mack

Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

E: 872869.57 N: 1085285.91

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☑ No

Surface Elevation: 495.64

Date Start: 9.18.18 Date Complete: 9.18.18

Depth Water Encountered: —

Other Water Measurement(s): —

COC #: LE09182018-07H

Meter Information / Background — Meter Calibration Due

44-9 F - 34 cpm 7 / 26 / 19

44-10 H - 8234 cpm 8 / 9 / 19

Calibration information maintained by RPM.

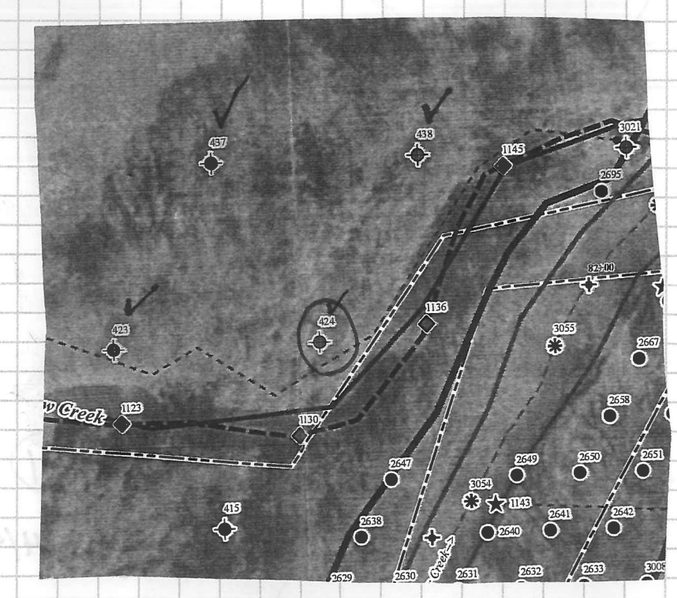
No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	—	—	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	2'-Surface	up to 2'	—

Additional Notes: NA

Signature of Inspector: ZMatth

Approx North ↑ Scale: ☑Rough ☐Actual

Location/Sketch



Recorded By: ZMatth 9.18.18 QA Check By: MSteiner 9-20-18

HTRW DRILLING LOG (Continuation Sheet) | Logbook ID: FP- 751 | Station ID: SVP190129

Project: CWC: St. Ferdinand Park to Jana School | Inspector: Zach Matthews | Sheet 2 of 2 424

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	med. brown silts, fine sand, small gravel, roots, dry (ML)	55 / 8556	SVP190129 @928	0-0.5'	0.5'
		56 / 8322	—		1.0'
	clays present →	48 / 8451	SVP190130 @934	1.0'-1.5'	1.5'
		64 / 8346	—		2.0'
	Light brown clays, silts roots, dry	66 / 8757	SVP190131 @942	2.0-2.5'	2.5'
		67 / 8562	—		3.0'
		50 / 8628	—		3.5'
		63 / 8609	—		4.0'
		64 / 8524	—		4.5'
		82 / 8552	—		5.0'
		67 / 8654	—		5.5'
		68 / 8731	SVP190132 @946	5.5'-6.0'	6.0'
	Terminate @ 6.0 ft				6.5'
	9.18.18 ZMatth			Soil bkgrd: 34/8234 cpm	7.0' 7.5' 8.0' 8.5' 9.0' 9.5' 10.0'

Recorded By: ZMatth 9.18.18 (sign/date) QA Check By: MSteiner 9-20-18 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE

Station ID: SVP19Φ139

Company Name: Leidos

Drilling Subcontractor: Leidos

Logbook ID: FP- 748

Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: #433

Name of Driller: A. Martinez / M Yakos

Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

E: 871542.9Φ N: 1Φ85172.81

Surface Elevation: 48Φ.95

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☒ No

Date Start: 1Φ-15-18

Date Complete: 1Φ-15-18

Depth Water Encountered: ≈ 2 ft

Meter Information / Background — Meter Calibration Due

Other Water Measurement(s): N/A

44-9 F - 36 cpm 7/26/19

44-10 H - 7826 cpm 8/9/19

COC #: LE1016 2Φ18-Φ1H

Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	3	Ø	1	—	—
Disposition (depth and type of material used for backfill):	**Cover Material**	**Gravel**	**Soil**	**Bentonite**	**Other**
	—	—	2ΦH below water	3.Φ - 2ΦH ft	—

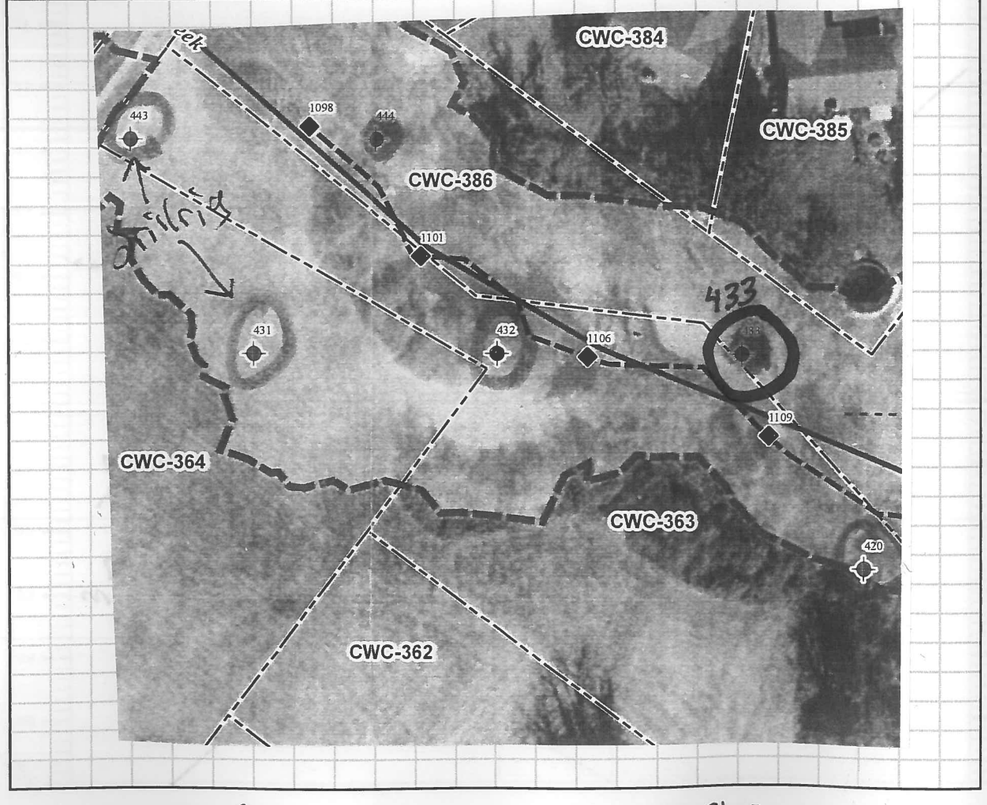
Additional Notes: NA

Signature of Inspector: David W. Gruya

Approx North

Scale: ☑ Rough ☐ Actual

Location/Sketch



Recorded By: David W. Gruya 10-15-18 QA Check By: MSteiner 10.22.18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 748

Station ID: SVP19Φ139

Project: CWC: St. Ferdinand Park to Jana School

Inspector: D. Guyan

Sheet 2 of 2 #433

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Dark brown clayey silt, little fine sand, very moist, soft (ML)	44 / 7971	SVP19Φ139 1245	Φ-0.5ft	
	add gravel	48 / 7964	SVP19Φ14Φ 13ΦΦ	Φ.5-1.Φ ft	
	Brown sandy, gravelly clay (GC) little silt, wet soft	59 / 7832	dup 1Φ-15-18	1.5-2.Φ ft	
		44 / 7588	SVP19Φ141 1314	▽ - water @ ≈ 2 ft	
		53 / 7867	SVP19Φ141 MS 10-22-18 1318 1314	2.Φ-2.5ft Native Soil	
	Gray & brown clayey (ML) silt, iron stains, sl. moist	52 / 7818	ARCHIVE 1318	2.5-3.ΦFt	
	Refusal @ 3.Φ ft - Hole Collapses				

DW6

1Φ-15-18

SOIL

Bkgrd: 36/7820 cpm

Refusal @ 6" on Rock offset 2.5 east, Refusal @ 6" offset 3ft south on rock

Recorded By: David W. Gruya 10-15-18 sign/date

QA Check By: MSteiner 10.22.18 sign/date

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SVP19Φ143

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP- 743 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: #434

Name of Driller: Tori Mack / Sage Rose | Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

E: 871672.28 N: 1085169.41

Surface Elevation: 492.34

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☒ No

Date Start: 8-6-18 | Date Complete: 8-6-18

Depth Water Encountered: N/A

Other Water Measurement(s): N/A

Meter Information / Background | Meter Calibration Due

44-9 B - 44 cpm | 12/13/18

44-10 A - BB32 cpm | 6/4/19

COC #: LEΦBΦ62Φ18-Φ4H

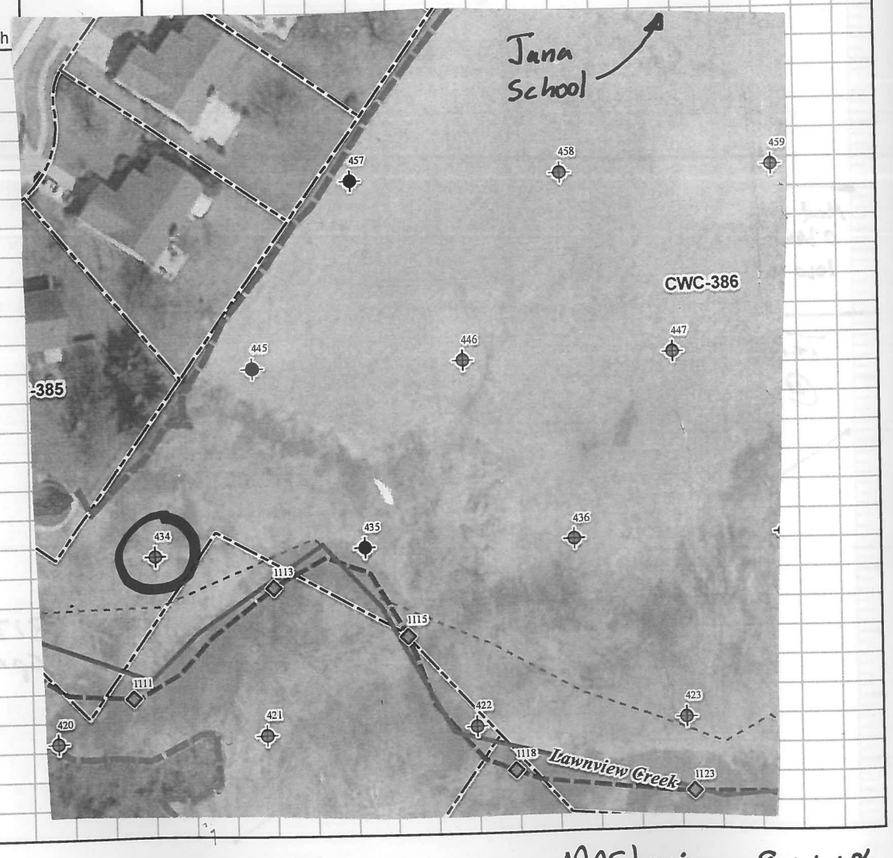
Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	2	Φ	1	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	Collapse Hole	—	—

Additional Notes: NA

Signature of Inspector: David W. Guyan

Approx North | Scale: | Location/Sketch



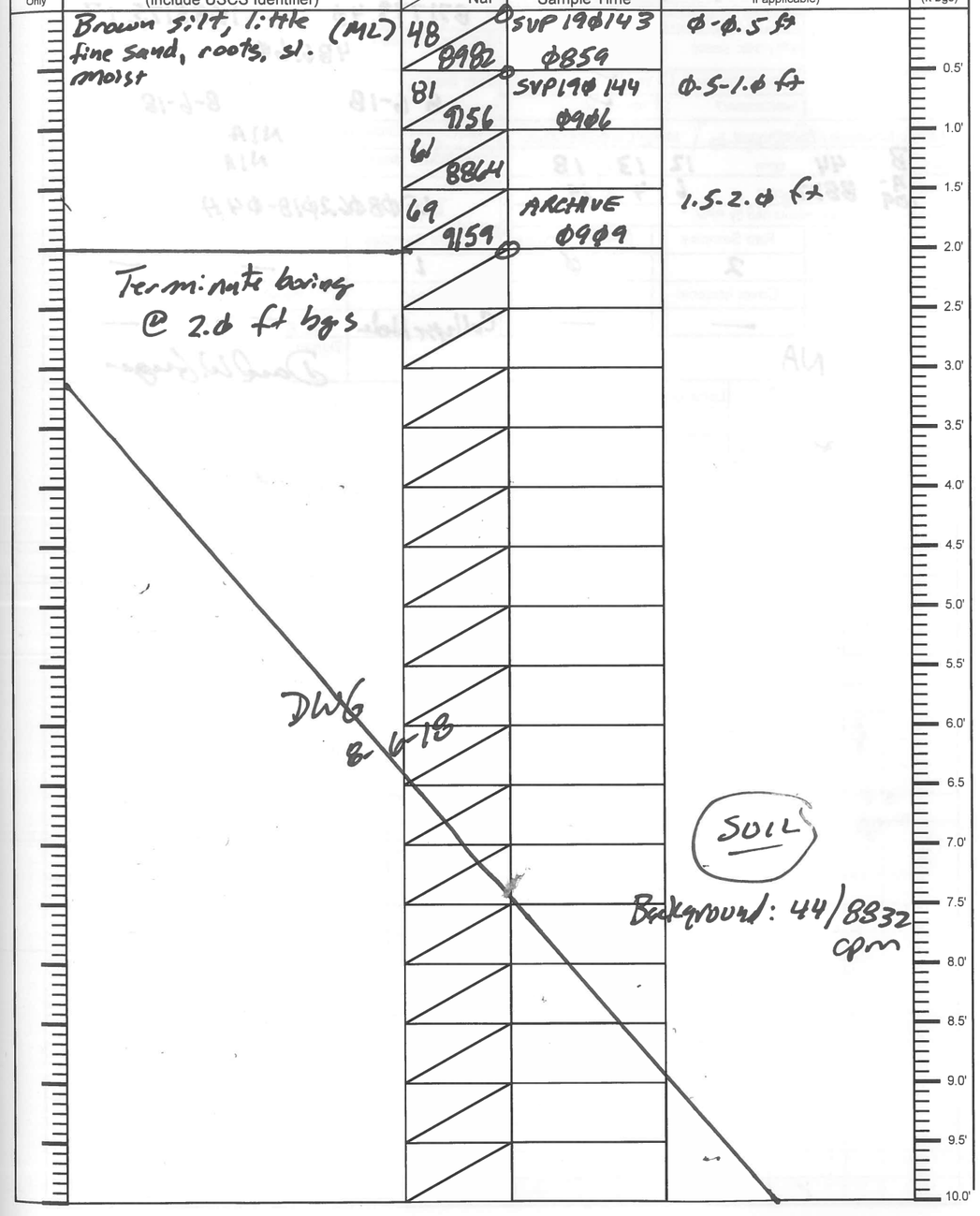
Recorded By: David W. Guyan 8-6-18 | QA Check By: MSteiner 8-14-18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 743 | Station ID: SVP19Φ143

Project: CWC: St. Ferdinand Park to Jana School | Inspector: D. Guyan | Sheet 2 of 2 #434

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown silt, little (ML) fine sand, roots, sl. moist	48 / 8982	SVP19Φ143 ΦΦ859	Φ-Φ.5 ft	
		81 / 7756	SVP19Φ144 ΦΦ06	Φ.5-1.Φ ft	
		W / BBCH			
		69 / 9159	ARCHIVE ΦΦΦ9	1.5-2.Φ ft	
	Terminate boring @ 2.Φ ft bgs				



Recorded By: David W. Guyan 8-6-18 (sign/date) | QA Check By: MSteiner 8-14-18 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE

Station ID: SVP19Φ145

Company Name: Leidos

Drilling Subcontractor: Leidos

Logbook ID: FP- 743

Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: # 435

Name of Driller: Tori Mauk / Sage Post

Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

E: 871779.4Φ N: 1Φ85175.17

Surface Elevation: 486.6Φ

Coring Equipment? ☐ Yes ☒ No

Jackhammer? ☐ Yes ☒ No

Date Start: 8-6-18

Date Complete: 8-6-18

Meter Information / Background — Meter Calibration Due

44-9 B - 44 cpm — 12/13/18

44-10 A: 106 - 8832 cpm — 6/4/19

Calibration information maintained by RPM.

Depth Water Encountered: N/A

Other Water Measurement(s): N/A

COC #: LEΦ8Φ62Φ18-Φ4H

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	2	Φ	1	—	—
Disposition (depth and type of material used for backfill):	**Cover Material**	**Gravel**	**Soil**	**Bentonite**	**Other**
	—	—	Collapse Hole	—	—

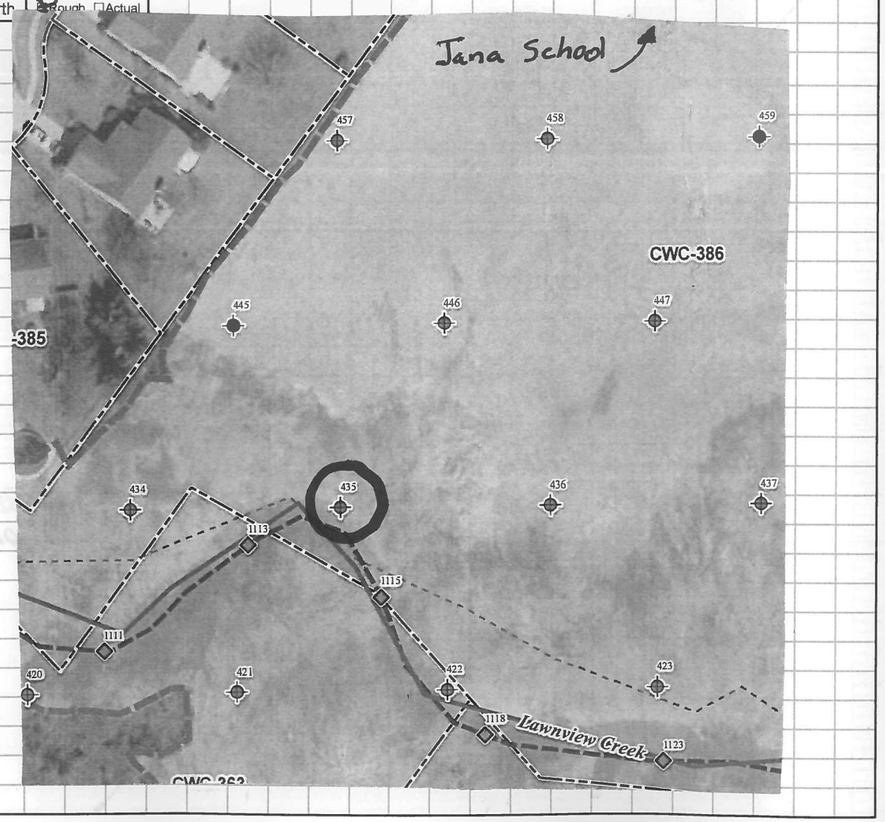
Additional Notes: NA

Signature of Inspector: David W. Gueye

Approx North

Scale: ☒ Rough ☐ Actual

Location/Sketch



Recorded By: David W. Gueye 8-6-18 QA Check By: MSteiner 8-14-18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 743

Station ID: SVP19Φ145

Project: CWC: St. Ferdinand Park to Jana School

Inspector: D. Gueye

Sheet 2 of 2 # 435

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown silt, little fine sand, roots, dry (ML)	6Φ / 8832	SVP19Φ145 ΦΦ32	Φ-Φ.5 ft	0.5'
		76 / 8851			1.0'
		79 / 9Φ21	SVP19Φ146 ΦΦ39	1.Φ-1.5 ft	1.5'
		65 / B97Φ	ARCHIVE ΦΦ43	1.5-2.Φ ft	2.0'
	Terminate boring @ 2.0 ft bgs				2.5'
					3.0'
					3.5'
					4.0'
					4.5'
					5.0'
					5.5'
					6.0'
					6.5
					7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

DW6

SOIL

8-6-18 Background: 44/8832 cpm

Recorded By: David W. Gueye 8-6-18 (sign/date) QA Check By: MSteiner 8-14-18 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SVP19Ø147

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP- 775 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: 436

Name of Driller: Roberts | Station coordinates: E: 871892.Ø4 N: 1085177.54

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve, ~~MS~~ Geoprobe

Coring Equipment? ☐ Yes ☒ No

Jackhammer? ☐ Yes ☒ No

Surface Elevation: 492.13

Date Start: 6·3·19 | Date Complete: 6·3·19

Meter Information / Background | Meter Calibration Due

44-9 F - 48 cpm | 12 / 11 / 19

44-10 H - 7740 cpm | 8 / 9 / 19

Calibration information maintained by RPM.

Depth Water Encountered: —

Other Water Measurement(s): —

COC #: LEØG042Ø19-ØIH

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	5	—	1	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	topsoil	—	Ø-2ft	Ø-2ft	—

Additional Notes: full recovery

Signature of Inspector: [signature]

Approx North | Scale: ☒Rough ☐Actual | Location/Sketch



Recorded By: [signature] 6·3·19

QA Check By: MSteines 6-10-19

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 775 | Station ID: SVP19Ø147

Project: CWC: St. Ferdinand Park to Jana School | Inspector: Zach Mathews | Sheet 2 of 2 436

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Dark gray clay, silt, plant debris, stiff, trace iron staining (CL)	78 / 8157	SVP19Ø147 1430	Ø.Ø'-Ø.5'	0.5'
		Cole / 79Ø6	—		1.0'
		76 / 8ØØ8	SVP19Ø148 1435	1.Ø'-1.5'	1.5'
		54 / 78Ø2	—		2.0'
		7Ø / 7747	—		2.5'
		45 / 8ØØ8	—		3.0'
		71 / 8168	SVPZ11Ø95 1439	3.Ø'-3.5'	3.5'
		63 / 7923	—		4.0'
		59 / 8187	SVPZ11Ø96 1441	4.Ø'-4.5'	4.5'
	med gray silty clay, stiff, iron staining, black specks (CL)	54 / 8Ø52	—		5.0'
		69 / 797Ø	SVPZ11Ø97 1443	5.Ø'-5.5' Non-fill Horizon	5.5'
	med gray silt, clay, low plast, iron staining (ML)	57 / 7959	Archive 1444	5.5'-6.Ø'	6.0'
	Terminate @ 6.Ø ft			bkgd: 48/774Ø cpm Soil	6.5
					7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

[signature] 6·3·19

Recorded By: [signature] 6·3·19
sign/date

QA Check By: MSteines 6-10-19
sign/date

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SVP19Φ149

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP-743 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: #437

Name of Driller: Zach Mathews / Tori Mecke | Station coordinates: E: 872ΦΦ8.84 N: 1ΦΒ5177.85

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☑ No

Surface Elevation: 496.17

Date Start: 8-6-18 | Date Complete: 8-6-18

Depth Water Encountered: N/A

Other Water Measurement(s): N/A

COC #: LEΦ8Φ62Φ18-Φ4#

Meter Information / Background	Meter Calibration Due
44-9 B - 44 cpm	12/13/18
44-10 A-109 - 8832 cpm	6/4/19

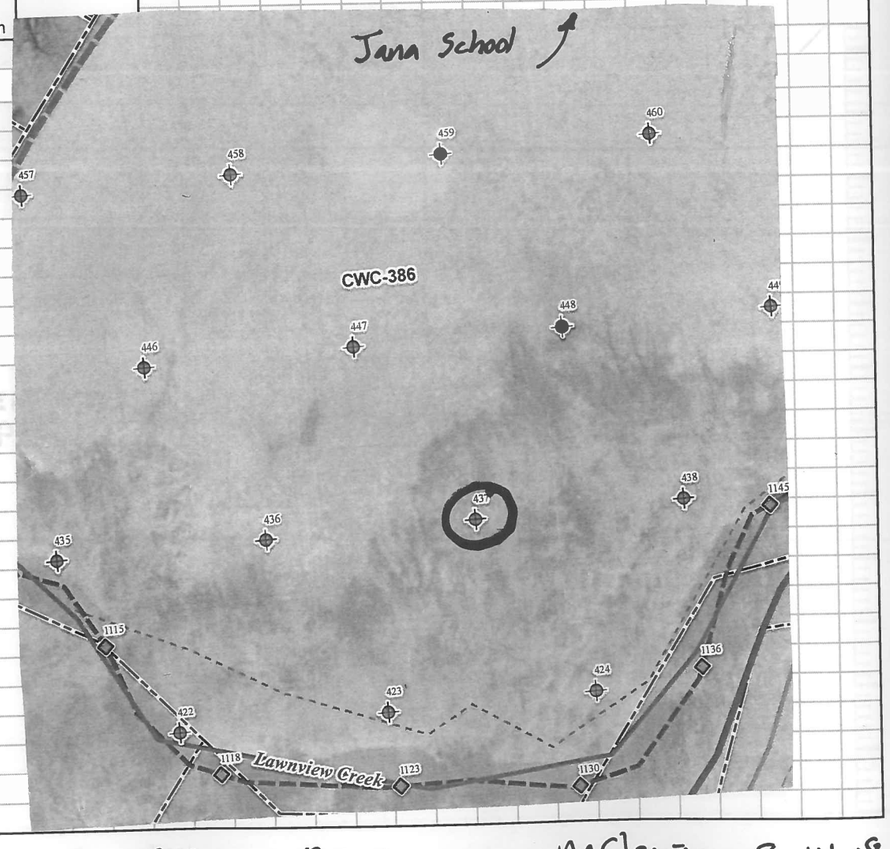
Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	Φ	1	—	—
Disposition (depth and type of material used for backfill):	**Cover Material**	**Gravel**	**Soil**	**Bentonite**	**Other**
	—	—	2'-Surface	6'-2'	—

Additional Notes: NA

Signature of Inspector: David W. Guyan

Approx North | Scale: | Location/Sketch



Recorded By: David W. Guyan 8-6-18 QA Check By: MSteiner 8-14-18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP-743 | Station ID: SVP19Φ149

Project: CWC: St. Ferdinand Park to Jana School | Inspector: D. Guyan | Sheet 2 of 2 #437

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown silt, little fine Sand, roots, dry (ML)	74 / 9Φ69	SVP19Φ149 1Φ25	Φ-Φ.5 ft	0.5'
		65 / 8964			1.0'
		55 / 8787			1.5'
		62 / 9Φ47	SVP19Φ15Φ 1Φ34	1.5-2.Φ ft	2.0'
		6Φ / 8954			2.5'
		75 / 9Φ81	SVP19Φ151 1Φ44	2.5-3.Φ ft	3.0'
	Gray-brown silt, tr. fine sand, tr. clay Dry (ML)	6Φ / 89B2			3.5'
		62 / 9Φ13			4.0'
		63 / 9244	SVP19Φ152 1Φ53	4.Φ-4.5 ft	4.5'
	Dark grey silty clay, dry, very stiff (CL)	64 / 8996			5.0'
		68 / 8966			5.5'
		46 / 8871	ARCHIVE 1Φ57	5.5-6.Φ ft	6.0'
	Terminate boring @ 6.Φ ft bgs				6.5'
				SOIL Background: 44/8832 cpm	7.0'
					7.5'
					8.0'
				DW 8-4-18	8.5'
					9.0'
					9.5'
					10.0'

Recorded By: David W. Guyan 8-6-18 (sign/date) QA Check By: MSteiner 8-14-18 (sign/date)

HTRW DRILLING LOG

HTRW DRILLING LOG	District: St. Louis USACE	Station ID: SVP190153	
Company Name: Leidos	Drilling Subcontractor: Leidos	Logbook ID: FP- 743	Sheet 1 of 2
Project: CWC: St. Ferdinand Park to Jana School		Location: # 438	
Name of Driller: Zach Mathews / Sage Pope		Station coordinates: E: 8721~~27.79~~ 27.79 N: 1085179.~~97~~ 36 (8.9-26.18)	
Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment)	Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.	Surface Elevation: 494.71	
	Coring Equipment? ☐ Yes ☑ No	Date Start: 8-6-18	Date Complete: 8-6-18
	Jackhammer? ☐ Yes ☑ No		
Meter Information / Background	Meter Calibration Due	Depth Water Encountered: N/A	
44-9 B - 39 cpm	12 / 13 / 18	Other Water Measurement(s): N/A	
44-10 A - 8589 cpm	6 / 4 / 19	COC #: LE08072018-01H	
Calibration information maintained by RPM.			

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	1	1	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	2'-Surface	6'-2'	—

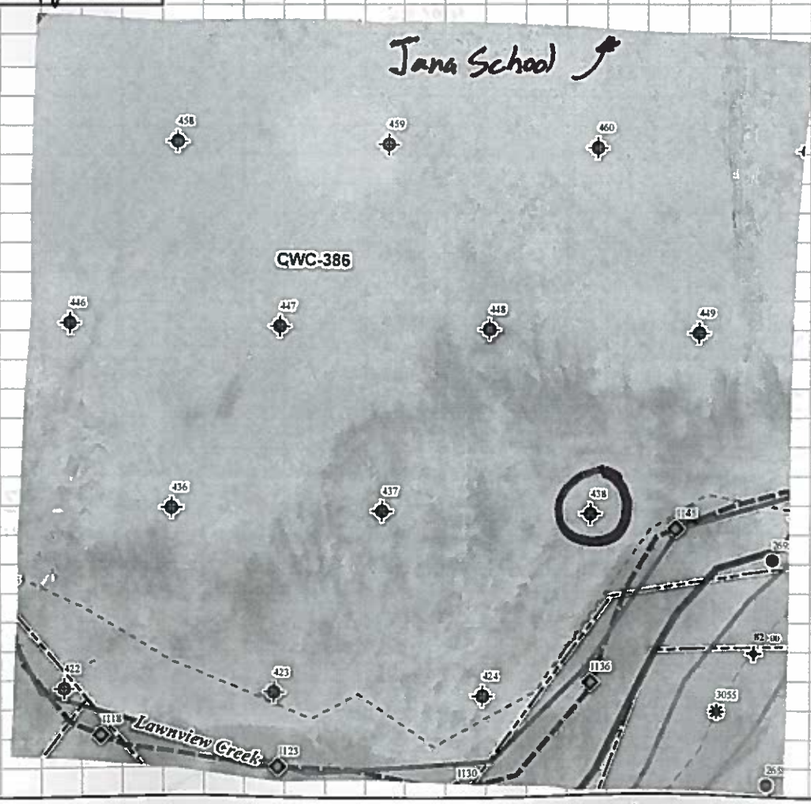
Additional Notes: NA

Signature of Inspector: David W. Guyan

Approx North

Scale: ☑ Rough ☐ Actual

Location/Sketch



Recorded By: David W. Guyan 8-6-18 QA Check By: MSteiner 8-14-18

HTRW DRILLING LOG (Continuation Sheet)

HTRW DRILLING LOG (Continuation Sheet)	Logbook ID: FP- 743	Station ID: SVP190153
Project: CWC: St. Ferdinand Park to Jana School	Inspector: D. Guyan	Sheet 2 of 2 # 438

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID if applicable)	Actual Depth (ft bgs)
	Brown silt, little fine sand, roots, dry (ML)	71 / 9018	SVP190153 1310	0-0.5 ft (+QA/QC)	0.5'
		66 / 8675			1.0'
		76 / ~~8675~~ 8762	DWG 8-6-18		1.5'
		59 / 8779	SVP190154 1324	1.5-2.0 ft	2.0'
	Grey-brown silt, little fine sand, fn clay, dry (ML)	76 / 9059	SVP190154 1342	2.0-2.5 ft DWG 8-6-18	2.5'
		78 / 8684			3.0'
		58 / 8674			3.5'
		86 / 8708			4.0'
	Dark gray-brown silty clay, dry, very stiff (CL)	68 / 9002			4.5'
		63 / 8711			5.0'
		64 / 9066	SVP190156 1414	5.0-5.5 ft	5.5'
		58 / 8957	ARCHIVE 1417	5.5-6.0 ft	6.0'
	Terminate boring @ 6.0 ft bgs				6.5'
					7.0'
				SOIL	7.5'
				Background: 39 / 8589 cpm	8.0'
	DWG 8-6-18				8.5'
					9.0'
					9.5'
					10.0'

Recorded By: 8-6-18 David W. Guyan sign/date

QA Check By: MSteiner 8-14-18 sign/date

16

HTRW DRILLING LOG

District: St. Louis USACE		Station ID: SVP190159	
Company Name: Leidos	Drilling Subcontractor: Leidos	Logbook ID: FP-755	Sheet 1 of 2
Project: CWC: St. Ferdinand Park to Jana School		Location: #444	
Name of Driller: Zack Matthews		Station coordinates: 871367.00 E: ~~871542.90~~ 10-9-18 N: 1085285.33 ~~1085172.81~~ 10-9-18	
Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment)	Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID ~~or SS sediment sampler with plastic sleeve.~~ 10-9-18	Surface Elevation: 491.56	
	Coring Equipment? ☐ Yes ☒ No	Date Start: 10-9-18	Date Complete: 10-9-18
	Jackhammer? ☐ Yes ☒ No		
Meter Information / Background	Meter Calibration Due	Depth Water Encountered: NA	
44-9 B - 39 cpm	12/13/18	Other Water Measurement(s): NA	
44-10 F - 7899 cpm	6/7/19	COC #: LE101020018-01H	
Calibration information maintained by RPM.			

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	3	1	1	0	0
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	Soil	0	0-2 FT	2-3 FT	0

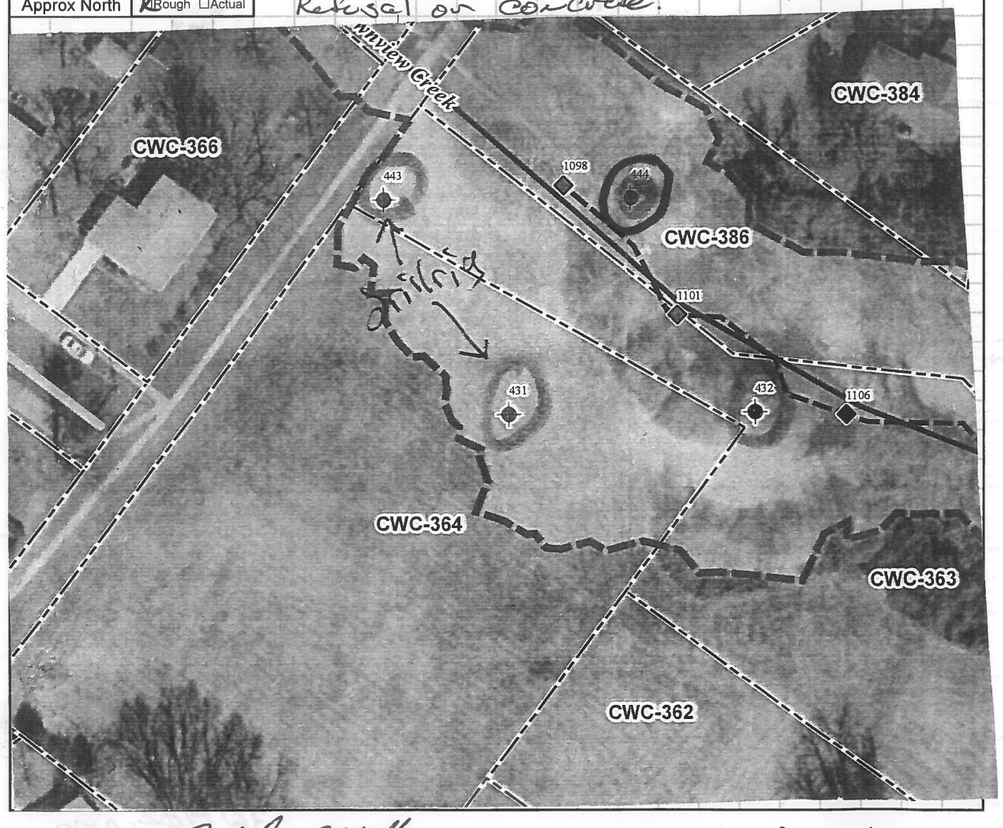
Additional Notes: 1st attempt refusal at 3.5 FT on concrete moved 3FT west for 2nd attempt. 2nd attempt

Signature of Inspector: Mike Miller

Approx North

Scale: ☒ Rough ☐ Actual

Location/Sketch Refusal at 4FT on concrete, moved 2FT east for 3rd attempt. 3rd attempt Refusal on concrete.



Recorded By: Mike Miller 10-9-18 QA Check By: MSteiner 10-11-18

#444 17

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP-755	Station ID: SVP190159	
Project: CWC: St. Ferdinand Park to Jana School	Inspector: Mike Miller	Sheet 2 of 2

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown Silt Trace coarse Limestone gravel Low plasticity medium stiff Dry (ML)	59 / 8296	Sup190159 1405	0-0.5 FT +QC	0.5'
		56 / 8298	—		1.0'
		57 / 8481	Svp190160 1420	1-1.5 FT	1.5'
		65 / 8332	—		2.0'
		69 / 8248	—		2.5'
		69 / 8337	Sup206986 1450	2.5-3.0 FT	3.0'
		65 / 8148	—		3.5'
		66 / 8126	Archive 1505	3.5-4 FT	4.0'
	Refusal on concrete				4.5'
					5.0'
					5.5'
					6.0'
					6.5
					7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

Soil

Bkgrd 39/7899 cpm

10-9-18

Recorded By: Mike Miller 10-9-18 sign/date QA Check By: MSteiner 10-11-18 sign/date

HTRW DRILLING LOG

District: St. Louis USACE	Station ID: SUP190161	
Company Name: Leidos	Drilling Subcontractor: Leidos	Logbook ID: FP-777 — Sheet 1 of 2
Project: CWC: St. Ferdinand Park to Jana School	Location: 445	
Name of Driller: Roberts Drilling	Station coordinates: E: 871717.77 N: 1085278.82	
Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve. Geoprobe	Surface Elevation: 495.09	
Coring Equipment? ☐ Yes ☒ No	Date Start: 6-3-19	Date Complete: 6-3-19
Jackhammer? ☐ Yes ☒ No	Depth Water Encountered: NA	
Meter Information / Background — Meter Calibration Due	Other Water Measurement(s): NA	
44-9 F - 48 cpm 12/11/19	COC #: LE06042019-02H	
44-10 H - 7740 cpm 8/9/19		
Calibration information maintained by RPM.		

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	0	1	0	0
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	Soil	0	0-2FT	2-6FT	0

Additional Notes: NA

Signature of Inspector: [signature]

Approx North — Scale: ☒ Rough ☐ Actual — Location/Sketch



Recorded By: [signature] 6-3-19 QA Check By: MSteines 6-26-19

#445

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP-777	Station ID: Sup190161	
Project: CWC: St. Ferdinand Park to Jana School	Inspector: [signature]	Sheet 2 of 2

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Dark Brown clayey silt with some roots slight Plasticity stiff moist (ML)	75 / 8068	Sup190161 1321	0-0.5FT	0.5'
		54 / 7892	—		1.0'
		68 / 8007	Sup190162 1325	1-1.5FT	1.5'
	Brown gray mottled clayey silt slight Plasticity moist medium stiff (ML)	87 / 7797	—		2.0'
		69 / 7635	—		2.5'
		62 / 8023	—		3.0'
	Dark gray with some light gray mottling clayey silt slight Plasticity moist (ML)	52 / 8198	Sup211090 1332	3-3.5FT	3.5'
		40 / 8066	—		4.0'
		68 / 7688	—		4.5'
		48 / 7800	—		5.0'
		60 / 7811	Sup211091 1335	5-5.5FT	5.5'
	gray ~~clayey~~ silty clay some non staining medium plasticity stiff moist (ML)	65 / 7852	Archive 1340	- non Fill 5.5-6FT	6.0'
	Terminated Soil boring				6.5
					7.0'
					7.5'
					8.0'
		N/A		Bkgd 48/7740cpm	8.5'
					9.0'
					9.5'
					10.0'

Recorded By: [signature] 6-3-19 sign/date QA Check By: MSteines 6.26.19 sign/date

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SUP19Φ163

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP- 775 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: 446

Name of Driller: Roberts | Station coordinates: E: 871834.23 N: 1065278.73

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve; MS Direct Push geoprobe

Coring Equipment? ☐ Yes ☒ No

Jackhammer? ☐ Yes ☒ No

Surface Elevation: 491.37

Date Start: 6.3.19 | Date Complete: 6.3.19

Depth Water Encountered: —

Other Water Measurement(s): —

COC #: LEXG042Φ19-Φ1H

Meter Information / Background | Meter Calibration Due

44-9 F - 48 cpm | 12 / 11 / 19

44-10 H 7467 cpm 7740 | 9 / 19

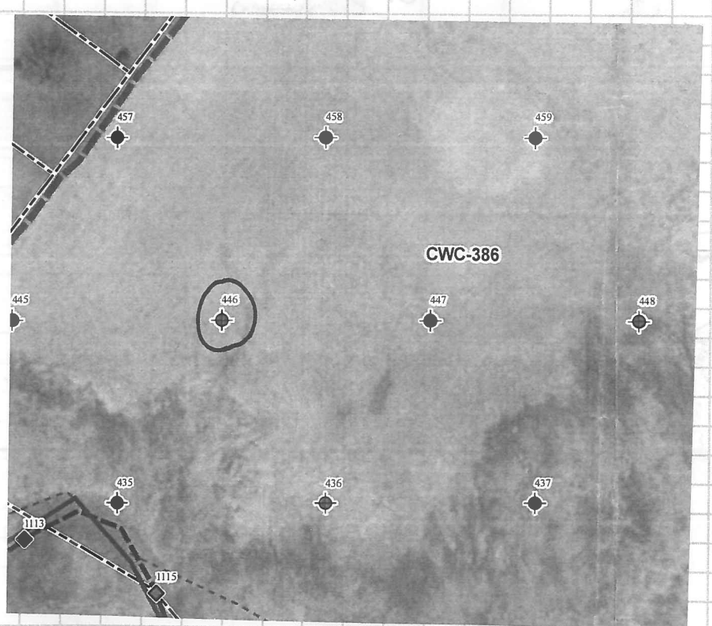
Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	—	1	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	top soil	—	0-2ft	6-2ft	—

Additional Notes: full recovery

Signature of Inspector: [signature]

Approx North | Scale: ☒Rough ☐Actual | Location/Sketch



Recorded By: [signature] 6.3.19 QA Check By: MSleynes 6.10.19

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 775 | Station ID: SUP19Φ163

Project: CWC: St. Ferdinand Park to Jana School | Inspector: Zach Matthews | Sheet 2 of 2 446

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	med brown silty clay, fine sands, plant debris, trace black specks, stiff. (CL)	88 / 7855	SUP19Φ163 1235	0.Φ'-0.5'	0.5'
		66 / 8Φ39	—		1.0'
	med. gray silty clay, trace roots, low plast. trace iron staining. trace black specks (CL)	6Φ / 81Φ4	—		1.5'
		74 / 8139	SUP19Φ164 1245	1.5'-2.Φ'	2.0'
		8Φ / 7933	—		2.5'
	med gray silty clay, stiff (CL)	86 / 7698	—	— Non-fill horizon	3.0'
		85 / 7899	—		3.5'
		75 / 8Φ86	SUP19Φ165 1254 JL 6.3.19	3.5'-4.Φ'	4.0'
		95 / 8Φ77	SUP19Φ166Φ6 1256	4.Φ'-4.5'	4.5'
	med gray silty clay, iron staing. low plast. (CL)	92 / 7786	—		5.0'
		78 / 7805	—		5.5'
		8Φ / 8Φ63	Archive 13Φ3	5.5'-6.Φ'	6.0'
	Terminate @ 6.Φft			774Φ cpm bkgd: 48/7467 JL 6.3.19 Soil	6.5'
					7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

6.3.19

Recorded By: [signature] 6.3.19 sign/date QA Check By: MSleynes 6.10.19 sign/date

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: Sup19Ø167

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP-777 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: #447

Name of Driller: Roberts Drilling | Station coordinates: E: 871950.24 N: 1085278.91

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve. Geoprobe

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☑ No

Surface Elevation: 492.31

Date Start: 6-3-19 | Date Complete: 6-3-19

Depth Water Encountered: NA

Other Water Measurement(s): NA

COC #: CEØ6Ø42Ø19-ØZH

Meter Information / Background | Meter Calibration Due

44-9 F - 48 cpm | 12/11/19

44-10 H - 7740 cpm | 8/9/19

Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	Ø	1	Ø	Ø
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	SOIL	Ø	Ø-2FT	2-5.5 Ft	Ø

Additional Notes: NA

Signature of Inspector: Mike Miller

Approx North | Scale: ☑Rough ☐Actual | Location/Sketch



Recorded By: Mike Miller 6-3-19 QA Check By: MSteiner 6-26-19

#447

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP-777 | Station ID: Sup19Ø167

Project: CWC: St. Ferdinand Park to Jana School | Inspector: Mike Miller | Sheet 2 of 2

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Dark Brown silty clay medium plasticity very stiff moist trace roots (CL)	52/7871	Sup19Ø167 1500	Ø-Ø.5 FT	0.5'
		54/7786	—		1.0'
		67/8172	Sup19Ø168 1505	1-1.5 FT	1.5'
		47/8088	—		2.0'
		59/7855	—		2.5'
	Dark grey with some Brown mottling very stiff medium plasticity moist, Trace roots Trace very fine sand (CL)	56/8159	Sup211Ø98 1508	2.5-3Ft	3.0'
		56/8140	—		3.5'
		55/7901	—		4.0'
		67/7849	—		4.5'
		57/7871	Sup211Ø99 1510	4.5-5FT	5.0'
	Medium gray with some Black Streaks silty clay stiff medium plasticity Trace iron staining (CL)	60/7973	Archive 152Ø	Non-fill 5-5.5 Ft	5.5'
	Terminated Soil boring				6.0'
					6.5'
					7.0'
					7.5'
					8.0'
				Bkgd 48/7740 cpm	8.5'
					9.0'
					9.5'
					10.0'

Recorded By: Mike Miller 6-3-19 (sign/date) QA Check By: MSteiner 6-26-19 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SVP19Ø169

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP- 775 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: 448

Name of Driller: Roberts Drilling

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeves ~~MS19Ø109~~ geoprobe

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☑ No

Station coordinates: E: 872Ø66.23 N: 1085278.67

Surface Elevation: 493.33

Date Start: 6.4.19 | Date Complete: 6.4.19

Depth Water Encountered: —

Other Water Measurement(s): —

COC #: LEADG04 ZØ19 - Ø34

Meter Information / Background — Meter Calibration Due

44-9 F - 48 cpm — 12 / 11 / 19

44-10 H - 8332 cpm — 8 / 9 / 19

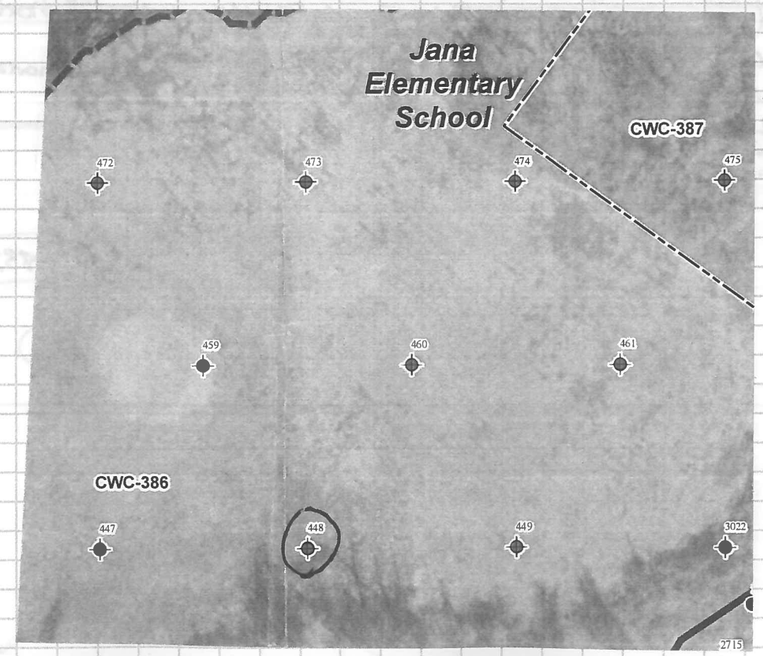
Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	5	—	—	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	topsoil	—	Ø-2ft	5-2ft	—

Additional Notes: Full recovery

Signature of Inspector: [signature]

Approx North ↑ | Scale: ☑Rough ☐Actual | Location/Sketch



Recorded By: [signature] 6.4.19 | QA Check By: MStevens 6.10.19

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 775 | Station ID: SVP19Ø169

Project: CWC: St. Ferdinand Park to Jana School | Inspector: Zach Matthews | Sheet 2 of 2 448

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	med. brown silty clay, trace iron staining, trace roots, stiff, (CL)	48 / 8311	SVP19Ø169 Ø92Ø	Ø.Ø'-Ø.5'	0.5'
		54 / 8337	SVP19Ø17Ø Ø922	Ø.5'-1.Ø'	1.0'
		44 / 8Ø63	—		1.5'
		68 / 8266	—		2.0'
		67 / 8582	SVPZ111Ø4 Ø93Ø	2.Ø'-2.5'	2.5'
		65 / 6455	—		3.0'
		72 / 8428	—		3.5'
		75 / 8268	—		4.0'
		64 / 8471	SVPZ111Ø5 Ø934	4.Ø'-4.5'	4.5'
	med gray silty clay, black trace mottling, iron staining, stiff, trace roots (CL)	67 / 8523	SVPZ111Ø6 Ø935	Nonfill horizon 4.5'-5.Ø'	5.0'
	Terminate @ 5.ØFt			bkgd: 48/8332 cpm	5.5'
				Soil	6.0'
					6.5
					7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

6.4.19

Recorded By: [signature] 6.4.19 (sign/date) | QA Check By: MStevens 6-10-19 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: Sup 19Ø171

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP-777 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: #449

Name of Driller: Roberts Drilling | Station coordinates: E: 872182.26 N: 1Ø85278.58

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve. Geoprobe

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☒ No

Surface Elevation: 496.86

Date Start: 6-4-19 | Date Complete: 6-4-19

Depth Water Encountered: NA

Other Water Measurement(s): NA

COC #: LEØ6Ø42Ø19-ØØH

Meter Information / Background	Meter Calibration Due
44-9 F - 48 cpm	12/11/19
44-10 H - 8332 epm	8/9/19

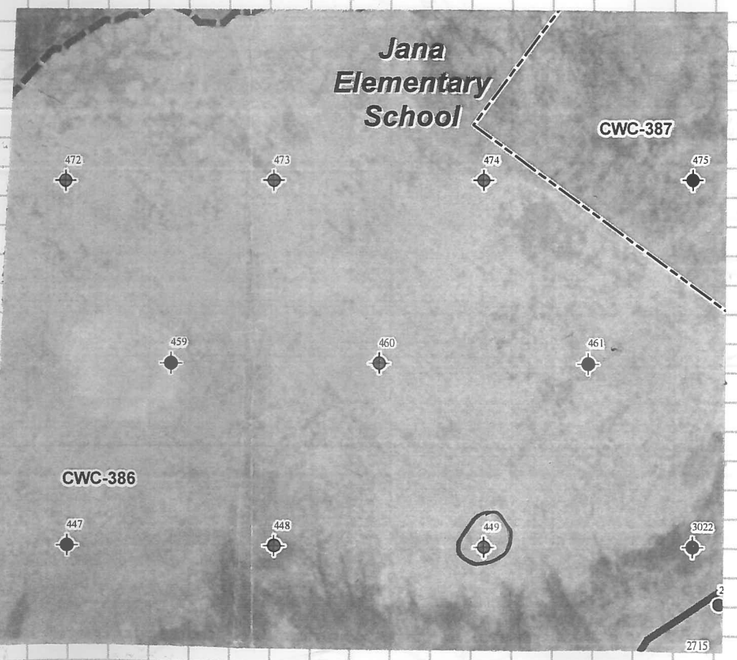
Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	6	Ø	1	Ø	Ø
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	Soil	Ø	Ø-2 FT	2-9 FT	Ø

Additional Notes: NA

Signature of Inspector: Mike Miller

Approx North | Scale: ☒ Rough ☐ Actual | Location/Sketch



Recorded By: Mike Miller 6-4-19 QA Check By: MStevens 6-26-19

449

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP-777 | Station ID: Sup 19Ø171

Project: CWC: St. Ferdinand Park to Jana School | Inspector: Mike Miller | Sheet 2 of 2

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown clayey silt trace fine sand stone roots slight plasticity soft moist (ML)	61/8234	Sup19Ø1719 49	Ø-Ø.5 FT	0.5'
		57/8165	—		1.0'
		5Ø/8277	Sup19Ø172 954	1-1.5 FT	1.5'
		5Ø/8134	—		2.0'
		62/8368	—		2.5'
		52/8182	—		3.0'
		55/8128	—		3.5'
	Becomes Medium stiff	4Ø/8439	Sup211Ø67 955	3.5-4 FT	4.0'
		75/8414	Sup211Ø68 1ØØ5	4-4.5 FT	4.5'
		51/8340	—		5.0'
		5Ø/8123	—		5.5'
	medium gray with some Brown mottling silty clay medium plasticity stiff trace fine gravel (CL)	56/8125	—		6.0'
		49/8231	—		6.5'
		64/84ØØ	Sup211Ø69 1ØØ9	6.5-7 FT	7.0'
		55/8267	—		7.5'
		62/8190	—		8.0'
		44/8285	Sup2111Ø 1Ø1Ø	8-8.5 FT	8.5'
	gray clayey silt some iron staining slight plasticity medium stiff moist (ML) Terminated Soil boring	46/8342	Archive 1Ø12	Now Fill 8.5-9 FT	9.0'
				Bkgrd 48/8332 cpm	9.5'
					10.0'

Recorded By: Mike Miller 6-4-19 (sign/date)

QA Check By: MStevens 6-26-19 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE

Station ID: SVP19Ø177

Company Name: Leidos

Drilling Subcontractor: Leidos

Logbook ID: FP- 775

Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: 457

Name of Driller: Roberts

Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment)

Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve, ~~Direct Push~~ Geoprobe

E: 871776.19 N: 1085379.88

Coring Equipment? ☐ Yes ☒ No

Surface Elevation: 496.55

Jackhammer? ☐ Yes ☒ No

Date Start: 6·3·19

Date Complete: 6·3·19

Meter Information / Background — Meter Calibration Due

Depth Water Encountered: —

44-9 F - 48 cpm 12 / 11 / 19

Other Water Measurement(s): —

44-10 H - 7740 cpm 8 / 9 / 19

COC #: LE0604Z0019-01H

Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	3	—	1	—	—

Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	Top Soil	—	Ø-2ft	3.5-2	—

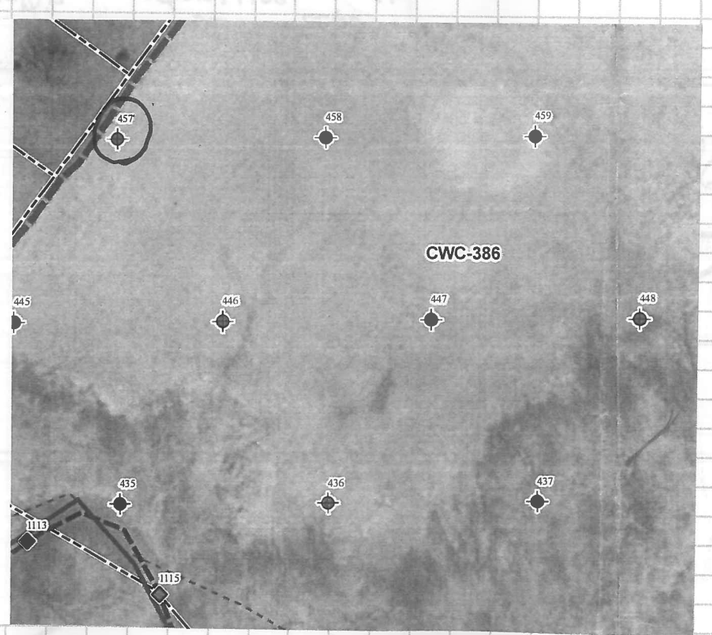
Additional Notes: full recovery

Signature of Inspector: Zkatth

Approx North

Scale: ☑Rough ☐Actual

Location/Sketch



Recorded By: Zkatth 6·3·19

QA Check By: MSteiner 6-10-19

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 775

Station ID: SVP19Ø177

Project: CWC: St. Ferdinand Park to Jana School

Inspector: Zach Matthews

Sheet 2 of 2 457

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	med brown silty clay, light grey mottling, plant debris, stiff, trace fine sand (CL)	C06 / 7931	SVP19Ø177 1349	Ø.Ø'-Ø.5'	0.5'
		73 / 7921	—		1.0'
		62 / 8Ø27	SVP19Ø178 1353	1.Ø'-1.5'	1.5'
		64 / 79Ø6	—		2.0'
		6Ø / 7687	—		2.5'
		C5 / 7944	SVP211Ø92 1357	2.5'-3.Ø'	3.0'
	med. grey clayey silt, heavy iron stainings, low plast (ml)	58 / 7944	Archive 1358	3.Ø'-3.5'	3.5'
	Terminate @ 3.5ft				4.0'
					4.5'
					5.0'
					5.5'
					6.0'
				bkgd: 48/7740 cpm	6.5
				Soil	7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

Zkatth 6·3·19

Recorded By: Zkatth 6·3·19
sign/date

QA Check By: MSteiner 6-10-19
sign/date

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: Sup 19ϕ179

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP-777 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: #458

Name of Driller: Roberts Drilling | Station coordinates: E: 871891.78 N: 1085379.67

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve. Geoprobe

Coring Equipment? ☐ Yes ☒ No

Jackhammer? ☐ Yes ☒ No

Surface Elevation: 492.16

Date Start: 6-3-19 | Date Complete: 6-3-19

Depth Water Encountered: NA

Other Water Measurement(s): NA

COC #: CEϕ6ϕ42ϕ19-ϕ2H

Meter Information / Background | Meter Calibration Due

44-9 F - 48 cpm | 12 11 19

44-10 H - 774ϕ cpm | 8 9 19

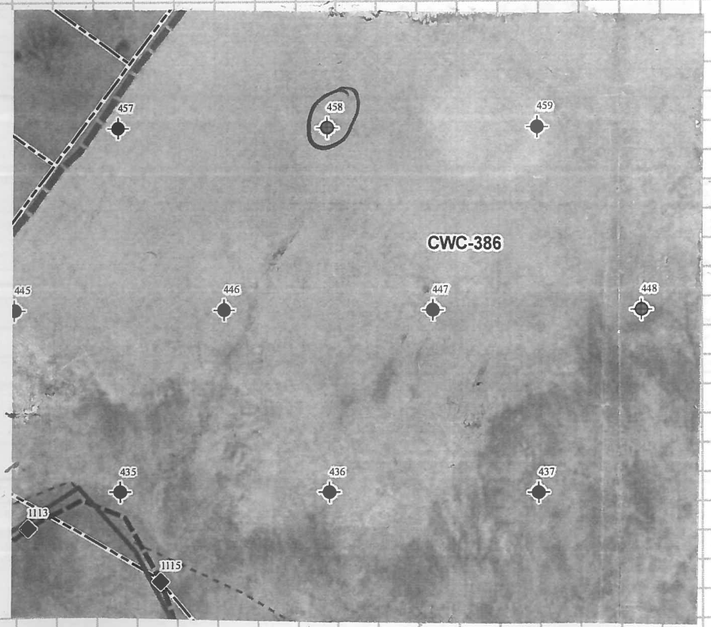
Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	5	ϕ	1	ϕ	ϕ
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	soil	ϕ	ϕ-2 Ft	2-6 Ft	ϕ

Additional Notes: NA

Signature of Inspector: Mike Miller

Approx North | Scale: ☑Rough ☐Actual | Location/Sketch



Recorded By: Mike Miller 6-3-19 | QA Check By: MSteiner 6.26.19

#458

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP-777 | Station ID: Sup 19ϕ179

Project: CWC: St. Ferdinand Park to Jana School | Inspector: Mike Miller | Sheet 2 of 2

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Light grey Silt Trace roots (ML)	65 / 8147	Sup 19ϕ179 1407	ϕ-ϕ.5 FT	0.5'
	Dark Brown with some grey Banding silty clay stiff medium plasticity Trace fine Sand (CL)	65 / 8189	Sup 19ϕ18ϕ	ϕ.5-1 FT	1.0'
		6ϕ / 7846	—		1.5'
		53 / 79ϕ6	—		2.0'
		52 / 7952	—		2.5'
		51 / 7998	—		3.0'
		76 / 8ϕ47	Sup 211ϕ93 1419	3-3.5 FT	3.5'
		73 / 8ϕ18	—		4.0'
		54 / 8ϕ4ϕ	Sup 211ϕ94 1423	4-4.5 FT	4.5'
		69 / 7856	—		5.0'
		75 / 7795	Sup 211ϕ95 1425 mwb 3-19	1ϕϕ 5-5.5 FT NON Fill	5.5'
	Light gray Clayey Silt Slight plasticity medium stiff moist some iron staining.	9ϕ / 7881	Archive 1426	5.5-6 FT	6.0'
	Terminated Soil boring				6.5'
					7.0'
					7.5'
				Bkgrd 48/774ϕ cpm	8.0'
					8.5'
					9.0'
					9.5'
					10.0'

Recorded By: Mike Miller 6-3-19 (sign/date) | QA Check By: MSteiner 6.26.19 (sign/date)

HTRW DRILLING LOG

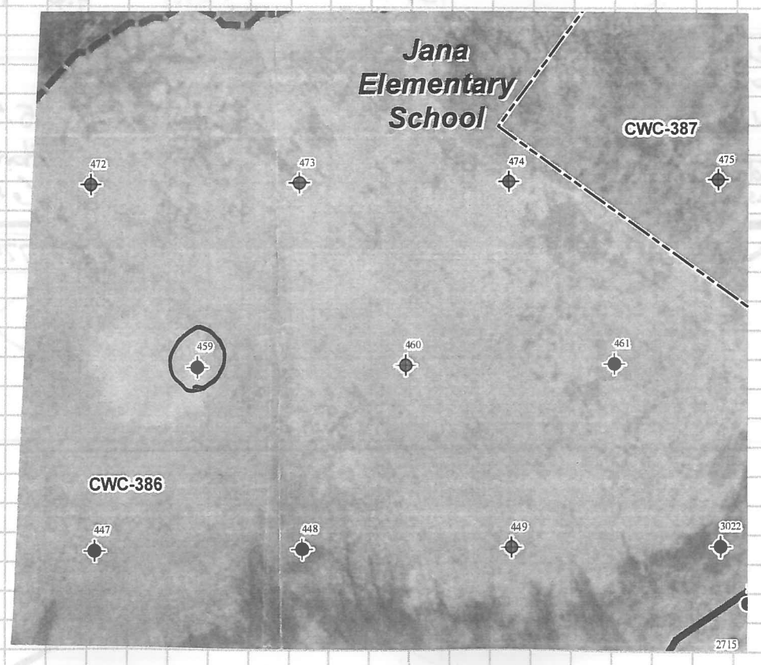
District: St. Louis USACE	Station ID: SVP19Ø181	
Company Name: Leidos	Drilling Subcontractor: Leidos	Logbook ID: FP- 775 — Sheet 1 of 2
Project: CWC: St. Ferdinand Park to Jana School	Location: 459	
Name of Driller: Roberts Drilling	Station coordinates: E: 872ØØ7.92 N: 1Ø85379.95	
Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve. MS 6/10/19 geoprobe	Surface Elevation: 493.95	
Coring Equipment? ☐ Yes ☒ No	Date Start: 6-4-19	Date Complete: 6-4-19
Jackhammer? ☐ Yes ☒ No		
Meter Information / Background — Meter Calibration Due	Depth Water Encountered: —	
44-9 F - 48 cpm 12 / 11 / 19	Other Water Measurement(s): —	
44-10 H - 8332 cpm 8 / 9 / 19	COC #: LEØ6Ø42Ø19-Ø4H	
Calibration information maintained by RPM.		

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	5	—	—	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	top soil	—	Ø-2ft	5.5-2ft	—

Additional Notes: 3ft recovered; 5ft recovered

Signature of Inspector: [signature]

Approx North — Scale: ☒Rough ☐Actual — Location/Sketch



Recorded By: [signature] 6.4.19 QA Check By: MSteiner 6-10-19

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 775	Station ID: SVP19Ø181	
Project: CWC: St. Ferdinand Park to Jana School	Inspector: Zach Matthews	Sheet 2 of 2 459

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	med brown silty clay, Coarse sand, plant debris, stiff, (CL)	45 / 8183	SVP19Ø181 Ø845	Ø.Ø'-Ø.5'	0.5'
		13Ø / 8157	—		
	Dark gray silty clay. Stiff, trace roots. (CL)	65 / 8592	SVP19Ø182 Ø849	1.Ø'-1.5'	1.0'
		52 / 8383	—		1.5'
		57 / 82Ø3	—		2.0'
		57 / 8262	—		2.5'
		58 / 8Ø63	—		3.0'
		72 / 8326	SVP211Ø1 Ø854	3.5'-4.Ø'	3.5'
		54 / 8218			4.0'
	med gray silty clay, trace black mottling, iron staining, stiff, trace roots (CL)	42 / 81Ø8	SVP211Ø2 Ø9Ø5	~~Nonfill horizon~~	4.5'
		55 / 85Ø2	SVP211Ø3 Ø9Ø7	Nonfill horizon	5.0'
	Terminate @ 5.5ft				5.5'
				bkgd: 48/8332 cpm	6.0'
				Soil	6.5
					7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

[initials] 6.4.19

Recorded By: [signature] 6.4.19 sign/date QA Check By: MSteiner 6-10-19 sign/date

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SVP190183

Company Name: Leidos | Drilling Subcontractor: Roberts | Logbook ID: FP- 778 | Sheet 1 of 3

Project: CWC St. Ferdinand Park to Jana School | Location: 460

Name of Driller: Roberts Drilling

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger, 3in ID or SS sediment sampler with plastic sleeve. geoprobe

Coring Equipment? ☐ Yes ☒ No

Jackhammer? ☐ Yes ☒ No

Station coordinates: E: 872124.27 N: 1085379.70

Surface Elevation: 497.23

Date Start: 6.4.19 | Date Complete: 6.4.19

Depth Water Encountered: —

Other Water Measurement(s): —

COC #: LEQG042019-Q3H

Meter Information / Background — Meter Calibration Due

44-9 F - 48 cpm — 12 / 11 / 19

44-10 H - 8332 cpm — 8 / 9 / 19

Calibration information maintained by RPM.

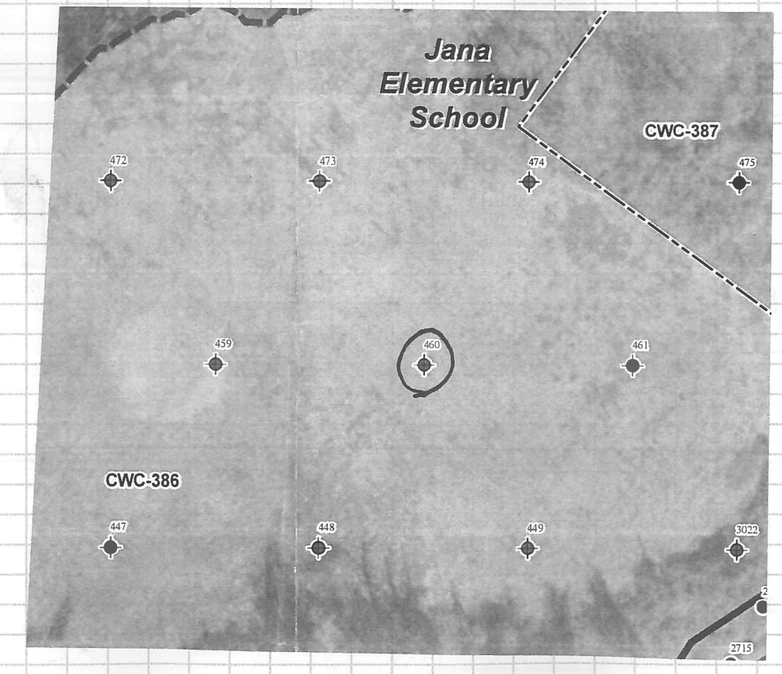
No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	6	1	1	—	—

Borehole Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	top soil	—	0-2ft	8-20ft	—

Additional Notes: full recovery

Signature of Inspector: Zach Matthews

Approx North | Scale: ☒Rough ☐Actual | Location/Sketch



Recorded By: Zmatthews 6.4.19 (Sign/Date)

QA Check By: MSteines 6-10-19 (Sign/Date)

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 778 | Station ID: SVP190183

Project: CWC St. Ferdinand Park to Jana School | Inspector: Zach Matthews | Sheet 2 of 3 460

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	med brown silt, clay. low plast. trace roots, (ML)	91 / 8157	SVP190183,-1,-2 1019	QA/QC 0.0'-0.5'	0.5'
		81 / 7942	—		1.0'
		77 / 8667	SVP190184 1022	1.0'-1.5'	1.5'
		98 / 8516	—		2.0'
		61 / 8437	—		2.5'
		48 / 8356	—		3.0'
		65 / 8179	—		3.5'
		74 / 8701	SVP190185 1033	3.5'-4.0'	4.0'
		72 / 8356	—		4.5'
	Dark brown silty clay, stiff, trace iron staining, trace roots (CL)	65 / 8223	—		5.0'
		65 / 8282	—		5.5'
		73 / 8532	SVP190186 1041	5.5'-6.0'	6.0'
		63 / 8454	SVP211111 1042	6.0'-6.5' blkgd: 48/8332	6.5'
		53 / 8350	—		7.0'
		51 / 8335	SVP211112 1046	Soil 7.0'-7.5'	7.5'
	med gray silty clay, trace black mottling, trace iron staining, low plast (CL)	59 / 8321	Archive 1047	Nonfill horizon 7.5'-8.0'	8.0'
	Terminate @ 8.0ft			blkgd: 48/8332 Grnd	8.5'
					9.0'
					9.5'
					10.0'

ZMatthews 6.4.19

Recorded By: ZMatthews 6.4.19 (sign/date)

QA Check By: MSteines 6-10-19 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE

Station ID: Sup19Ø187

Company Name: Leidos

Drilling Subcontractor: Leidos

Logbook ID: FP- 777

Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: #461

Name of Driller: Roberts Drilling

Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve. Geoprobe

E: 8722Ø.16 N: 1085379.78

Coring Equipment? ☐ Yes ☒ No

Surface Elevation: 496.93

Jackhammer? ☐ Yes ☒ No

Date Start: 6-4-19

Date Complete: 6-4-19

Meter Information / Background — Meter Calibration Due

44-9 F - 48 cpm — 12/11/19

44-10 H - 8332 cpm — 8/9/19

Calibration information maintained by RPM.

Depth Water Encountered: NA

Other Water Measurement(s): NA

COC #: LEØ6Ø42Ø19-Ø4H

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	Ø	1	Ø	Ø
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	Soil	Ø	Ø-2FT	2-5.5FT	Ø

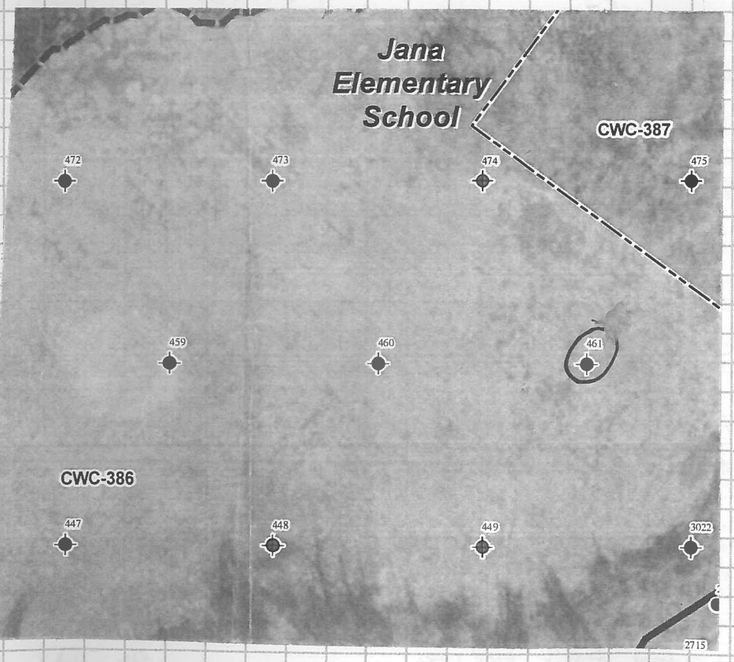
Additional Notes: NA

Signature of Inspector:

Approx North

Scale: ☒ Rough ☐ Actual

Location/Sketch



Recorded By: 6-4-19 QA Check By: MSteines 6.26.19

#461

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 777

Station ID: Sup19Ø187

Project: CWC: St. Ferdinand Park to Jana School

Inspector: Mike Miller

Sheet 2 of 2

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brn clayey silt some roots Trace Fine sand slight plasticity soft moist (CL)	69/8329	Sup19Ø187 1Ø55	Ø-Ø.5FT	0.5'
		57/8430	—		1.0'
		68/8439	—		1.5'
		58/8532	Sup19Ø188 1Ø56	1.5-2FT	2.0'
		69/8612	~~Sup19Ø188~~ Sup211113 11Ø2	2-2.5FT	2.5'
		59/8285	—		3.0'
		65/8444	—		3.5'
		55/8391	—		4.0'
		68/8263	—		4.5'
	Becomes Darker Brown with some grey banding	61/8062	Sup 211114 1105	4.5-5FT	5.0'
	Dark gray silty clay medium plasticity stiff moist (CH)	63/8258	Archive 1115	NON FILL 5-5.5FT	5.5'
	Terminated soil boring				6.0'
					6.5
					7.0'
					7.5'
				BKgrd 48/8332cpm	8.0'
					8.5'
					9.0'
					9.5'
					10.0'

Recorded By: 6-4-19 (sign/date) QA Check By: MSteines 6.26.19 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE		Station ID: SUP 19Φ221	
Company Name: Leidos	Drilling Subcontractor: Leidos	Logbook ID: FP- 777	Sheet 1 of 2
Project: CWC: St. Ferdinand Park to Jana School		Location: #472	
Name of Driller: Roberts Drilling		Station coordinates:	
Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve. Geoprobe		E: 871950.08 N: 1085480.95	
	Coring Equipment? ☐ Yes ☒ No	Surface Elevation: 497.15	
	Jackhammer? ☐ Yes ☒ No	Date Start: 6-4-19	Date Complete: 6-4-19
Meter Information / Background: #47	Meter Calibration Due: 2/12/20	Depth Water Encountered: NA	
44-9 F - 62 cpm	12/11/19	Other Water Measurement(s): NA	
44-10 A - 8725 cpm	8/9/19	COC #: LEΦ6Φ52Φ19-Φ14	
Calibration information maintained by RPM.			

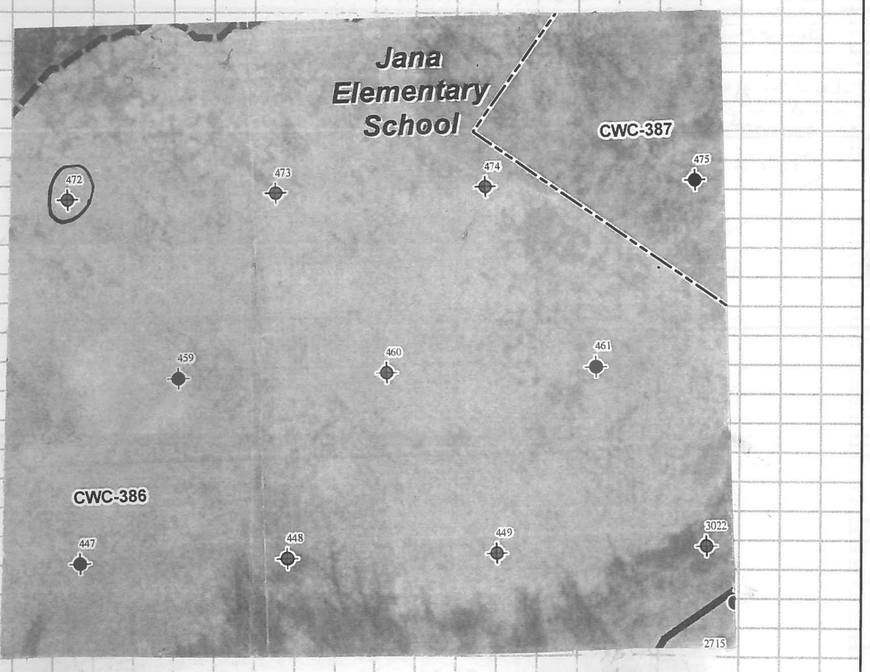
No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	Φ	1	Φ	Φ
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	Soil	Φ	Φ-2 FT	2-5.5 Ft	Φ

Additional Notes: NA

Signature of Inspector: Mike Miller

Approx North ↑ Scale: ☒ Rough ☐ Actual

Location/Sketch



Recorded By: Mike Miller 6-4-19 QA Check By: MSteiner 6.26.19

#472

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 777 | Station ID: SUP 19Φ221

Project: CWC: St. Ferdinand Park to Jana School | Inspector: Mike Miller | Sheet 2 of 2

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown Clayey Silt some roots slight Plasticity soft mo. ST (CH)	71/8748	SUP 19Φ221 1435	Φ-Φ.5 FT	0.5'
		58/8854	SUP19Φ222 1436	Φ.5-1FT	1.0'
		44/8839	—		1.5'
		53/8726	—		2.0'
		57/8372	—		2.5'
		46/8569	—		3.0'
		66/8660	—		3.5'
	Dark Brown Clayey Silt slight plasticity medium Stiff moist (CH)	62/8727	SUP 211118 1440	3.5-4.ΦFT	4.0'
		44/8516	—		4.5'
		66/8531	SUP 211119 1444	4.5-5 FT	5.0'
	Dark gray Silty clay medium Stiff medium Plasticity moist (CH)	49/8721	Archive 1446	Non Fill 5-5.5FT	5.5'
	Terminated Soil Boring				6.0'
					6.5'
					7.0'
					7.5'
				Bkgd 47/8725 cpm	8.0'
					8.5'
					9.0'
					9.5'
					10.0'

Recorded By: Mike Miller 6-4-19 (sign/date) QA Check By: MSteiner 6.26.19 (sign/date)

HTRW DRILLING LOG	District: St. Louis USACE	Station ID: SVP190223	
Company Name: Leidos	Drilling Subcontractor: Roberts	Logbook ID: FP- 778	Sheet 1 of 3

Project: CWC St. Ferdinand Park to Jana School	Location: 473
Name of Driller: Roberts Drilling	Station coordinates: E: 872066.18 N: 108548.0.77
Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve. geoprobe	Surface Elevation: 497.11
Coring Equipment? ☐ Yes ☒ No	Date Start: 6.4.19 Date Complete: 6.4.19
Jackhammer? ☐ Yes ☒ No	
Meter Information / Background: 44-9 ~~FM47~~ 6.23 cpm 6.4.19 ~~12.2.11.12~~ 12.20 6.4.19; 44-10 H - 8725 cpm 8 / 9 / 19	Depth Water Encountered: — Other Water Measurement(s): — COC #: LE06052019-01H
Calibration information maintained by RPM.	

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	5	—	1	—	—

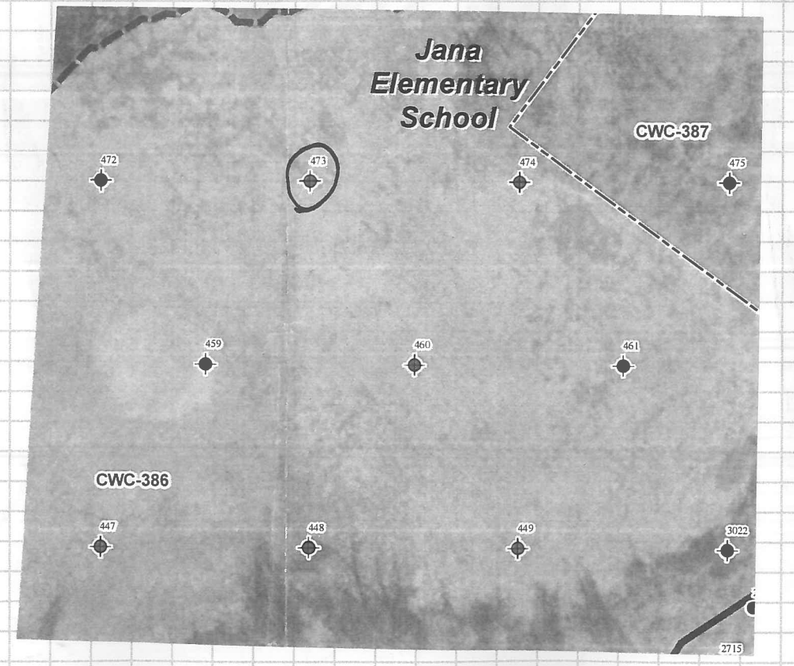
Borehole Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	top soil	—	0-2ft	6-2ft	—

Additional Notes: 44-9F meter broken; switched with M

Signature of Inspector: [signature]

Approx North ↑ Scale: ☒Rough ☐Actual

Location/Sketch



Recorded By: [signature] 6.4.19 Sign/Date

QA Check By: MSteines 6-10-19 Sign/Date

HTRW DRILLING LOG (Continuation Sheet)	Logbook ID: FP- 778	Station ID: SVP190223
Project: CWC St. Ferdinand Park to Jana School	Inspector: Zach Matthews	Sheet 2 of 3 473

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 ~~FM~~ 6.4.19 Nal	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	med brown clay silt, plant debris, low plast, trace iron staining, trace roots (ML)	46 228/8942	SVP190223 1330	0.0'-0.5'	0.5'
		41 179/9060	SVP190224 1335	0.5'-1.0'	1.0'
		63 261/9005	~~SVP190224 1335~~	~~1.0-1.5~~ ~~*sampled beta~~ 6.4.19	1.5'
		58 106/8858	—		2.0'
		60/8826	SVP190225 1411	2.0'-2.5'	2.5'
		54/8723	—		3.0'
		53/8374	—		3.5'
		35/8478	—		4.0'
		62/8728	SVP211117 1414	4.0'-4.5'	4.5'
	Dark gray silty clay, stiff, trace roots (CL)	70/8660	Archive 1417	Non fill horizon 4.5'-5.0'	5.0'
		55/8484	—		5.5'
		69/8996	SVP190226 1418	5.5'-6.0'	6.0'
	Terminate @ 6.0ft			47 cpm ~~62~~/8725 cpm bkgd 6.4.19 cpm Soil	6.5'

[signature] 6.4.19

Recorded By: [signature] 6.4.19 sign/date

QA Check By: MSteines 6-10-19 sign/date

HTRW DRILLING LOG

District: St. Louis USACE	Station ID: SVP190227	
Company Name: Leidos	Drilling Subcontractor: Leidos	Logbook ID: FP-777 Sheet 1 of 2
Project: CWC: St. Ferdinand Park to Jana School	Location: #474	
Name of Driller: Roberts Drilling	Station coordinates: E: 872182.09 N: 1085480.84	
Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve. Geoprobe	Surface Elevation: 497.31	
Coring Equipment? ☐ Yes ☒ No	Date Start: 6-4-19	Date Complete: 6-4-19
Jackhammer? ☐ Yes ☒ No		
Meter Information / Background: 44-9 F - 62 cpm; 44-10 A - 8725 cpm	Meter Calibration Due: 12/11/19; 8/9/19	Depth Water Encountered: NA
Calibration information maintained by RPM.		Other Water Measurement(s): NA
		COC #: LE06052019-01H

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	0	1	0	0

Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	Soil	0	0-2 FT	2-5.5 FT	0

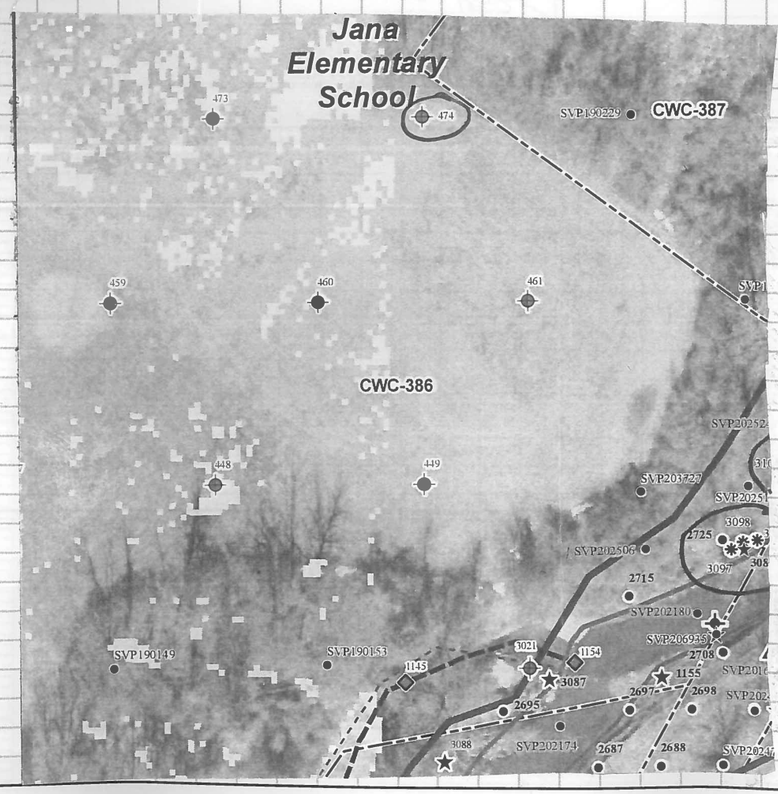
Additional Notes: NA.

Signature of Inspector: [signature]

Approx North

Scale: ☒ Rough ☐ Actual

Location/Sketch



Recorded By: [signature] 6-4-19 QA Check By: MSteines 6.26.19

#474

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP-777	Station ID: SVP190227	
Project: CWC: St. Ferdinand Park to Jana School	Inspector: Mike Miller	Sheet 2 of 2

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown Clayey Silt some roots slight plasticity soft Dry (ML)	74 / 8954	SVP190227 1245	0-0.5 FT	0.5'
	Becomes moist	78 / 8858	—		1.0'
		63 / 9109	SVP190228 1250	1-1.5 FT	1.5'
		60 / 8986	—		2.0'
		72 / 8830	—		2.5'
		52 / 8747	—		3.0'
		58 / 9089	SVP211115 1300	3-3.5 FT	3.5'
		90 / 9018	—		4.0'
		56 / 8811	—		4.5'
	Becomes Dark Brown with some Dark gray Banding	62 / 8814	SVP211116 1310	4.5-5 FT	5.0'
	Dark gray silty clay medium plasticity stiff moist (CL)	66 / 8688	Archive 1315	now fill 5-5.5 FT	5.5'
	Terminated soil boring				6.0'
					6.5
					7.0'
					7.5'
					8.0'
				Bkgrd 62/8725 cpm	8.5'
					9.0'
					9.5'
					10.0'

Recorded By: [signature] 6-4-19 sign/date QA Check By: MSteines 6.26.19 sign/date

HTRW DRILLING LOG

District: St. Louis USACE

Station ID: SVP19Φ247

Company Name: Leidos

Drilling Subcontractor: Leidos

Logbook ID: FP- 743

Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: #496

Name of Driller: Hailey Weber / Sage Pope

Station coordinates: B7229864 1085683.37

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

E: 1085683.37 N: 1085683.37

Surface Elevation: 495.9Φ

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☑ No

Date Start: 8-16-18

Date Complete: 8-16-18

Meter Information / Background — Meter Calibration Due

44-9 F - 4Φ cpm 7/26/19

44-10 S - 9835 cpm 6/22/19

Calibration information maintained by RPM.

Depth Water Encountered: N/A

Other Water Measurement(s): N/A

COC #: LE4B162Φ18-Φ4H

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	2	Φ	1	—	—
Disposition (depth and type of material used for backfill):	**Cover Material**	**Gravel**	**Soil**	**Bentonite**	**Other**
	—	—	Collapse Hole	—	—

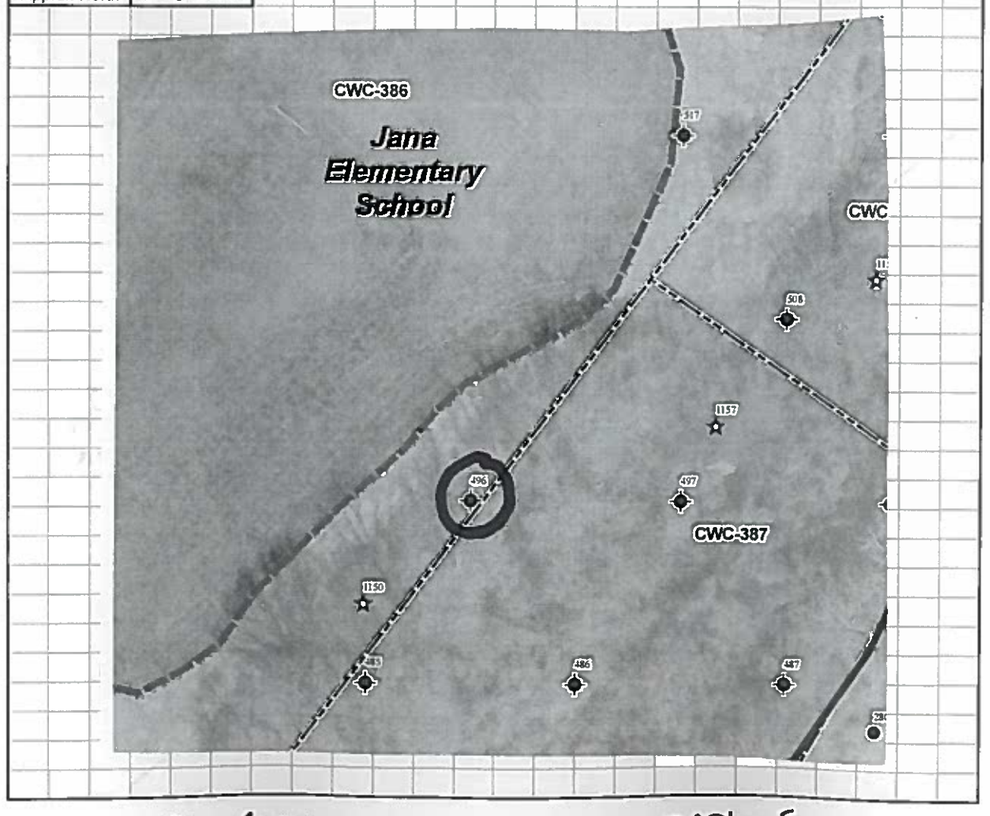
Additional Notes: NA

Signature of Inspector: David W. Guyan

Approx North

Scale: ☑ Rough ☐ Actual

Location/Sketch



Recorded By: David W. Guyan 8-16-18 QA Check By: MSteiner 8-29-18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 743

Station ID: SVP19Φ247

Project: CWC: St. Ferdinand Park to Jana School

Inspector: D. Guyan

Sheet 2 of 2 # 496

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID if applicable)	Actual Depth (ft bgs)
	Brown silt, roots (ML) dry	B2 / 4769	SVP19Φ247 ΦB3Φ	0-0.5 ft	0.5'
		7Φ / 10063			1.0'
	Brown dark gray silt, (ML) dry	8Φ / 1Φ143	SVP19Φ248 ΦB43	1.Φ-1.5 ft	1.5'
		64 / 9952	ARCHIVE ΦB47	1.5-2.0 ft	2.0'
	Terminate boring @ 2.0 ft bgs				2.5'
					3.0'
					3.5'
					4.0'
					4.5'
					5.0'
					5.5'
					6.0'
					6.5
					7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

Soil

Background: 44/9835 cpm

DWG

8-16-18

Recorded By: David W. Guyan 8-16-18 (sign/date) QA Check By: MSteiner 8-29-18 (sign/date)

HTRW DRILLING LOG	District: St. Louis USACE	Station ID: SVP190~~255~~ 63 6.4.19	
Company Name: Leidos	Drilling Subcontractor: Roberts	Logbook ID: FP- 778	Sheet 1 of 3
Project: CWC St. Ferdinand Park to Jana School		Location: 517	
Name of Driller: Roberts Drilling		Station coordinates:	
Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment)	Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve. geoprobe	E: 872414.14	N: 1085884.98
		Surface Elevation: 494.78	
	Coring Equipment? ☐ Yes ☑ No	Date Start: 6.4.19	Date Complete: 6.4.19
	Jackhammer? ☐ Yes ☑ No		
Meter Information / Background	Meter Calibration Due	Depth Water Encountered: —	
44-9 M - 47 cpm	2 / 12 / 20	Other Water Measurement(s): —	
44-10 H - 8725 cpm	8 / 9 / 19	COC #: LE06052019-01H	
Calibration information maintained by RPM.			

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	3	—	1	—	—
Borehole Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	top soil	—	0-2ft	4-2ft	—

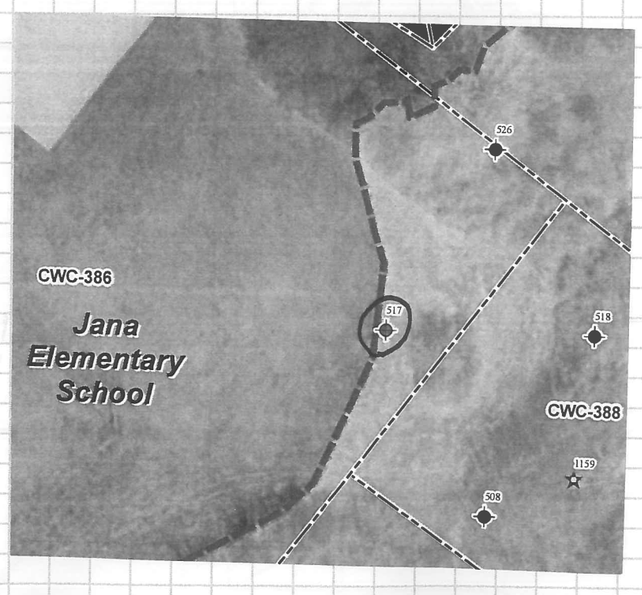
Additional Notes: full recovery

Signature of Inspector: [signature]

Approx North

Scale: ☑Rough ☐Actual

Location/Sketch



Recorded By: [signature] 6.4.19 Sign/Date

QA Check By: MSterner 6.10.19 Sign/Date

HTRW DRILLING LOG (Continuation Sheet)	Logbook ID: FP- 778	Station ID: SVP190~~255~~ 263
Project: CWC St. Ferdinand Park to Jana School	Inspector: Zach Matthews	Sheet 2 of 3 517 6.4.19

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Med. brown silty clay. Stiff, trace fine sand. plant debris, roots. (CL)	59 / 8664	~~SVP190255~~ 1502 ~~0302~~ 6.4.19	SVP190263 0.0'-0.5'	0.5'
		52 / 8666	—		1.0'
		64 / 8814	—		1.5'
		71 / 8889	SVP190264 1510	1.5'-2.0'	2.0'
		49 / 8663	—		2.5'
		60 / 8815			3.0'
		69 / 8967	SVP211120 1515	3.0'-3.5'	3.5'
	med gray clay silt, med brown mottling, iron staining, trace roots (ML)	47 / 8445	Archive 1516	Non fill horizon 3.5'-4.0'	4.0'
	Terminate boring @ 4.0ft				4.5'
					5.0'
					5.5'
				blkgd: 47/8725cpm	6.0'
				Soil	6.5
					7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

[signature] 6.4.19

Recorded By: [signature] 6.4.19 sign/date

QA Check By: MSterner 6.10.19 sign/date

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SvP19Ø267

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP-743 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: #526

Name of Driller: Agdonis Martinez | Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID ~~or SS sediment sampler with plastic sleeve.~~ DCM 8-21-18

Coring Equipment? ☐ Yes ☒ No

Jackhammer? ☐ Yes ☑ No

E: 872469.76 N: 1085988.04

Surface Elevation: 503.19

Date Start: 8-21-18 | Date Complete: 8-21-18

Depth Water Encountered: NA

Other Water Measurement(s): NA

COC #: LEØ8212Ø18-ØØ1H

Meter Information / Background | Meter Calibration Due

44-9 B - 41 cpm | 12/13/18

44-10 F - 9Ø69 cpm | 6/17/19

Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	4	1	1	Ø	Ø
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	Soil	Ø	Ø-2FT	2-6FT	Ø

Additional Notes: 2FT location converted to 6FT location.

Signature of Inspector: Mike Miller

Approx North | Scale: ☒ Rough ☐ Actual | Location/Sketch



Recorded By: Mike Miller 8-21-18 QA Check By: MSteinin 8-29-18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP-743 | Station ID: SvP19Ø267

Project: CWC: St. Ferdinand Park to Jana School | Inspector: Mike Miller | Sheet 2 of 2

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown Silt soft moist (ML)	57 / 9225	SvP19Ø267 935	Ø-Ø.5Ft +QC	0.5'
	Brown grey Silt soft Dry (ML)	73 / 9386	—		1.0'
		59 / 9Ø92	—		1.5'
		63 / 9401	SvP19Ø268 945	1.5-2.ØFt	2.0'
		63 / 9169	—		2.5'
		62 / 9401	—		3.0'
		65 / 9257	—		3.5'
		59 / 9466	SvP2Ø5289 952	3.5-4.ØFt	4.0'
		53 / 9162	—		4.5'
		66 / 9334	SvP2Ø5296 957	4.5-5.ØFt	5.0'
		6Ø / 9125	—		5.5'
		66 / 9154	Archive 1ØØØ	5.5-6.ØFT	6.0'
	Terminated Soil boring				6.5'
					7.0'
					7.5'
			DCM 8-21-18	50:1 Bkgrd 41/9Ø69 cpm	8.0'
					8.5'
					9.0'
					9.5'
					10.0'

Recorded By: Mike Miller 8-21-18 (sign/date) QA Check By: MSteinin 8-29-18 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE

Station ID: SVP19Φ3Φ9

Company Name: Leidos

Drilling Subcontractor: Leidos

Logbook ID: FP- 748

Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: # 11Φ1

Name of Driller: A. Martinez / M. Yakos

Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

E: 871391.99 N: 1Φ85225.ΦΦ

Surface Elevation: 477.31

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☑ No

Date Start: 1Φ-15-18

Date Complete: 1Φ-15-18

Meter Information / Background — Meter Calibration Due

Depth Water Encountered: N/A

Other Water Measurement(s): N/A

44-9 F - 36 cpm 7 / 26 / 19

44-10 H - 782Φ cpm B / 9 / 19

COC #: LE1Φ162Φ18-Φ1H

Calibration information maintained by RPM.

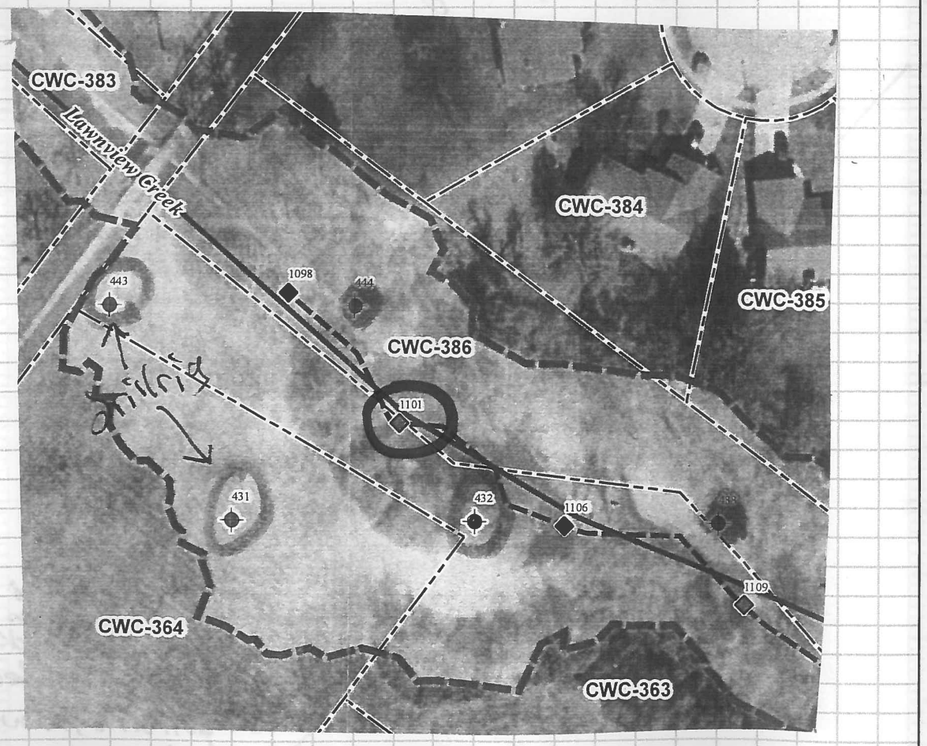
No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	2	Ø	Ø	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	Collapse Hole	—	—

Additional Notes: - Sediment
- 28" Water Depth

Signature of Inspector: David W. Guyan

Approx North ⇧ Scale: ☑ Rough ☐ Actual

Location/Sketch



Recorded By: David W. Guyan 10-15-18 QA Check By: MSteiner 10.22.18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 748

Station ID: SVP19Φ3Φ9

Project: CWC: St. Ferdinand Park to Jana School

Inspector: D. Guyan

Sheet 2 of 2 — # 11Φ1

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 Nal	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Med gray Clayey Silt tr. brown mottling, moist	56 / 834Φ	SVP19Φ3Φ4 1359	Φ-Φ.5 ft	0
		53 / 7889			0.5'
		53 / 7963			1.0'
	- soft	59 / 8128	SVP19Φ31Φ 14Φ4	1.5-2.Φ ft	1.5'
	Terminate boring @ 2Φ ft bgs				2.0'
					2.5'
					3.0'
					3.5'
					4.0'
					4.5'
					5.0'
					5.5'
					6.0'
	DWG				6.5
	10-15-18			Sediment 28" Water Depth Bkgrd: 36 / 782Φ cpm	7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

Recorded By: David W. Guyan 10-15-18 (sign/date) QA Check By: MSteiner 10.22.18 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SVP 19Ø337

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP-748 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: #1115 (Biased Tributary)

Name of Driller: Zach Matthews / Tom Mack | Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

Coring Equipment? ☐ Yes ☒ No

Jackhammer? ☐ Yes ☒ No

E: 871888.42 N: 1085126.51

Surface Elevation: 474.48 @ 11-12-18

Date Start: 10-11-18 | Date Complete: 10-11-18

Depth Water Encountered: N/A

Other Water Measurement(s): N/A

Meter Information / Background | Meter Calibration Due

44-9 B - 39 cpm | 12/13/18

44-10 F - 8752 cpm | 6/7/19

Calibration information maintained by RPM.

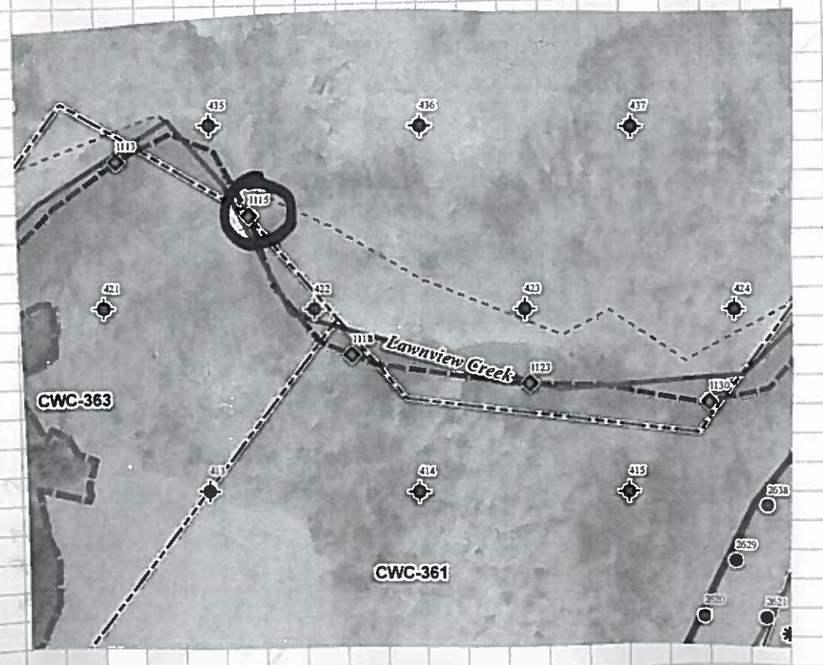
COC #: LE1Ø112Ø18-Ø2H

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	3	Ø	Ø	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	Collapse Hole	—	—

Additional Notes: - Sediment = 1.Ø ft Water Depth

Signature of Inspector: David W Guyan

Approx North | Scale: ☒Rough ☐Actual | Location/Sketch



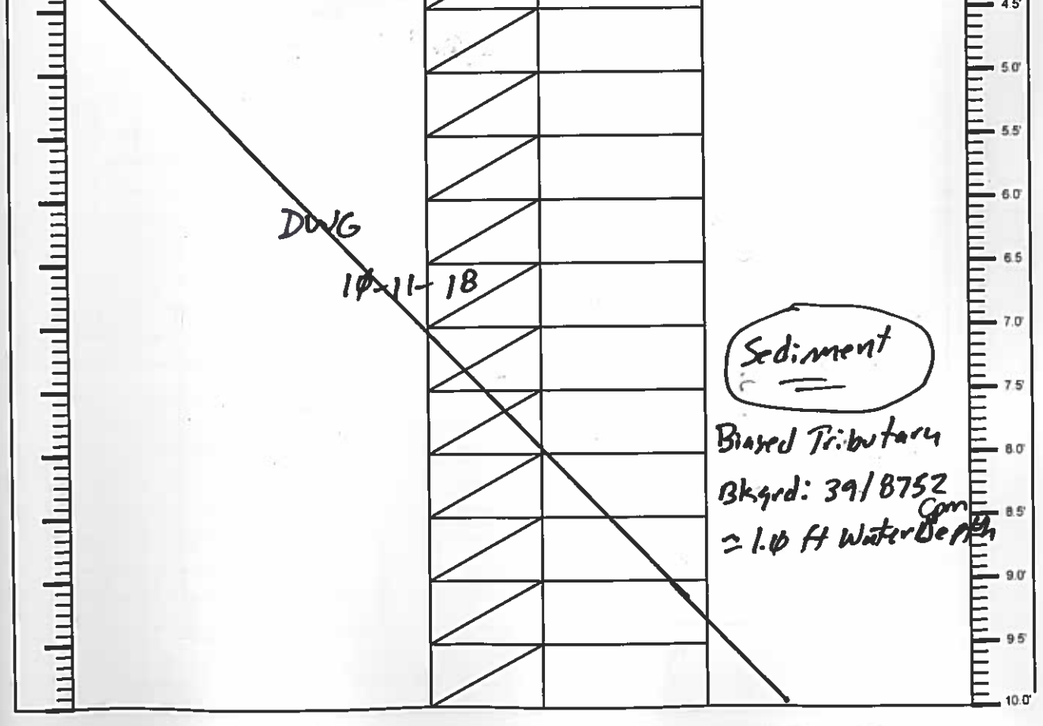
Recorded By: David W Guyan 10-11-18 | QA Check By: MStevens 10-22-18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP-748 | Station ID: SVP19Ø337

Project: CWC: St. Ferdinand Park to Jana School | Inspector: D. Guyan | Sheet 2 of 2 #1115

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Black & brown gravel, some sand, little silt, tr glass, tr sticks + leaves, wet (GM)	42 / 9301	SVP19Ø337 Ø859	Ø-@ 5 ft	
	-incr. silt + sand	63 / 9119			
		46 / 10874	SVP19Ø33B Ø9Ø8	1.Ø-1.5 ft	
		45 / 10479	SVP2Ø699B Ø912	1.5-2.Ø ft	
	Terminate boring @ 2.Ø ft below creek bed				



Recorded By: David W Guyan 10-11-18 (sign/date) | QA Check By: MStevens 10-22-18 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE		Station ID: SVP19Ø353	
Company Name: Leidos	Drilling Subcontractor: Leidos	Logbook ID: FP- 748	Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: #1123 (Biased Tributary)

Name of Driller: Zach Mathews / Tori Mack

Station coordinates: E: 871452.44 N: 1Ø85Ø34.7Ø

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☑ No

Surface Elevation: 478.Ø4

Date Start: 1Ø-11-18 Date Complete: 1Ø-11-18

Depth Water Encountered: N/A

Other Water Measurement(s): N/A

COC #: LE1Ø112Ø18-Ø2H

Meter Information / Background — Meter Calibration Due

44-9 B- 39 cpm — 12 / 13 / 18

44-10 F- 8752 cpm — 6 / 7 / 19

Calibration information maintained by RPM.

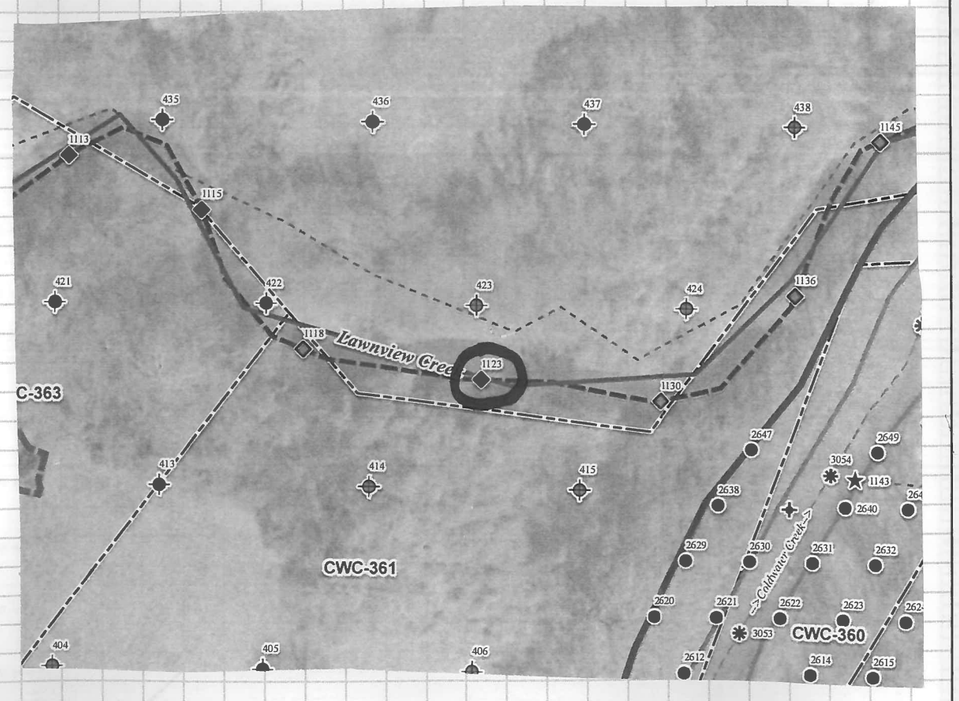
No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	2	Ø	1	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	Collapse Hole	—	—

Additional Notes: - Sediment
- 1 ft Water Depth

Signature of Inspector: David W Geyer

Approx North ↑ Scale: ☑ Rough ☐ Actual

Location/Sketch



Recorded By: David W Geyer 10-11-18 QA Check By: MStevens 10-22-18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 748 Station ID: SVP19Ø353

Project: CWC: St. Ferdinand Park to Jana School Inspector: D. Guyan Sheet 2 of 2 #1123

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Med gray clayey silt w/ brown mottling, tr shells (ML) wet, very soft	72 / 948Ø	SVP19Ø353 Ø957	Ø-Ø.5 ft	
		63 / 9241			0.5'
	- fr. gravel	46 / 9319	SVP19Ø354 1ØØ1	1.Ø-1.5 ft	1.0'
	incr. brown mottling	66 / 9266	ARCHIVE 1ØØ4	1.5-2.Ø ft	1.5'
	Terminate boring @ 2Ø ft below creek bed				2.0'
					2.5'
					3.0'
					3.5'
					4.0'
					4.5'
					5.0'
					5.5'
					6.0'
					6.5
					7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

DUG 10-11-18

Sediment

Biased Tributary

1 ft Water Depth

Bkgrd: 39/8752 cpm

Recorded By: David W Geyer 10-11-18 (sign/date) QA Check By: MStevens 10-22-18 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE

Station ID: SVP19Φ365

Company Name: Leidos

Drilling Subcontractor: Leidos

Logbook ID: FP- 748

Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: #113Φ (Biased Tributary)

Name of Driller: Zach Mathews / Tori Mack

Station coordinates: QB 9-16-2020 E: 872054.21 N: 1085024.46 ~~26~~

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

Coring Equipment? ☐ Yes ☒ No

Jackhammer? ☐ Yes ☒ No

Surface Elevation: ~~474.52~~ 474.69 QB 11-12-18

Date Start: 10-11-18

Date Complete: 10-11-18

Meter Information / Background — Meter Calibration Due

44-9 B - 39 cpm — 12/13/18

44-10 F - 8752 cpm — 6/7/19

Calibration information maintained by RPM.

Depth Water Encountered: N/A

Other Water Measurement(s): N/A

COC #: LE1Φ112Φ18-Φ2H

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	2	Ø	1	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	Collapse Hole	—	—

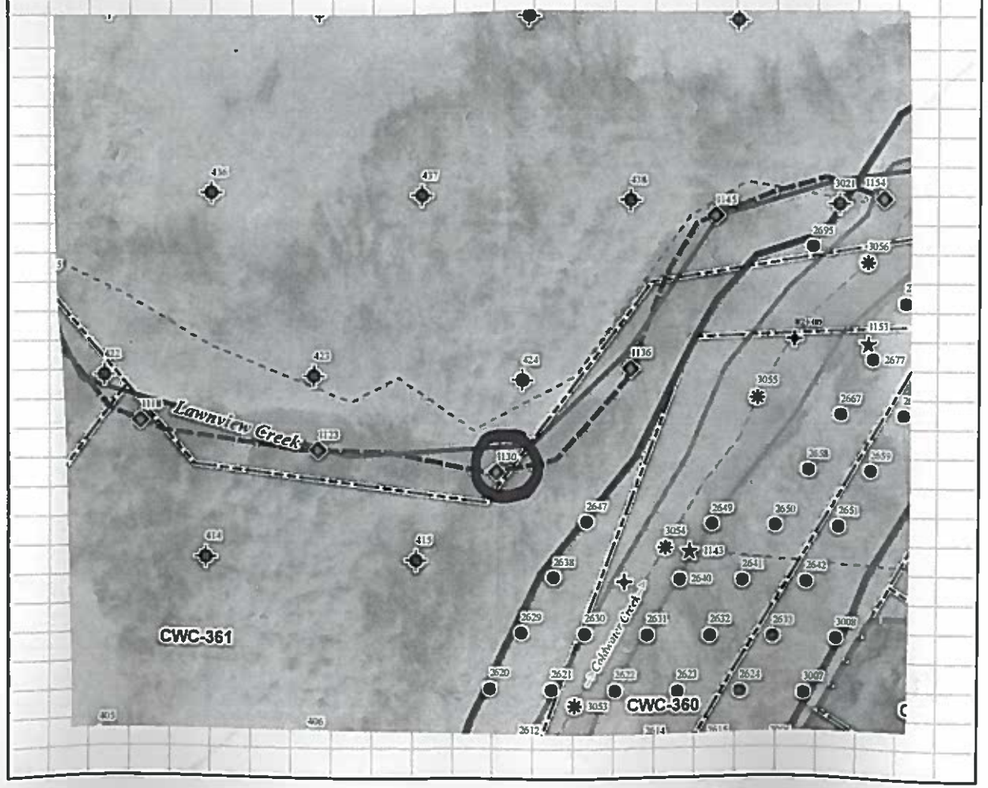
Additional Notes: - Sediment
- 2.5 ft Water Depth

Signature of Inspector: David W. Guyan

Approx North

Scale: ☒ Rough ☐ Actual

Location/Sketch



Recorded By: David W. Guyan 10-11-18

QA Check By: MSteines 10.22.18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 748

Station ID: SVP19Φ365

Project: CWC: St. Ferdinand Park to Jana School

Inspector: D. Guyan

Sheet 2 of 2 #113Φ

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID if applicable)	Actual Depth (ft bgs)
	Dark gray clayey silt, little large gravel, wet (ML) very soft	56 / 8859	SVP19Φ365 1Φ22	Φ-Φ.5 ft	
		64 / 9195	SVP19Φ366 1Φ28	Φ.5-1.Φ ft	
		65 / 8850			
	- Add brown mottling	66 / 8971	ARCHIVE 1Φ32	1.5-2.Φ ft	
	Terminate boring @ 2.Φ ft below creek bed				
	DWG 10-11-18			Sediment Biased Tributary 2.5 ft water depth Bkgrd: 39/8752 cpm	

Recorded By: David W. Guyan 10-11-18 (sign/date)

QA Check By: MSteines 10.22.18 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SVP2Φ166Φ

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP- 743 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: #115Φ (Biased Low Lying Area)

Name of Driller: Zach Mathews / Tori Mack | Station coordinates:

E: 872236.9Φ N: 1ΦΒ5625.Φ6

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

Coring Equipment? ☐ Yes ☒ No | Jackhammer? ☐ Yes ☒ No

Surface Elevation: 496.ΦΦ

Date Start: 8-8-18 | Date Complete: 8-8-18

Depth Water Encountered: N/A

Other Water Measurement(s): N/A

COC #: LEΦ8Φ92Φ18-Φ1H

Meter Information / Background | Meter Calibration Due

44-9 E - 41 cpm | 4 / 3 / 19

44-10 F - 9ΦΦ5 cpm | 6 / 7 / 19

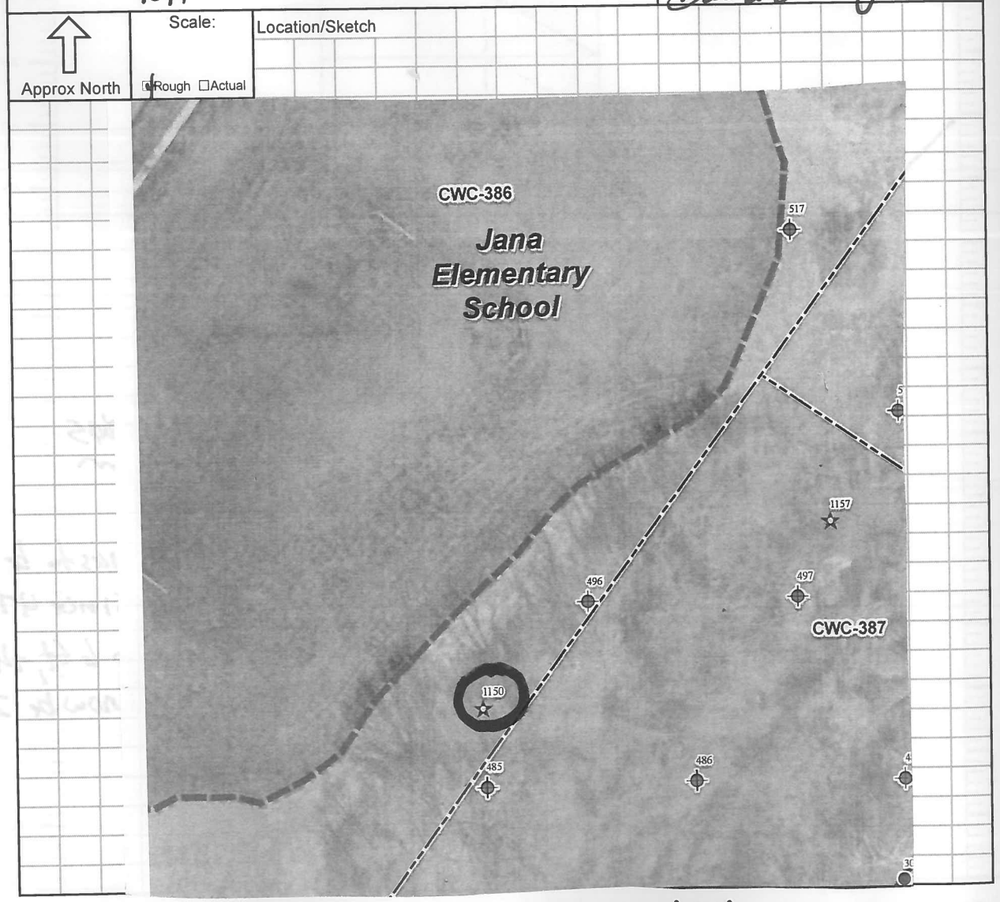
Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	2	Ø	1	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	Collapse Hole	—	—

Additional Notes: NA

Signature of Inspector: David W. Guyan

Approx North | Scale: ☒ Rough ☐ Actual | Location/Sketch



Recorded By: David W. Guyan 8-8-18 QA Check By: MSteines 8-14-18

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 743 | Station ID: SVP2Φ166Φ

Project: CWC: St. Ferdinand Park to Jana School | Inspector: D. Guyan | Sheet 2 of 2 #115Φ

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown silt, tr. fine sand, roots, dry (ML)	56 / 9737	SVP2Φ166Φ 1421	Φ-Φ.5 ft	
		62 / 9216	SVP2Φ1661 1426	Φ.5-1.Φ ft	
		59 / 9Φ86			
		68 / 8994	ARCHIVE 1431	1.5-2.Φ ft	
	Terminate boring @ 2.Φ ft bgs				

0.5' 1.0' 1.5' 2.0' 2.5' 3.0' 3.5' 4.0' 4.5' 5.0' 5.5' 6.0' 6.5 7.0' 7.5' 8.0' 8.5' 9.0' 9.5' 10.0'

DW6
8-8-18
SOIL
Background: 41 / 9Φ95 cpm
Biased Low Lying Area

Recorded By: David W. Guyan 8-8-18 sign/date

QA Check By: MSteines 8-14-18 sign/date

HTRW DRILLING LOG

District: St. Louis USACE

Station ID: SVP2Φ7127

Company Name: Leidos

Drilling Subcontractor: Leidos

Logbook ID: FP- 777

Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: #1525 (Biased Hist. Drainage)

Name of Driller: H.Weber / M.Plummer

Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

E: 872Φ22.36 N: 10B5Φ71.78

Surface Elevation: 447.81

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☑ No

Date Start: 6-11-19

Date Complete: 6-11-19

Meter Information / Background — Meter Calibration Due

Depth Water Encountered: N/A

44-9 M - 46 cpm — 2/12/2Φ

Other Water Measurement(s): N/A

44-10 G - 7825 cpm — 11/1/19

COC #: LEΦ6122Φ19-Φ2H

Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	3	1	2	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	2'- Surface	3'- 2'	—

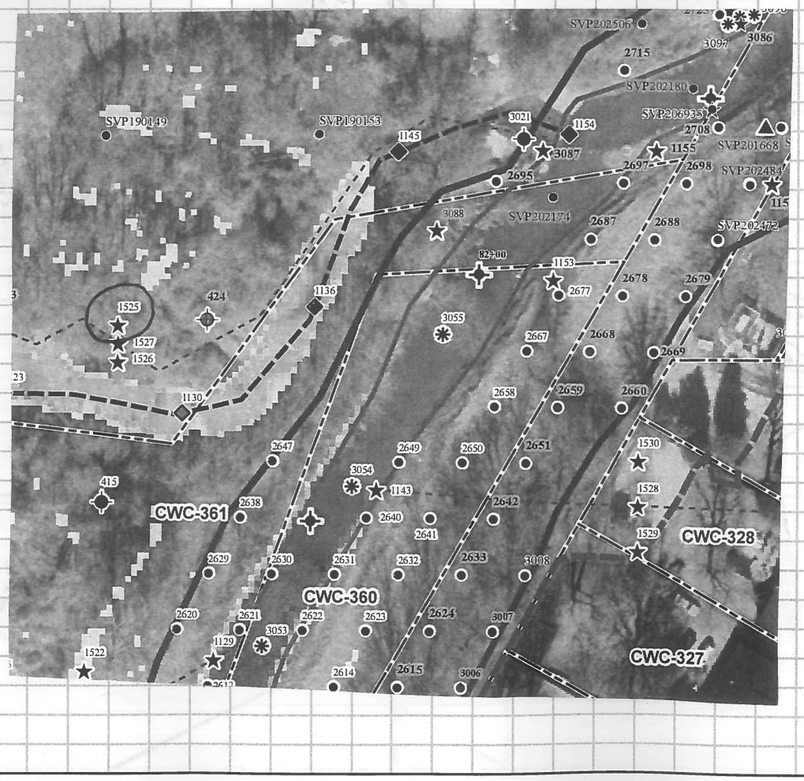
Additional Notes: NA

Signature of Inspector: David W. Geyer

Approx North

Scale: ☑Rough ☐Actual

Location/Sketch



Recorded By: David W. Geyer 6-11-19 QA Check By: MSteiner 6.26.19

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 777

Station ID: SVP2Φ7127

Project: CWC: St. Ferdinand Park to Jana School

Inspector: D. Geyer

Sheet 2 of 2 #1525

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown silt, little sand, roots, sl. moist (ML)	65 / 7884	SVP2Φ7127 Φ9ΦΦ	Φ-0.5 ft #QA/QC	0.5'
		54 / 7649	ARCHIVE Φ91Φ	Φ.5-1.Φ ft	1.0'
		49 / 7949	SVP2Φ7128 Φ914	1.Φ-1.5 ft	1.5'
		57 / 7808			2.0'
		68 / 8089	SVP211141 Φ917	2.Φ-2.5 ft	2.5'
		59 / 7968	ARCHIVE Φ921	2.5-3.Φ ft	3.0'
	Terminate boring @ 3.Φ ft bgs				3.5'
					4.0'
					4.5'
					5.0'
					5.5'
					6.0'
					6.5'
					7.0'
					7.5'
					8.0'
					8.5'
					9.0'
					9.5'
					10.0'

Native Soil @ surface

SOIC

Bkgd: 46/7825 cpm

DWG 6-11-19

Recorded By: David W. Geyer 6-11-19 (sign/date)

QA Check By: MSteiner 6.26.19 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE

Station ID: SVP2Φ7129

Company Name: Leidos

Drilling Subcontractor: Leidos

Logbook ID: FP- 777

Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School

Location: #1526

Name of Driller: M. Plummer / H. Weber

Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

E: 872Φ29.1Φ N: 1ΦΒ5Φ57.37

Coring Equipment? ☐ Yes ☒ No

Surface Elevation: 488.Φ7

Jackhammer? ☐ Yes ☒ No

Date Start: 6-11-19

Date Complete: 6-11-19

Meter Information / Background — Meter Calibration Due

Depth Water Encountered: N/A

44-9 M - 46 cpm — 2/12/2Φ

Other Water Measurement(s): N/A

44-10 6 - 7825 cpm — 11/1/19

COC #: LEΦ6122Φ19-Φ2H

Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	3	Ø	1	—	—
Disposition (depth and type of material used for backfill):	**Cover Material**	**Gravel**	**Soil**	**Bentonite**	**Other**
	—	—	2'-Surface	5'-2'	—

Additional Notes: NA

Signature of Inspector: David W. Guyan

Approx North

Scale: ☒ Rough ☐ Actual

Location/Sketch



Recorded By: David W. Guyan 6-11-19 QA Check By: MSteiner 6.26.19

HTRW DRILLING LOG (Continuation Sheet) — Logbook ID: FP- 777 — Station ID: SVP2Φ7129

Project: CWC: St. Ferdinand Park to Jana School — Inspector: D. Guyan — Sheet 2 of 2 #1526

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Gray-brown silt, tr. fine sand, roots, sl. moist (ML)	58 / 7799	SVP2Φ7129 1Φ17	Φ-Φ.5 ft	0.5'
		66 / 7776			1.0'
		72 / 7783			1.5'
	Dark gray silty clay sl. moist, med. stiff (CL)	55 / 7833	SVP2Φ713Φ 1Φ26	1.5-2Φ ft	2.0'
		51 / BΦ56	SVP211142 1Φ34	2.Φ- 2.5ft	2.5'
		57 / 7767			3.0'
		55 / 7796			3.5'
		5Φ / 7917			4.0'
		63 / 78ΨΦ			4.5'
		65 / 7826	ARCHIVE 164Φ	4.5-5.Φ ft	5.0'
	Terminate boring @ 5.Φ ft bgs				5.5'
					6.0'
					6.5
					7.0'
				Soil Bkgnd: 46/7825 cpm	7.5'
					8.0'
	DWG		6-11-19		8.5'
					9.0'
					9.5'
					10.0'

Recorded By: David W. Guyan 6-11-19 (sign/date) QA Check By: MSteiner 6.26.19 (sign/date)

HTRW DRILLING LOG

District: St. Louis USACE | Station ID: SVP2Φ7131

Company Name: Leidos | Drilling Subcontractor: Leidos | Logbook ID: FP- 777 | Sheet 1 of 2

Project: CWC: St. Ferdinand Park to Jana School | Location: #1527

Name of Driller: M. Plummer / H. Weber | Station coordinates:

Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.

E: 872Φ26.27 N: 1Φ85Φ63.54

Surface Elevation: 493.69

Coring Equipment? ☐ Yes ☑ No

Jackhammer? ☐ Yes ☑ No

Date Start: 6-11-19 | Date Complete: 6-11-19

Meter Information / Background | Meter Calibration Due

Depth Water Encountered: N/A

44-9 M - 46 cpm 2 / 12 / 2Φ

Other Water Measurement(s): NA

44-10 G - 7825 cpm 11 / 1 / 19

COC #: LEΦ6122ΦM-Φ2H

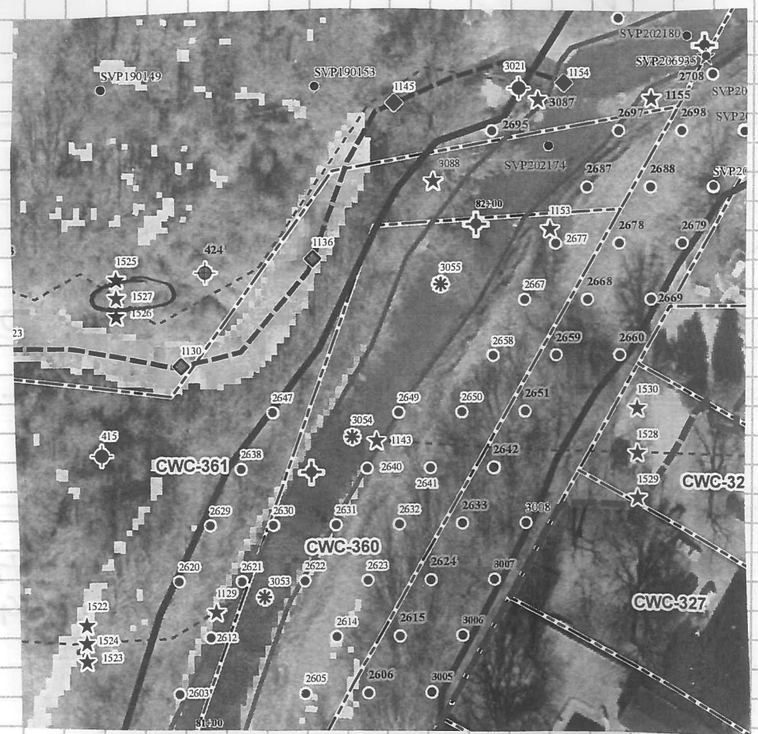
Calibration information maintained by RPM.

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	2	Φ	1	—	—
Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	2'-surface	3'-2'	—

Additional Notes: N/A MS 10-26-19

Signature of Inspector: David W. Geyer

Approx North | Scale: ☑ Rough ☐ Actual | Location/Sketch



Recorded By: David W. Geyer 6-11-19 | QA Check By: MSteines 6-26-19

HTRW DRILLING LOG (Continuation Sheet)

Logbook ID: FP- 777 | Station ID: SVP2Φ7131

Project: CWC: St. Ferdinand Park to Jana School | Inspector: D. Geyer | Sheet 2 of 2 #1527

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	Brown silt, little fine sand, roots, slight (ML)	45 / 7747	SVP2Φ7131 ΦΦ937	Φ-Φ.5 ft	0.5'
		52 / 7735			1.0'
		57 / 7830			1.5'
	- large roots	62 / 7994	SVP2Φ7132 ΦΦ945	1.5-2.Φ ft	2.0'
		57 / 7915			2.5'
		59 / 7834	ARCHIVE ΦΦ95Φ	2.5-3.Φ ft	3.0'
	Terminate boring @ 3.Φ ft bgs				3.5'
					4.0'
					4.5'
					5.0'
					5.5'
					6.0'
					6.5
	DW6 6-11-19			Native Soil @ Surface	7.0'
					7.5'
				Soil	8.0'
				Bkgnd: 46/7825 cpm	8.5'
					9.0'
					9.5'
					10.0'

Recorded By: David W. Geyer 6-11-19 (sign/date) | QA Check By: MSteines 6-26-19 (sign/date)

HTRW DRILLING LOG	District: St. Louis USACE	Station ID: SVP 190267	
Company Name: Leidos	Drilling Subcontractor: Leidos	Logbook ID: FP- 977	Sheet 1 of 3

Project: CWC St. Ferdinand Park to Jana School	Location: 526
Name of Driller: Michael M / Matt P	Station coordinates: E: 872469.70 N: 1085988.04
Types of Drilling & Sampling Equipment Used (include sizes of drilling equipment): Stainless Steel (SS) bowl(s), SS trowel(s) with SS hand auger 3in ID or SS sediment sampler with plastic sleeve.	Surface Elevation: 503.19
Coring Equipment? ☐ Yes ☑ No	Date Start: 7-6-2021 Date Complete: 7-6-2021
Jackhammer? ☐ Yes ☑ No	Depth Water Encountered: N/A
Meter Information / Background — Meter Calibration Due	Other Water Measurement(s): N/A
44-9 D - 48 cpm 12/15/2021	COC #: LE07072021-01ML
44-10 G-1- 8635 cpm 8/25/2021	
Calibration information maintained by RPM.	

No. of Samples of Each Type	Rad Samples	QA/QC Samples	Archive Samples	VOC	Metals
	3	0	1	—	—

Borehole Disposition (depth and type of material used for backfill):	Cover Material	Gravel	Soil	Bentonite	Other
	—	—	0-2'	2'-9.5'	—

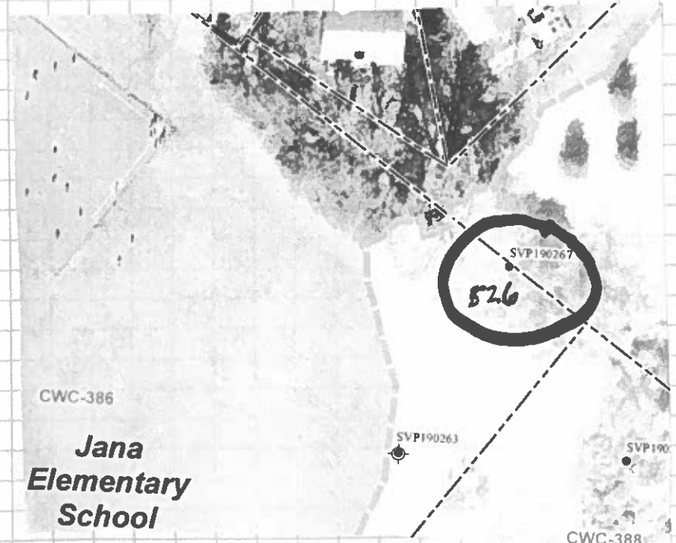
Additional Notes: NA

Signature of Inspector: David W. Guyan

Approx North

Scale: 1" = 82' ☐ Rough ☑ Actual

Location/Sketch



Recorded By: David W. Guyan 7-6-2021 Sign/Date

QA Check By: M Steiner 7.21.21 Sign/Date

HTRW DRILLING LOG (Continuation Sheet)	Logbook ID: FP- 977	Station ID: SVP190267
Project: CWC St. Ferdinand Park to Jana School	Inspector: D. Guyan	Sheet 2 of 3 526

Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
	This location was sampled 8-21-2018 and terminated at 6 ft bgs. See logbook FP-743 pgs 98 + 99 for details. This is an attempt to go deeper + hit native soil. Will auger down to 6 ft + then begin sampling.				0.5' 1.0' 1.5' 2.0' 2.5' 3.0' 3.5' 4.0' 4.5' 5.0' 5.5'
				soil B: 48/8635 cpm	
	Dark gray clayey silt, moist, med. plasticity (ML)	57 / 8462	SVP232388 1400	6.0-6.5 ft	6.0'
	Dark gray silty clay, moist, med. stiff (CL)	56 / 8342			6.5
		63 / 8456			7.0'
		67 / 8357			7.5'
	- becomes stiff	46 / 8414	SVP232389 1416	8.0-8.5 ft	8.0'
		49 / 8266	SVP232390 1420	8.5-9.0 ft	8.5'
	Dark brown silty clay, lite brown mottled, moist, stiff (CL)	65 / 8140	ARCHIVE 1425	NON FILL 9.0-9.5 ft	9.0'
	Terminate boring @ 9.5 ft bgs				9.5' 10.0'

Recorded By: David W. Guyan 7-6-2021 sign/date

QA Check By: M Steiner 7.21.21 sign/date

HTRW DRILLING LOG (Continuation Sheet)		Logbook ID: FP-		Station ID:	
Project: CWC St. Ferdinand Park to Jana School		Inspector:		Sheet 3 of 3	
Driller Reference Only	Description of Materials (include USCS Identifier)	44-9 / NaI	Sample ID / Sample Time	Remarks (with Blow Counts/Recovery/PID, if applicable)	Actual Depth (ft bgs)
		DWG	7-6-2021		10.5' 11.0' 11.5' 12.0' 12.5' 13.0' 13.5' 14.0' 14.5' 15.0' 15.5' 16.0' 16.5' 17.0' 17.5' 18.0' 18.5' 19.0' 19.5' 20.0'

Recorded By: [signature] 7-6-2021
sign/date

QA Check By: MSteiner 7.21.21
sign/date

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Start: 0815 End: 1040

HTRW DRILLING LOG

DISTRICT: St. Louis P5	HOLE NUMBER: SVP263644	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P5 Jana Elementary - 405 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085682.700 E 871834.075	
PID 592-601025 BKG: 0.0 ppm CAL DATE: 01/19/23	NaI 157033/171378 169246/174865 SCD 9160 BKG: ~~7219~~ CPM CAL DATE: 2/22/23	LUDLUM 156377/164822 BKG: 1/189 CPM CAL DATE: 08/01/23
9. SURFACE ELEVATION: 505.1 ft msl	10. DATE STARTED: 10/26/22	11. DATE COMPLETED: 10/26/22
12. OVERBURDEN THICKNESS: NA ft.	13. DEPTH DRILLED INTO ROCK: NA	15. DEPTH GROUNDWATER ENCOUNTERED: 8.0 ft. bgs
14. TOTAL DEPTH OF HOLE: 16.0 feet bgs	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

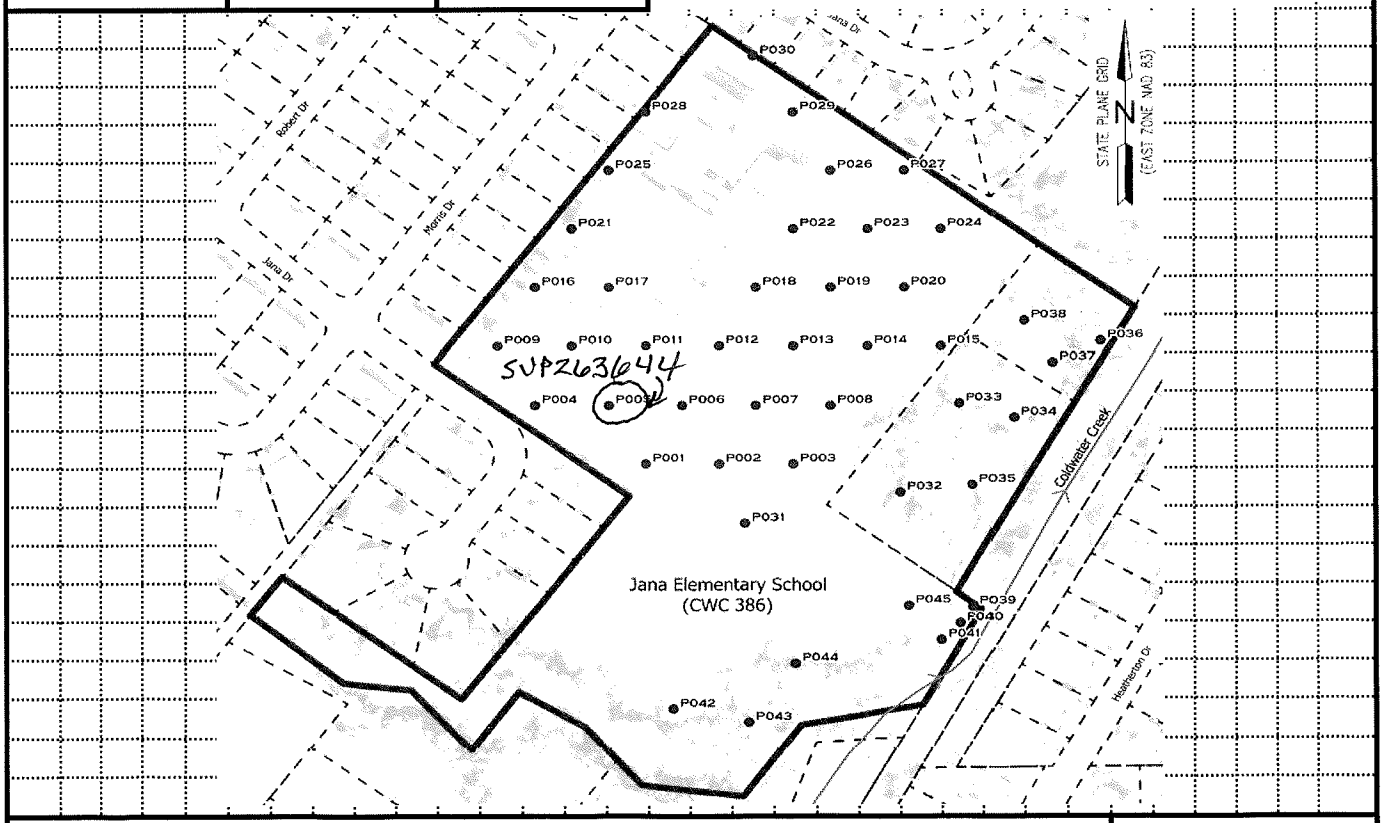
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	[signature]

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed [signature] SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT	HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	SVP263644

P5

505.10 el.

HTRW DRILLING LOG (CONTINUATION SHEET)

P5

HOLE NUMBER SVP263 644

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: John Dolde

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	505.1 el.	Silt little clay, brown, some organic matter, grass, roots, non-plastic, loose crumbly, dry ML	0.0 / 7200	48" / 48"	SVP263644 @ 0926	NA	Background ~~7219~~ 9160 CPM; CPM - Counts per minute; CPMs are gross numbers; New meter
	1	Silt few-trace clay, lt. brown, non-plastic, low stiffness, blocky structure 3-4 mm partings ML	0.0 / 7100; 0.0 / 7300; 0.0 / 7100		SVP263645 @ 0928		
ML	2, 3	Silt, trace clay, reddish brown, non-plastic, low stiffness crumbly, few 1-2 mm laminations ML	0.0 / 7100; 0.0 / 7300; 0.0 / 7500; 0.0 / 7300		SVP263646 @ 0930		
	4, 5, 6	Silt few clay, lt. brown slight-non-plastic, ~~to~~ soft few gray mottles. ML	0.0 / 7400; 0.0 / 7400; 0.0 / 7300; 0.0 / 7200; 0.0 / 7200	48" / 48"	SVP263647 @ 0947		
ML	7	Silt, little clay, lt. brown some Mn nodules (1-3mm) slight plasticity, soft, damp silt nodule - 3cm ML	0.0 / 7100; 0.0 / 7200; 0.0 / 7200	SLD	SVP263648 @ 0949		∇ H_2O, 8.0 bgs
	8, 9, 10	Silt, trace clay gray, some brown laminations 1-2mm, non-plastic, wet soft ML	0.0 / 7400; 0.0 / 7300; 0.0 / 7500; 0.0 / 7500	48" / 48"	SVP263649 @ 1007	NA	

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

HOLE NO. SVP263 644

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P5

HTRW DRILLING LOG (CONTINUATION SHEET) PS

HOLE NUMBER SVP263 644

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dolde

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	11	Silt trace clay, gray, some brown laminations 1-3 mm non-plastic, soft, wet ML	0.0 7200	48/46"		NA	Background 7249 CPM JLD
			0.0 7400				CPM - Counts per minute
							CPMs are gross numbers
		Silt, gray, MnO streaking laminated 1-2 mm, non-plastic, soft, wet ML	0.0 7300		SVP263650 @1009		BG 9160 - new meter
	12		0.0 7100				
		Same as Above FeO staining + streaking	0.0 7300	42/48"			
			0.0 7400				
	13	Same as Above, minor FeO streaking ML	0.0 7400				
			0.0 7500		SVP263651 @1027		
	14		0.0 7200				
			0.0 7500		SVP263652 @1029		
	15	Same as Above, many FeO Stains ML	0.0 7400		Archive 1031	NA	
NR	16	No Recovery		No Recovery			No Recovery
		Boring Terminated @ 16' bgs		Witness by:		Maria Pascual	
	17	Total Depth 16' bgs					26 OCT 22
		End @ 1040					Boring completed with commercial soil. JLD 11/7/22

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips JLD

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 644

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

PS

P1

Start: 1045 End: 1230

HTRW DRILLING LOG

DISTRICT St. Louis P1	HOLE NUMBER SVP263 653	
1. COMPANY NAME HGL	2. DRILLING SUBCONTRACTOR HGL	SHEET 1 of 3 SHEETS
3. PROJECT Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION P1 405 Jana Dr.	
5. NAME OF DRILLER(S) Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT, GH63 Percussion Hammer, MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION N 1085581.526 E 879891.905	
PID 592-601025 BKG: 0.0 ppm CAL DATE: 01/19/23	NaI 157033/171378 BKG: 7277/4160 CPM CAL DATE: 2/22/23	LUDLUM 156377/164822 BKG: 1/189 CPM CAL DATE: 08/01/23
9. SURFACE ELEVATION 500.3 ft msl	10. DATE STARTED 10/26/22	11. DATE COMPLETED 10/26/22
12. OVERBURDEN THICKNESS Ø ft.	13. DEPTH DRILLED INTO ROCK NA	15. DEPTH GROUNDWATER ENCOUNTERED NA
14. TOTAL DEPTH OF HOLE 16.0 feet bgs	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED NA	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

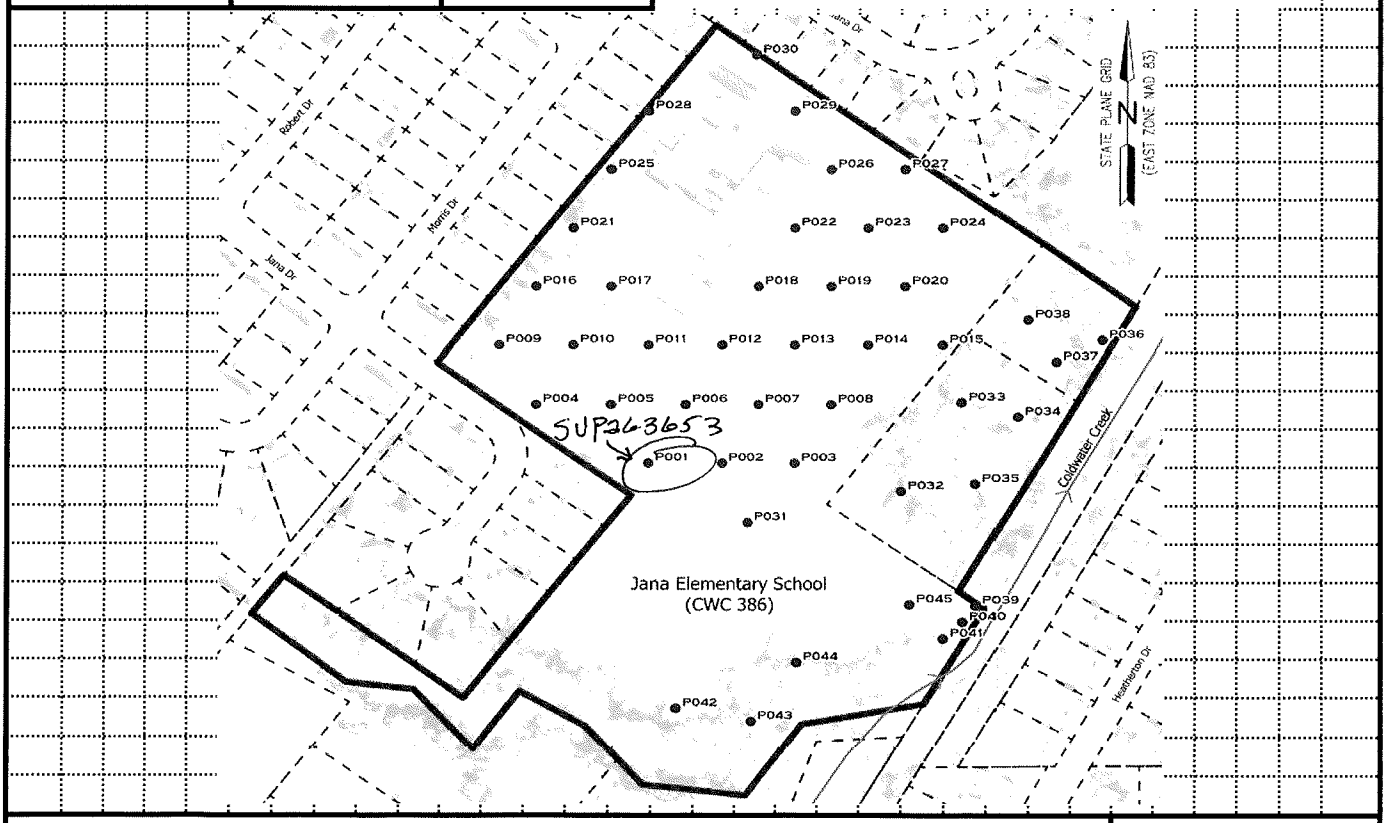
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - Ø	Archive - 3	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	John L. Dalde

LOCATION SKETCH / COMMENTS / WITNESSED BY: K Reed [signature] SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East; ft. = Feet; ppm = Parts per million; N = North; msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 653

P1

HTRW DRILLING LOG (CONTINUATION SHEET) P1

HOLE NUMBER SVP263653

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dolde

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	500.3 el.	Silt little clay brown, some grass roots, non-plastic, loose crumbly ML	0.0 / 7500	48" / 48"	SVP263653 @ 1124	NA	Background 7277 CPM
	1	Silt few-trace clay light brown, non-plastic, low stiffness, blocky, dry ML	0.0 / 7400		SVP263654 @ 1126		CPM - Counts per minute
			0.0 / 7300				CPMs are gross numbers
			0.0 / 7300		Archive @ 1128		
	2		0.0 / 7400				
		Same as above some MnO nodules + streaking	0.0 / 7200				
	3		0.0 / 7300				
		ML	0.0 / 7500		SVP263655 @ 1130 3.5-4		
	4		0.0 / 7700	48" / 48"	SVP263656 @ 1138 4-4.5		
			0.0 / 7300				
	5						
ML		Silt, trace clay, tan-light brown, some FeO staining few MnO nodules/streaking non plastic, moist soft, ≤1mm laminae ML	0.0 / 7300				
			0.0 / 7300				
	6		0.0 / 7600		[redacted] JZD		SVP263657 @ 1140 6-6.5
			0.0 / 7500			NA	
	7		0.0 / 7400				
			0.0 / 7300				
	8		6.0 / 7400		Archive @ 1155 8-8.5		Archive collected to bridge gap in samples above + below JZD 11/4/22
			0.0 / 7300				NOTES: SVP = SLAPS Vicinity Property NR = No Recovery
	9		0.0 / 7400				JZD Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water
			0.0 / 7200		SVP263658 @ 1157		Backfilled with 30% solids bentonite grout: 1 bag grout & 14-gallons water Backfilled with hydrated bentonite chips: 1 gallon water per 2 foot chips JZD
	10						

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263653

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P1

HTRW DRILLING LOG (CONTINUATION SHEET) P1

HOLE NUMBER SVP263653

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/NORCO

Inspector:

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
OL		10cm organic silt, Tan, some FeO nodules, non-plastic, stiff moist OL	0.0 / 7400	44/48	SVP263659 @1159		Background 7277 CPM CPM - Counts per minute CPMs are gross numbers ▽ 10.2 H_2O
ML		Silt trace clay, tan, some FeO stains, trace MnO stains, non-plastic, med stiff wet ML	0.0 / 7400 0.0 / 7400 0.0 / 7400		~~SVP263~~ JLD		
		Same as above grading to orangish-brown ML	0.0 / 7300 7100 7300	48/48			
		Silt, trace clay, few organic laminations, gray, wet non-plastic, stiff, few MnO nodules ML	7500 7500 7500		SVP263660 @1207 SVP263661 @1209		
		Silt, gray, non-plastic med. stiff, wet ML	7400 7200		Archive @1211		
		Borehole Terminated @ 16' bgs End: 1230			Witness by: Pedro A. Rosario USACE		Boring completed with commercial top soil. JLD 11/7/22

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
JLD
Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water
Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips JLD

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP263653

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

START: 12:50 END 14:34 PLe

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP263 662
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: 405 Jana Dr. / Jana Elementary PLe	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085682.593 E 871949.966	
	9. SURFACE ELEVATION: 503.2 ft msl	
	10. DATE STARTED: 10/26/22	11. DATE COMPLETED: 10/26/22
	15. DEPTH GROUNDWATER ENCOUNTERED: 10.2 ft bgs	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 116 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	157038/171378	156377/164822
BKG: 0.0 ppm	BKG: 7277 CPM	BKG: 1189 CPM
CAL DATE: 01/19/23	CAL DATE: 2/22/23	CAL DATE: 08/01/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

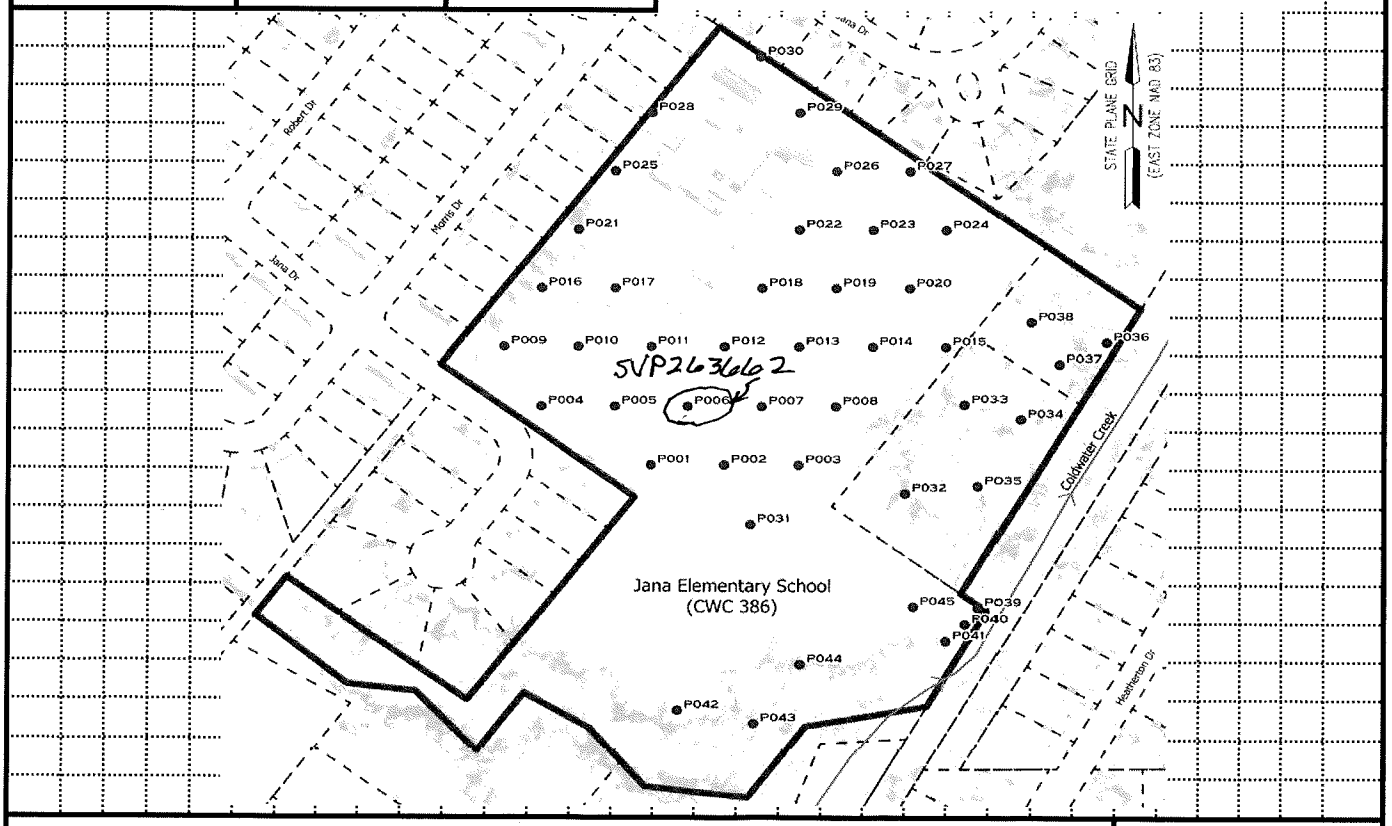
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 662

PLe

HTRW DRILLING LOG (CONTINUATION SHEET)

PLC

HOLE NUMBER: SVP263662

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dalde

Sheet 2 of 3 Sheets

ft. bgs

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt, few clay, brown, non-plastic crumbly, loose, Grass + roots ML	0.0 / 7100	48/48	SVP263662 @1338	NA	Background 7277 CPM CPM - Counts per minute CPMs are gross numbers SVP263662-1, -2
	1	Silt, few clay, lt. brown, non-plastic, stiff, blocky structure dry 1.2-1" worm castings ML	0.0 / 7300 0.0 / 7500		SVP263663 @1340		
	2	Silt, few-little clay, brown, Fe staining, few Mn0 nodules, non-plastic, stiff, dry ML	0.0 / 7100 0.0 / 7100 0.0 / 7300				
	3		0.0 / 7700 0.0 / 7500		SVP263664 @1342		
	4	Same as above	0.0 / 6900	48"/48"			
	5		0.0 / 7100 0.0 / 7100				
	6	Silt, trace clay, lt. brown, Mn0 streaking, non-plastic, soft, damp ML	0.0 / 7300 0.0 / 7380		SVP263665 @1400		
ML	7	Silt, gray, non-plastic soft, <1mm laminations damp-moist ML	0.0 / 7400 0.0 / 7500		SVP263666 @1402		
	8		0.0 / 7200 0.0 / 7480	48/48			8.75-9.25'
	9		0.0 / 7300 0.0 / 7100		SVP263667 @1412		NOTES: SVP = SLAPS Vicinity Property NR = No Recovery JLD Backfilled with cement strengthened grout: ~~2 bags grout, 1 bag cement, & 40 gallons water~~ Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water Backfilled with hydrated bentonite chips: ~~1 gallon water per 2 foot chips~~ JLD
	10		0.0 / 7300				

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263662

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

PLC

HTRW DRILLING LOG (CONTINUATION SHEET)

P6

HOLE NUMBER: SVP263 662

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: John Dalle

Sheet 3 of 3 Sheets

ft. bgs

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	10	Silt, trace clay, gray, MnO stains, FeO staining, non plastic, med stiff, wet	0.0 7200 0.0 7300 0.0 7300 0.0 7200	48/48	SVP263668 @ 1414		Background 7271 CPM CPM - Counts per minute CPMs are gross numbers H_2O @ 10.2' bgs
	12	Same as above few FeO streaks	0.0 7200 0.0 7200		SVP263669 @ 1428		
	13	~~1/2~~ SLD Iron Nodule	0.0 7100 0.0 7100				
	14		0.0 6900		Archive @ 1430		
	15	Silt, gray, non-plastic med stiff, wet, 1-2mm laminations ML	0.0 6800 0.0 6900				
	16		0.0 7200		SVP263670 @ 1432		
	17	Borehole Terminated @ 16' bgs End: 1434			Withdrawn per A. Rascio 1433		
	18						Boring completed with commercial topsoil. SLD 11/7/22
	19						NOTES: SVP = SLAPS Vicinity Property NR = No Recovery SLD Backfilled with cement strengthened grout: 2 ~~bags~~ grout, 1 bag cement, & 40 gallons water Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips JCN
	20						

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 662

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P6

START 0815 END 0930 P2

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP263671
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 3 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

4. LOCATION: P2 485 Jana Dr.

5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton

6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT

7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler

8. HOLE LOCATION: N 1085581.694 E 872088.173

9. SURFACE ELEVATION: 498.10 ft msl

PID	NaI	LUDLUM
592-601025	157033 / 171378	163843 / 167708
BKG: 0.0 ppm	BKG: 7487 CPM	BKG: 5/242 CPM
CAL DATE: 01/19/23	CAL DATE: 09/07/23	CAL DATE: 3/3/23

10. DATE STARTED: 10/27/22

11. DATE COMPLETED: 10/27/22

15. DEPTH GROUNDWATER ENCOUNTERED: NA

12. OVERBURDEN THICKNESS: 0 ft.

13. DEPTH DRILLED INTO ROCK: NA

16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA

14. TOTAL DEPTH OF HOLE: 16 feet bgs

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

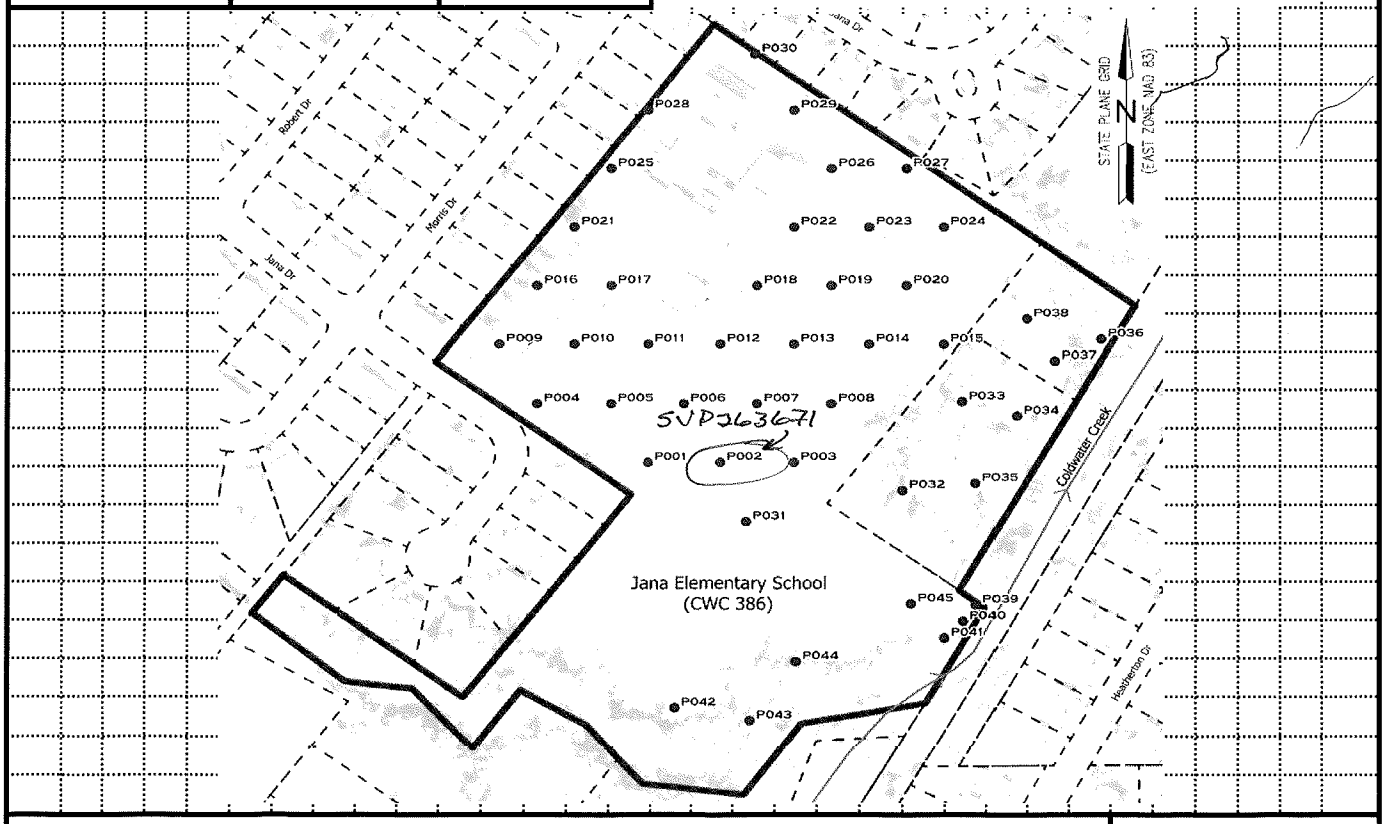
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: OAK SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

HOLE NUMBER: SVP263 671

P2

HTRW DRILLING LOG (CONTINUATION SHEET) PZ

HOLE NUMBER SVP263671

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dulle

Sheet 2 of 3

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	498.1 el.	Silt, few clay brown, non-plastic, soft, crumbly, dry, grass roots	0.0 / 7400	48/48	SVP263671 @0838	NA	Background 7487 CPM
		Silt, trace clay, lt. brown non-plastic, low stiffness easily crumbles w/finger pressure, blocky structure	0.0 / 7500				CPM - Counts per minute
	1	ML	0.0 / 7600		SVP263672 @0840		CPMs are gross numbers
ML		Same as above	0.0 / 7500				
	2		0.0 / 7400				
			0.0 / 7400				
	3		0.0 / 7600		SVP263673 @0842		
			0.0 / 7100	48/48			
	4	Silt, some clay gray, med plastic, soft, dry, some MnO/FeO nodules, stains.	0.0 / 7300	48/48			
		ML	0.0 / 7500		SVP263674 @0853		
	5		0.0 / 7400				
			0.0 / 7400				
	6		0.0 / 7700		Archive @0855		
ML	7	Silt, trace clay, gray, few orange (FeO) mottles low-non-plastic, med. stiff, damp, ≥1mm laminations 6.7'-8' bgs	0.0 / 7400				
		ML	0.0 / 7500				
			0.0 / 7600		SVP263675 @0857		
	8	Same as above Laminations throughout	0.0 / 7100	48/48			
		ML	0.0 / 7200		SVP263676 @0910		
	9		0.0 / 7100				
			0.0 / 7400				
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

JCA

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1^ gallon water per 2 foot chips JCA

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263671

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P2

HTRW DRILLING LOG (CONTINUATION SHEET)

P2

HOLE NUMBER SVP263 671

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Waldo

Sheet 3 of 3

ft. bgs

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	11	Silt, trace clay, gray, low orange (FeO) mottles, low-non-plastic, med-stiff, damp ≥ 1mm laminations throughout ML	0.0 7300	48/48		NA	Background 7487 CPM
			0.0 7200				CPM - Counts per minute
		Silt, gray, many red-orange FeO nodules, strong very low plasticity, soft moist Laminations ≥1mm throughout	0.0 7300				CPMs are gross numbers
	12		0.0 7400		SVP263677 @0917		
ML		Same as above ML	0.0 7000	48/48			
	13		0.0 7500				
			0.0 7400				
			0.0 7500		SVP263678 @0918		
	14		0.0 7700				
			0.0 7500				
	15		0.0 7800		SVP263679 @0920		
			0.0 7400			NA	
	16	Borehole Terminated @ 16' bgs End 0930					Bore hole completed with cement soil JCW 11/7/22
							USACE
							NOTES: SVP = SLAPS Vicinity Property NR = No Recovery VCS
							Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water
							Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water
							Backfilled with hydrated bentonite chips: 1 gallon water per 2 feet chips JCW

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 671

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P2

Start 0935 End 1128

HTRW DRILLING LOG

DISTRICT: St. Louis P31	HOLE NUMBER: SVP263 1680	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 4 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P31 405 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085479.579 E 872048.978	
PID 592-601025 BKG: 0.0 ppm CAL DATE: 01/19/23	NaI 157033/171578 BKG: 7487 CPM CAL DATE: 09/07/23	LUDLUM, 163863/167708 BKG: 5/242CPM CAL DATE: 3/3/23
	9. SURFACE ELEVATION: 497.1 ft msl	
	10. DATE STARTED: 10/27/22	11. DATE COMPLETED: 10/27/22
	15. DEPTH GROUNDWATER ENCOUNTERED: 13.0' bgs	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 24 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

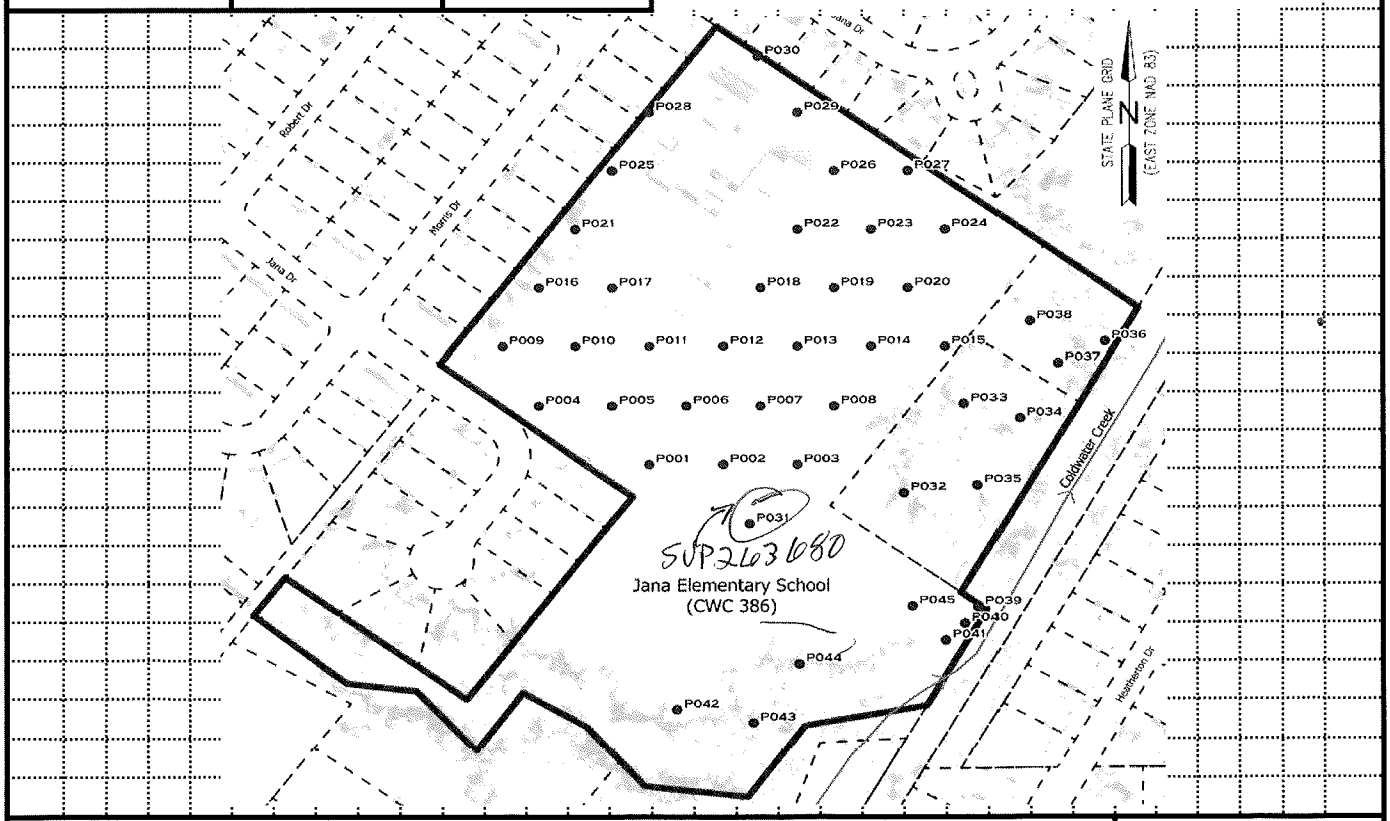
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 13	QA/QC - 0	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: QAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 1680

P31

HTRW DRILLING LOG (CONTINUATION SHEET) P3

HOLE NUMBER SVP263 680

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dodd

Sheet 2 of 4 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0–4	Silt, some clay, brown, low non-plastic, soft, loose crumbly, blocky structure, cracks @ surface, roots throughout interval ML	0.0 / 7300; 0.0 / 7300; 0.0 / 7400; 0.0 / 7000; 0.0 / 7300; 0.0 / 7300; 0.0 / 7300; 0.0 / 7100	48/48; 48/48	SVP263680 @0950; SVP263681 @0952; SVP263682 @0954	NA	Background 7487 CPM CPM - Counts per minute CPMs are gross numbers
CL	4–7	Clay, some silt, dark olive gray, high plasticity, stiff, dry, blocky structure CL	0.0 / 7100; 0.0 / 7100; 0.0 / 7200; 0.0 / 7300; 0.0 / 7400; 0.0 / 7200; 0.0 / 7300	48/48; 42/48	SVP263683 @1004; SVP263684 @1006; Archive @1008		Archive collected at bottom of recovered interval
	7–8	No Recovery	JLD 0.0	JLD NR	JLD NO Recovery		
ML	8–10	Silt, some clay, gray, medium plastic, med-stiff, few MnO streaks, nodules, faint 2-3 mm laminations, trace roots/organic matter ML	0.0 / 7300; 0.0 / 7300; 0.0 / 7200; 0.0 / 7300	48/48	SVP263685 @1022	NA	NOTES: SVP = SLAPS Vicinity Property NR = No Recovery JLD Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips JLD

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 680

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P3 1

HTRW DRILLING LOG (CONTINUATION SHEET) P31

HOLE NUMBER SVP263680

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dold

Sheet 3 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	11	Silt some clay, gray, med. plastic, med stiff, few Mn0/Fe0 nodules & streaks 2-3mm laminations, moist ML	0.0 7100 0.0 7200 0.0 7400 0.0 7100	48/48 48/48	SVP263680 @1021	NA	Background 7482 CPM CPM - Counts per minute CPMs are gross numbers
	12	Same As Above	0.0 7300 0.0 7300	39/48	SVP263687 @1040		
ML	13	Silt, trace clay, gray, med. stiff, non-plastic 1-3mm laminations, wet ML	0.0 7200 0.0 7100				▽ H_2O 13.0' bgs
	14	Same as above red/orange Mottles (Fe)	0.0 6900 0.0 6900				
	15		0.0 7100	39/48	SVP263688 @1042		14.8-15.3
No Recovery	16	No Recovery	—	No Recovery		No Recovery	
ML	17	SAME AS Above ML	0.0 7100 0.0 7300	48/48	SVP263689 @1027 16.7-17.2	NA	Boring completed with commercial top soil JLD 11/7/22
	18		0.0 7200 0.0 7200 0.0 6800		SVP263690 @1039 18.1-18.6		
	19	Silt, trace clay, gray non-plastic, stiff, wet ML	0.0 7100 0.0 ~~7400~~ 7000 0.0 7000	48/48			NOTES: SVP = SLAPS Vicinity Property NR = No Recovery JLD ~~Backfilled with~~ cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water ~~Backfilled with hydrated~~ bentonite chips: 1-gallon water per 2 foot chips JLD
	20						

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263680

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P31

HTRW DRILLING LOG (CONTINUATION SHEET)

P31

HOLE NUMBER SVP263 680

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: [signature]

Sheet 4 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML		Silt, trace clay, brown, low-non-plastic, soft, moist-wet trace FeO staining ML	0.0 / 7300	39/48		NA	Background 7487 CPM CPM - Counts per minute CPMs are gross numbers
			0.0 / 7300				
	21	Silt, gray, non-plastic med stiff, damp ML	0.0 / 7500		SVP263691 @1112		
			0.0 / 7400		SVP263692 @1114		
	22		0.0 / 7300				
			0.0 / 7300				
	23		0.0 / 7300	39/48	Archive @1116		22.8-23.2 collected @ bottom of interval
		No Recovery		No Recovery			No Recovery
	24	Borehole Terminated @ 24' bgs End 1128					

Boring completed with commercial soil JLD 11/7/22

[signature] USACE

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
JLD
Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water
Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips JLD

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

HOLE NO. SVP263 680

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P31

Start 1225 End ~~1400~~ 1410 FLD

HTRW DRILLING LOG

DISTRICT: St. Louis P3	HOLE NUMBER: SVP263693	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 4 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P3 405 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085582.026 E 872124.143	
PID: 592-601025; BKG: 0.0 ppm; CAL DATE: 01/19/23	NaI: 157033/171378; BKG: 7487 CPM; CAL DATE: 09/07/23	LUDLUM: 163863/167705; BKG: 5/242 CPM; CAL DATE: 3/3/23
9. SURFACE ELEVATION: 498.2 ft msl		
10. DATE STARTED: 10/27/22	11. DATE COMPLETED: 10/27/22	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA
14. TOTAL DEPTH OF HOLE: 24 feet bgs		16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

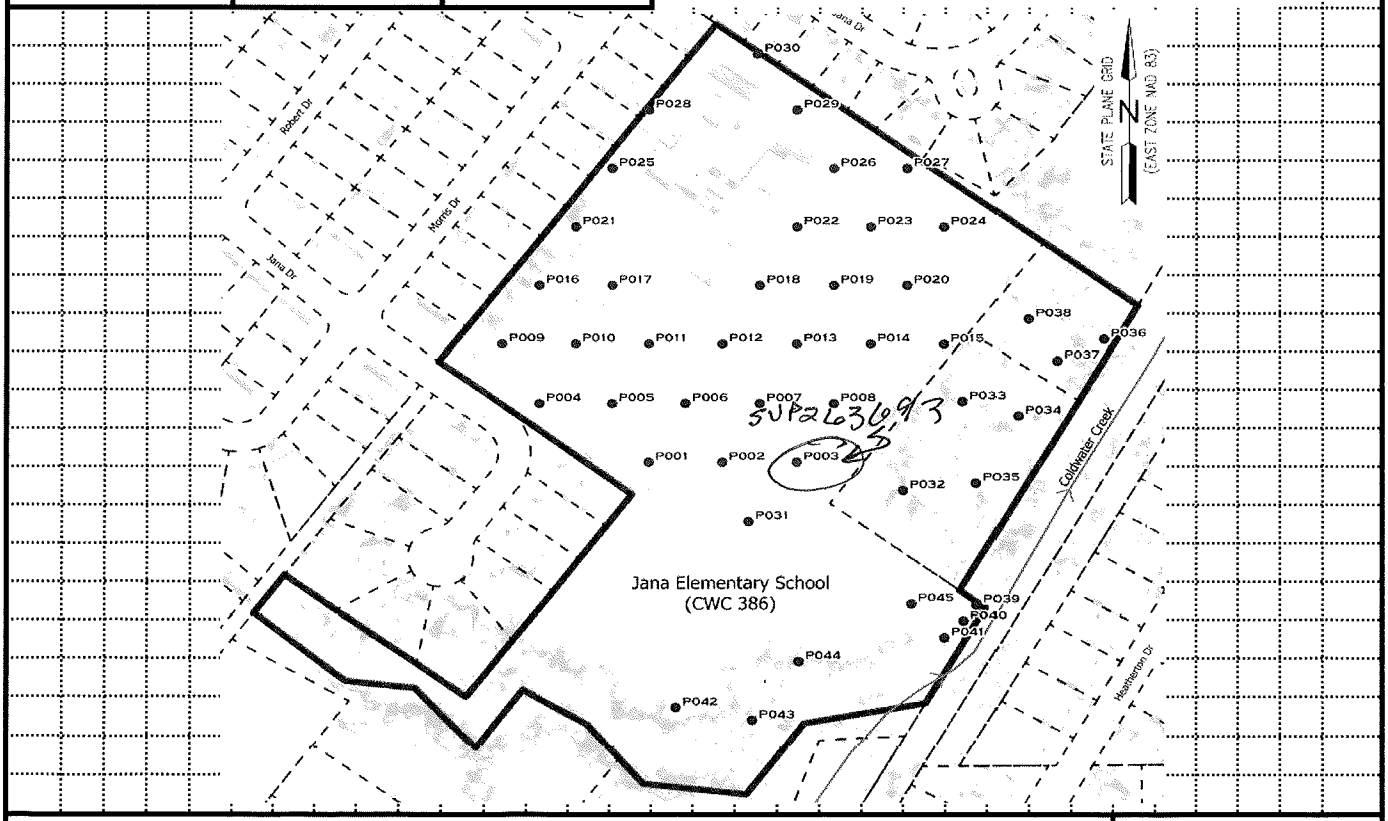
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 13	QA/QC - 1	Archive - 3	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: ~~K. Reed~~ OAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 693

P3

HTRW DRILLING LOG (CONTINUATION SHEET) P3

HOLE NUMBER SVP263 693

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dalle

Sheet 2 of 4 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt, little clay, dark brown, non-plastic, soft, crumbly, dry, grass at ground surface Roots 0.2 – 1' ML	0.0 / 6800	48/48	SVP263693 @ 1238 -1, -2	NA	Background 7487 CPM CPM - Counts per minute CPMs are gross numbers
	1	Silt some clay, brown non-plastic, stiff, blocky structure, crumbly, dry roots throughout interval ML	0.0 / 7200		SVP263694 @ 1232		
	2		0.0 / 7000				
			0.0 / 7000				
	3		0.0 / 7000				
			0.0 / 7100		SVP263695 @ 1234		
			0.0 / 7000	48/48			
	4	Silt little clay reddish-brown, some FeO staining Roots low plastic, stiff ML	0.0 / 7000	48/48			
			0.0 / 7400				
	5	Silt few clay, gray, FeO staining, mottles, few nodules. non-plastic, med stiff, damp - roots throughout ML	0.0 / 7400		SVP263696 @ 1257		
ML			0.0 / 7400				
	6		0.0 / 7300		SVP263697 @ 1259		
			0.0 / 7100				
	7		0.0 / 7100				
			0.0 / 6800	48/48			
	8	Same as above with few FeO nodules	0.0 / 7000	48/48	Archive @ 1313		
			0.0 / 7000				
	9		0.0 / 7100				
			0.0 / 7300		SVP263698 @ 1315		
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

JCH

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1 gallon water per 2 foot chips JCH

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 693

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P3

HTRW DRILLING LOG (CONTINUATION SHEET)

P3

HOLE NUMBER SVP263 693

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: John Dalde

Sheet 3 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML		Silt few clay, gray, few FeO nodules + staining, non-plastic, low stiffness, damp ML	0.0 / 7300			NA	Background 7487 CPM; CPM - Counts per minute; CPMs are gross numbers JLD
	11	trace organic matter, decomposed vegetation ML	0.0 / 7400		SVP263699 @1317		10.75 - ~~12.25~~ 11.75
			0.0 / 7400				
			0.0 / 7100	48/48			
	12	SILT, few clay, gray, FeO staining, non-plastic low stiffness, damp ML	0.0 / 6900	40/48"			
			0.0 / 7300				
	13		0.0 / 7300		SVP263~~670~~ 700 JLD @1334		
			0.0 / 7100				
	14		0.0 / 7400		SVP263~~671~~ 701 JLD @1336		Archive collected due to no recovery at bottom of evaluation interval JLD 11/7/22
			0.0 / 7000				
	15		0.0 / 7200	40/48"	Archive @1338		14.9'-15.4'
No Recovery		No Recovery JLD ~~15.4-16~~ 15.4'-16'	~~0.0~~ JLD / NR	No Recovery			No recovery
ML	16	Silt, little clay, brown few yellowish mottles, low plastic, med. stiff dry ML	0.0 / 7200	48/48			
			0.0 / 7100				
	17	SILT, gray-(greenish) non-plastic, med. stiff, moist ML	0.0 / 7500		SVP263702 @1350		17.1'-17.6'
			0.0 / 7400				
	18		0.0 / 7200		SVP263703 @1352		19'-19.5' Archive collected due to no recovery at bottom of evaluation interval JLD 11/7/22
			0.0 / 6800				
	19		0.0 / 6900	42/48	19-19.5 Archive @1354		
NR	20	NO RECOVERY	~~0.0~~ JLD / NR	JLD ~~42/48~~	NO Recovery		

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
JLD

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips JLD

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

HOLE NO. SVP263 693

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P3

HTRW DRILLING LOG (CONTINUATION SHEET)

P3

HOLE NUMBER	Project	Inspector	Sheet	Sheets
SVP263693	Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO	John Dolde	4 of 4	

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML		SILT, olive-greenish gray, non-plastic, stiff, damp-moist, faint >1mm laminations ML	0.0 / 7000	42/48			Background 7487 CPM CPM - Counts per minute CPMs are gross numbers
			0.0 / 7200		SVP263704 @1402		
	21		0.0 / 7100				
			0.0 / 7100				
	22		0.0 / 7200				
			0.0 / 7200		SVP263705 @1405		
	23		0.0 / 7100				
			JLD ~~0.0~~ / NR	No Recovery			
	24	Borehole Terminated @16' bgs End: 1410					
	25						
							Borehole completed with commercial top soil JLD 11/7/22
							[signature] USACE

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
JLD
Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water
Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips JLD

ft. bgs: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP263693

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P3

START 1412 END 1542

P7

HTRW DRILLING LOG

DISTRICT: St. Louis P7	HOLE NUMBER: SVP263 704 (6) JLD	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P7 405 Jana School	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085083.342 E 8720666.199	
PID: 592-601025; BKG: 0.0 ppm; CAL DATE: 01/19/23	NaI: 157033 / 171378; BKG: 7487 CPM; CAL DATE: 09/07/23	LUDLUM: 163463 / 167703; BKG: 5/242 CPM; CAL DATE: 3/3/22
9. SURFACE ELEVATION: 504.457 ft msl		
10. DATE STARTED: 10/27/22	11. DATE COMPLETED: 10/27/22	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	15. DEPTH GROUNDWATER ENCOUNTERED: 10.20 ft bgs
14. TOTAL DEPTH OF HOLE: 16 feet bgs		16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

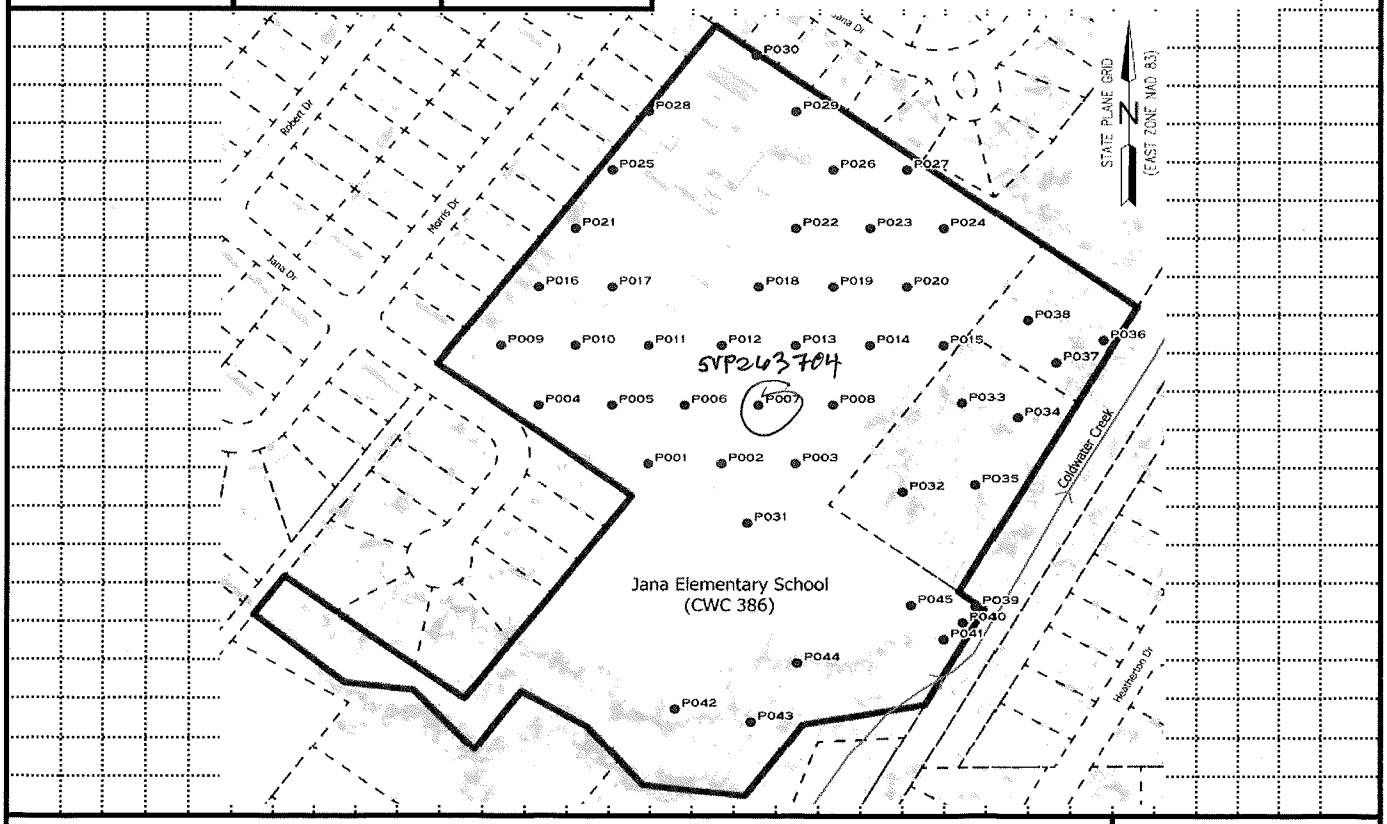
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	John Dalde

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QAP SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 704 (6) JLD

P7

HTRW DRILLING LOG (CONTINUATION SHEET)

P 7

HOLE NUMBER: SVP263 706

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: John Dilla

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt little clay brown, non-plastic, soft, crumbly, dry, Grass @ surface, roots throughout 0-4' interval ML	0.0 / 7400	48/48	SVP263706 @ 1428	NA	Background 7487 CPM
	1	Silt, trace clay, lt. brown non-plastic, stiff blocky structure 2-4mm partings ML	0.0 / 7400		SVP263707 @ 1430		CPM - Counts per minute
	2	Silt, few clay brown, non-plastic, stiff, breaks under finger pressure ML	0.0 / 7300				CPMs are gross numbers
	3		0.0 / 7200				
	4	Silt few clay, brown, grey mottles, low plasticity stiff, crumbly, dry few FeO stains ML	0.0 / 7100		SVP263708 @ 1432 -1, -2		
	5		0.0 / 7400	48/48			
	6		0.0 / 6800	48/48			
	7		0.0 / 7100				
	8	Same as Above MW Some Fe Nodules & staining ML	0.0 / 7300		SVP263709 @ 1454		
	9		0.0 / 7400				
	10		0.0 / 7300		SVP263710 @ 1456		
			0.0 / 7200				
			0.0 / 7200	48/48			
			0.0 / 7100	48/48			
			0.0 / 7400				
			0.0 / 7600		SVP263711 @ 1507		
			0.0 / 7400				

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

JLD
~~Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, 8-40 gallons water~~

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

~~Backfilled with hydrated bentonite chips: 1 gallon water per 2 foot chips~~ JLD

ft. bgs: 0 1 2 3 4 5 6 7 8 9 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 706

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P7

HTRW DRILLING LOG (CONTINUATION SHEET) P7

HOLE NUMBER SVP263 706

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: John Dalde

Sheet 3 of 3 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	10.2 wet	Silt, gray, non-plastic soft, fine 1mm laminations, wet ML	0.0 / 7600	48/48	SVP263712 @1509	NA	Background 7487 CPM CPM - Counts per minute CPMs are gross numbers H_2O @ 10' bgs
	11		0.0 / 7400				
			0.0 / 7000				
			0.0 / 7400		Archive @1511		Archive collected between intervals sampled JLS 11/4/22
	12	Same as Above ML	0.0 / 7100	48/48			
ML			0.0 / 7300				
	13		0.0 / 7300		SVP263713 @1520		
			0.0 / 6980				
	14		0.0 / 7100				
			0.0 / 7100				
	15	Silt, gray, non-plastic soft - med. stiff, damp. 15.25-15.83 seam of organic material ML	0.0 / 7100		SVP263714 @1522		
			0.0 / 7400	48/48	Archive @1524		
	16						
		Borehole Terminated @16' bgs					
	17						Boring Completed with commercial top soil, JLS 11/7/22
							USACE
	18						
	19						NOTES: SVP = SLAPS Vicinity Property NR = No Recovery JLS Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water JLS Backfilled with hydrated bentonite chips: 1 gallon water per 2 foot chips
	20						

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 706

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P7

START 0800 End 1025

HTRW DRILLING LOG

DISTRICT: St. Louis P8	HOLE NUMBER: SVP263 715	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 4 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P8 405 Jana School	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085682.853 E 872181.367	
	9. SURFACE ELEVATION: 501.9 ft msl	
	10. DATE STARTED: 10/28/22	11. DATE COMPLETED: 10/28/22
	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 28.0 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	169245/174494	163863/167708
BKG: 0.0 ppm	BKG: 7100 CPM	BKG: 7/1230 CPM
CAL DATE: 01/19/23	CAL DATE: 11/30/22	CAL DATE: 3/13/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

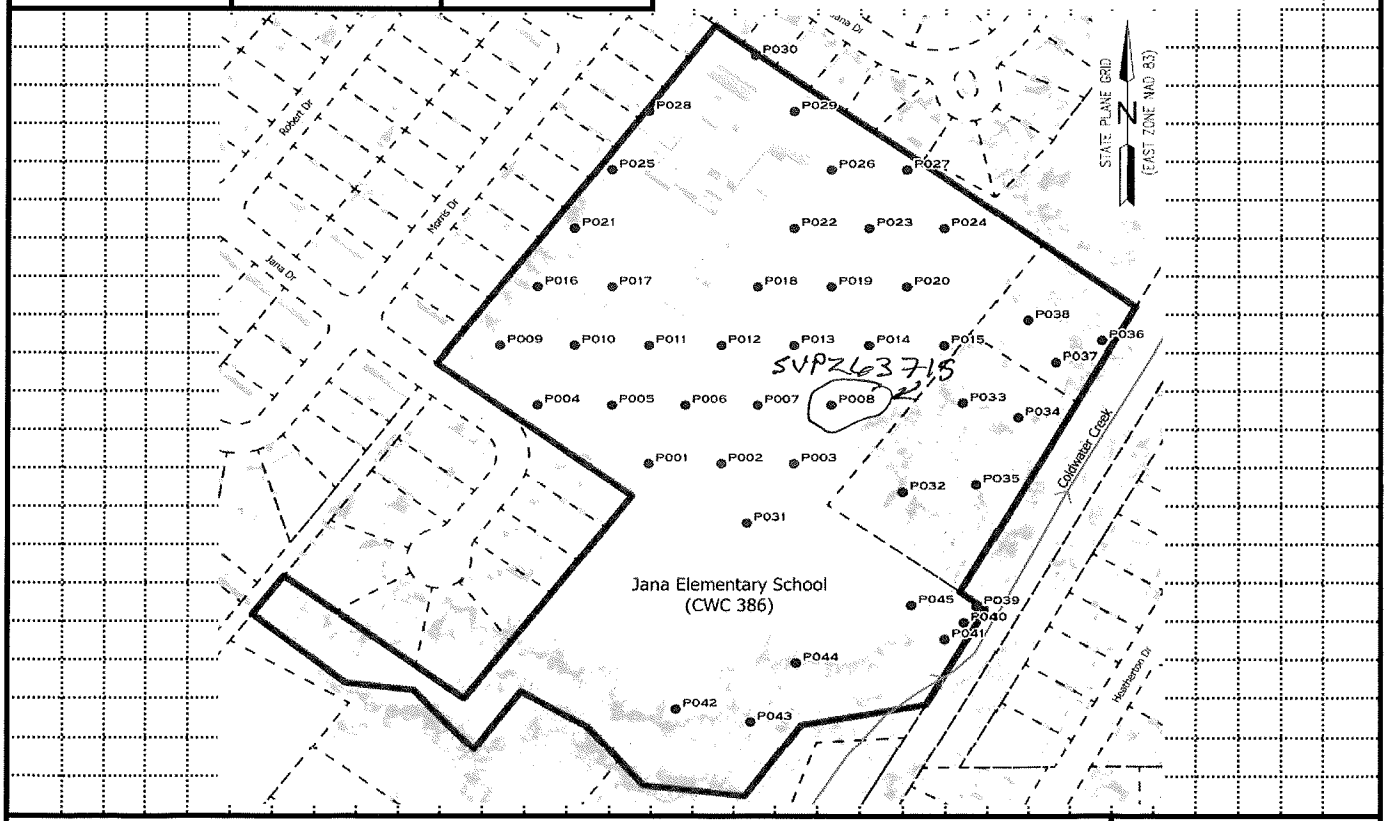
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD SA 1075	QA/QC - 1	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed Oar SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 715

P8 P8

HTRW DRILLING LOG (CONTINUATION SHEET)

P8

HOLE NUMBER SVP263 715

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: [illegible]

Sheet 2 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt little clay, brown, non-plastic, loose crumbly dry, grass @ surface Roots throughout interval ML	0.0 / 7800	48/48	SVP263718 @ 0821	NA	Background 7200 CPM (CPM - Counts per minute; CPMs are gross numbers)
			0.0 / 7200				
	1	Silt trace clay, lt. brown, non-plastic, stiff, crumbles w/ fingers easily, 3-4mm partings blocky structure dry ML	0.0 / 7800				
			0.0 / 8000		SVP263716 @ 0822		
	2	Silt little clay, brown low-non-plastic, low stiffness, blocky structure Roots throughout ML	0.0 / 7800				
			0.0 / 7900		SVP263717 @ 0824		
	3		0.0 / 7600				
			0.0 / 7500	48/48			
	4	Same As Above few gravel 4'-4.5'	0.0 / 7700	48/48			
			0.0 / 8000		SVP263718 @ 0836		
	5		0.0 / 7800				
		ML	0.0 / 7900				
	6		0.0 / 8000		SVP263719 @ 0838		
			0.0 / 7800		JCD		
	7		0.0 / 7800		SVP263720 @ 0840		ARCHIVE 7-7
		Silt trace clay, gray few orange (Fe) mottles non-plastic, soft, damp. ML	0.0 / 7800	48/48	JCD		
	8	Same As Above	0.0 / 7700	48/48			
			0.0 / 7900				
	9		0.0 / 7700				
			0.0 / 7900		SVP263720 @ 0850		
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 715

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P8

HTRW DRILLING LOG (CONTINUATION SHEET) P8

HOLE NUMBER SVP263 715

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dodd

Sheet 3 of 4 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	11	silt trace clay, gray, few red/orange mottles, few FeO nodules, non-plastic low stiff, damp ≤1mm laminations throughout ML	0.0 / 7700 0.0 / 7900 0.0 / 8100 0.0 / 7600	48/48	SVP263721 @ 0852 JD		Background 7200 CPM CPM - Counts per minute; CPMs are gross numbers
	12	Same as above few MnO nodules 12-16' ML	0.0 / 7600 0.0 / 7700 0.0 / 7600 0.0 / 7900 0.0 / 7700 0.0 / 7700 0.0 / 7700 0.0 / 7600	48/48	SVP263722 @ 0904 JD		
ML	14						
	15				SVP263723 @ 0906 JD		
	16	silt, trace clay, lt. brown-tan, few yellow-orange mottles, non-plastic, low stiffness - soft, damp ≤1mm laminations ML	0.0 / 7600 0.0 / 7800 0.0 / 7700 0.0 / 7700 0.0 / 7600 0.0 / 7600	48/48 48/48	SVP263724 @ 0917		
ML	17						
	18				17.5-18 Archive @ 0919		center of capture agility interval brown, 17-18.5' bgs JD 11/4/22
	19				SVP263725 @ 0921		
	20		0.0 / 7600	48/48			NOTES: SVP = SLAPS Vicinity Property NR = No Recovery Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 715

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P8

HTRW DRILLING LOG (CONTINUATION SHEET) P8

HOLE NUMBER SVP263 715

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: John Dolde

Sheet 4 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Silt, few clay, tan, low-non-plastic, stiff, damp, fine ≥1 mm laminations little FeO staining/orange mottles	0.0 / 7800	45/48			Background 7200 CPM (CPM - Counts per minute; CPMs are gross numbers)
			0.0 / 7500				
	21		0.0 / 7700				
			0.0 / 7900		SVP263726 @ 0951 -1, -2		Duplicate/split duplicate
	22		0.0 / 7600				Offset 2'E to recover interval from 23'-24' bgs
			0.0 / 7800				
	23		0.0 / 7800	45/48	SVP263727 @ 0953		
		NO RECOVERY	7800	No Recovery			No Recovery
	24	Clay ~~some~~ JLD ~~little~~ JLD some silt, gray, highly plastic, hard, few orange-yellow mottles, dry ~~CL~~ JLD CH	0.0 / 7500	48/48			
JLD ~~CL~~ CH	25		0.0 / 7500				
			0.0 / 7800				
			0.0 / 7900		SVP263728 @ 1016		
			0.0 / 7600				
		Clay little silt, dark gray (olive) high plastic very hard, dry JLD ~~CL~~ CH	0.0 / 7800				
			0.0 / 7800		SVP263729 @ 1018		
			0.0 / 7600	48/48			
		Borehole Terminated @ 28' bgs End: 1025					USACE
							Boring completed with commercial top soil. JLD 11/7/22

John Dolde

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water.

ft. bgs: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP263 715

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P8

Start: 1038 End: 1155 P42

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP263 730
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 4 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P42 405 Jana 2nd Dr.	
5. NAME OF DRILLER(S): ~~Travis~~ Hearne, Cody Schwartz, Kevin Sutton (JSD 2days)	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085159.655 E (JSD 492.9 871935.947)	
	9. SURFACE ELEVATION: 492.9 ft msl	
PID: 592-601025; BKG: ppm; CAL DATE: 01/19/23	NaI: 169245/174494; BKG: 7100 CPM; CAL DATE: 11/30/22	LUDLUM: 163563/167708; BKG: 1238 CPM; CAL DATE: 3/13/23
	10. DATE STARTED: 10/28/22	11. DATE COMPLETED: 10/28/22
	15. DEPTH GROUNDWATER ENCOUNTERED: 9.2' bgs	
12. OVERBURDEN THICKNESS: ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 24 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

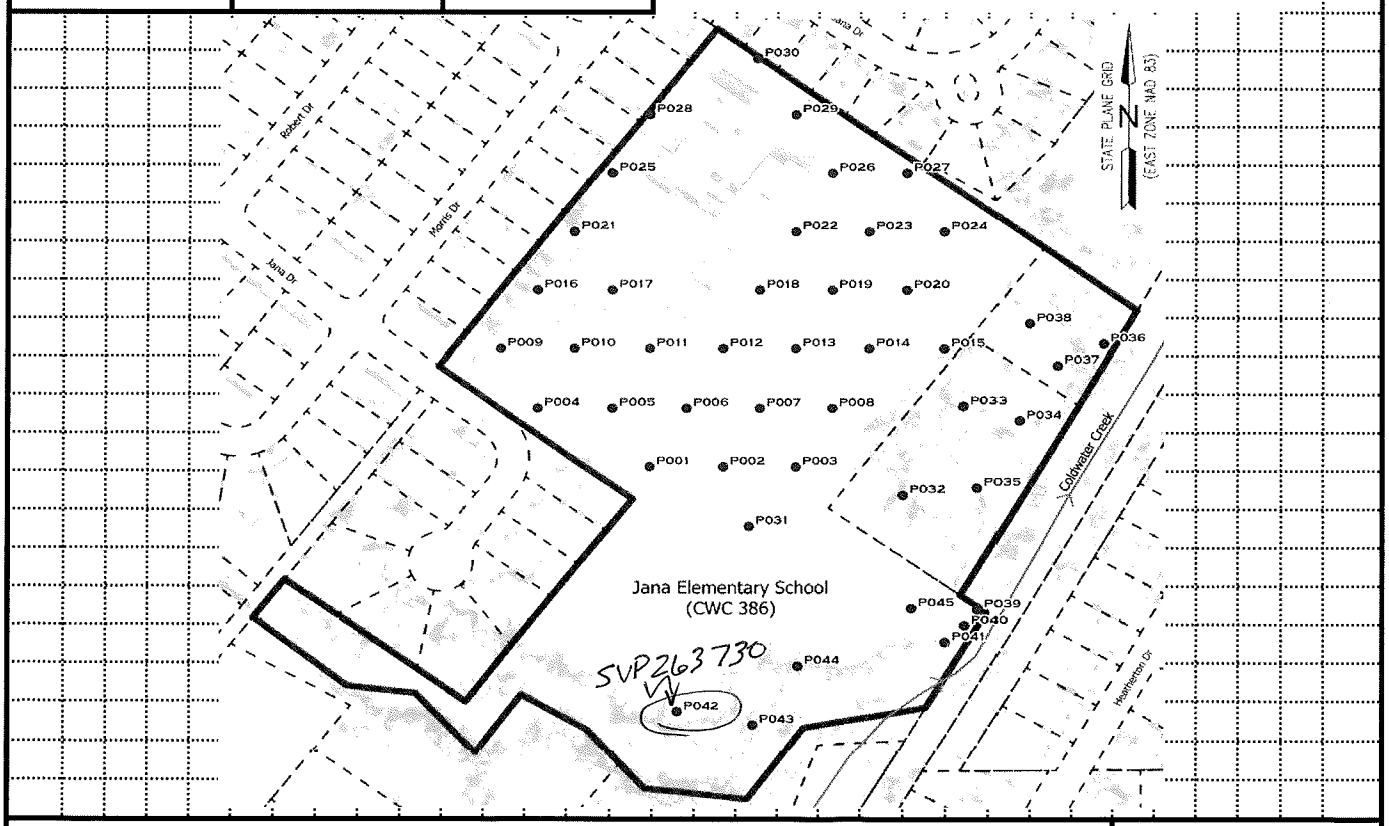
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 13	QA/QC - 0	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: ~~K Reed~~ CAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; ft. = Feet; msl = Mean Sea Level; cpm = Counts per minute; ppm = Parts per million; bgs = below ground surface; E = East; N = North



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 730

P42

HTRW DRILLING LOG (CONTINUATION SHEET) P 42

HOLE NUMBER SVP263 730

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dildl

Sheet 2 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt little clay, brown, non-plastic, loose, crumbly, dry grass @ surface, Roots throughout interval ML	0.0 / 7700	48/48	SVP263730 @ 1041	NA	Background 7200 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1		0.0 / 7700				
		Silt Some clay, dark brown, med. plastic, soft, dry (silt loam) ML	0.0 / 7600		SVP263731 @ 1046		
	2		0.0 / 7600				
			0.0 / 7600				
	3		0.0 / 7700				
			0.0 / 7700				
			0.0 / 7800	48/48	SVP263732 @ 1048		
	4	Same as above trace mica ML	0.0 / 7400	48/48			
ML	5		0.0 / 7700				
			0.0 / 7700				
			0.0 / 7800		SVP263733 @ 1054		
	6		0.0 / 7900				
			0.0 / 7700				
	7		0.0 / 7900		SVP263734 @ 1056		
			0.0 / 7600	48/48			
CL	8	Silty clay some silt, dark olive gray, high plasticity very stiff, dry	0.0 / 7800	48/48			
			0.0 / 7900		SVP263735 @ 1110		
ML	9	Silt, few clay, some Fe O/MnO streaking/layering staining, non-plastic soft, wet ML	0.0 / 7900				H_2O ▽ 9.2' bgs
			0.0 / 8000		Archive @ 1117		
	10						

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14 gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 730

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P42

HTRW DRILLING LOG (CONTINUATION SHEET)

P42

HOLE NUMBER SVP263 730

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: John Dolle

Sheet 3 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML		Silt, few clay, some FeO/MnO streaking/ layering/ staining, non-plastic, soft, wet ML	0.0 / 7600	42/48		NA	Background 7200 CPM (CPM - Counts per minute numbers; CPMs are gross)
	11		0.0 / 7600				
			0.0 / 7800		SVP263736 @ 1114		
No Recovery	12	No Recovery	X	No Recovery			No Recovery
ML		Silt, little clay, some FeO/ MnO stains, non-plastic stiff, ~~[illegible]~~ JLD moist, root traces ML	0.0 / 7100	48/48			
	13	Silt few clay, lt. brown non-plastic, stiff, damp, some red-orange mottles ML	0.0 / 7300				
			0.0 / 7900		SVP263737 @ 1125		
	14		0.0 / 7800				
		Silt trace clay, dark gray, non-plastic, stiff, damp-moist ML	0.0 / 7600				
	15		0.0 / 7600				
			0.0 / 7800		SVP263738 @ 1127		
	16		0.0 / 7600	48/48			Archive colleted to capture wood + organic material JLD 1/4/22
		Same as above, wood organic layers, etc. ML	0.0 / 7300	48/48			
			0.0 / 7300		Archive @ 1136		16.4 - 16.9 Archive
ML	17	Silt, ~~few~~ JLD little clay, greenish-gray, low plasticity stiff, dry ML	0.0 / 7700		SVP263739 @ 1138		
	18		0.0 / 7600				
			0.0 / 7400				
	19		0.0 / 7400				
			0.0 / 7500		SVP263740 @ 1140		
	20		0.0 / 7400	48/48			

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout. 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP263 730

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P42

HTRW DRILLING LOG (CONTINUATION SHEET)

P42

HOLE NUMBER SVP263 730

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: John Dolde

Sheet 4 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML		Silt few clay, gray, non-plastic, med. stiff, damp-moist ML	0.0 / 7300	36/48		NA	Background 720 CPM (CPM - Counts per minute numbers; CPMs are gross)
			0.0 / 7500				
	21		0.0 / 7300		SVP263741 @ 1148		o.m = organic matter 21.25 - 21.75
		Same as above, little wood/roots - o.m.	0.0 / 7400				
	22	ML	7500				
			7600		SVP263742 @ 1150		
	23	No Recovery		NO Recovery			
	24	Borehole Terminated @24' bgs End 1155					
	25						

Boring completed with commercial soil JLD 11/7/22

USACE

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

ft. bgs: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP263 730

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P42

Start 1300 End 1431 P43

HTRW DRILLING LOG

DISTRICT	St. Louis P43	HOLE NUMBER	SVP263 743
1. COMPANY NAME	HGL	2. DRILLING SUBCONTRACTOR	HGL
SHEET	1 of 4 SHEETS		
3. PROJECT	Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION	405 Jana Dr. P43
5. NAME OF DRILLER(S)	Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL	GeoProbe 7822DT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	GeoProbe 7822DT GH63 Percussion Hammer MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION	N 1085141.437 E 872054.202
		9. SURFACE ELEVATION	~~496.6~~ 496.3 SLD ft msl
PID	592-601025 BKG: 0.0 ppm CAL DATE: 01/19/23	NaI	169245/174494 BKG: 200 CPM CAL DATE: 11/30/22
LUDLUM	163863/167708 BKG: 1238 CPM CAL DATE: 3/13/23	10. DATE STARTED	10/28/22
		11. DATE COMPLETED	10/28/22
12. OVERBURDEN THICKNESS	0 ft.	13. DEPTH DRILLED INTO ROCK	NA
15. DEPTH GROUNDWATER ENCOUNTERED	~~496.6~~ SLD 16.6 ft bgs		
14. TOTAL DEPTH OF HOLE	24 feet bgs	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED	NA
		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA
18. GEOTECHNICAL SAMPLES	DISTURBED: NA; UNDISTURBED: NA	19. TOTAL NUMBER OF CORE BOXES	NA

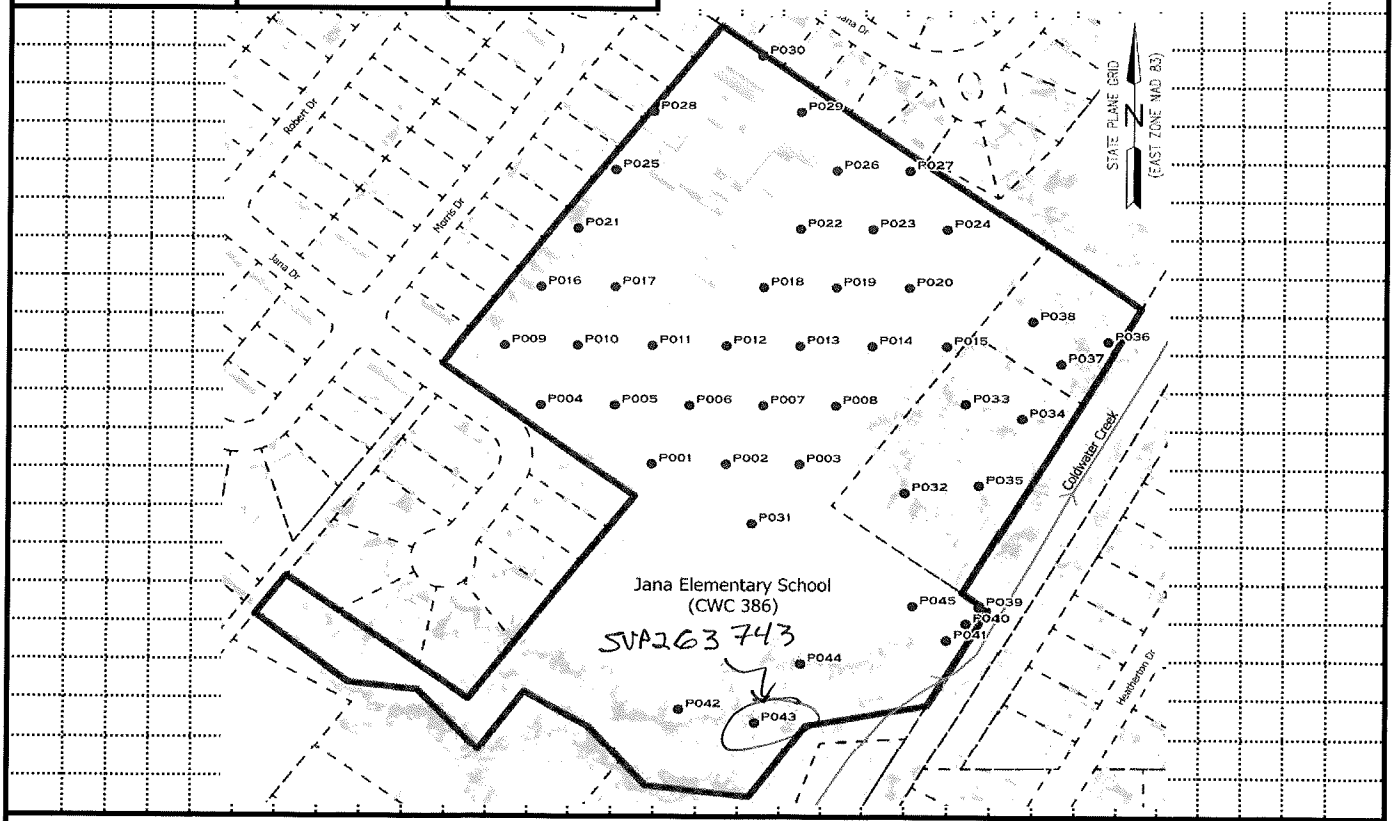
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 13	QA/QC - 0	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: ~~K Rood~~ DAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 743

P43

HTRW DRILLING LOG (CONTINUATION SHEET) P43

HOLE NUMBER SVP263 743

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: John Dodd

Sheet 2 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt, little clay brown, non-plastic, soft, crumbly, dry few roots, few grass @ surface ML	0.0 / 7500	4/4 / 48	SVP263 743 @ 1317	NA	Background 7200 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1	Silt, gray-brown, non-plastic, crumbly, 2-4 mm laminations/ partings dry ML	0.0 / 7500				
			0.0 / 7400				
	2		0.0 / 7600		SVP263744 @ 1319		
			0.0 / 7500				
	3		0.0 / 7400				
		Silt, few clay, lt. brown non-plastic, med. stiff dry ML	0.0 / 7700		SVP263745 @ 1321		
			0.0 / 7600	4/4 / 48			
NR	4	No Recovery		No Recovery			
ML CH JZD		SAME AS ABOVE ML	0 / 7500	4.8/48		NA	
	5		7600		SVP263746 @ 1332		
CH		Clay some silt, dark olive gray, high plasticity hard, dry CH	7700				
	6		7600				
			0.0 / 7500				
		Silt, little clay, gray, med plastic, v-stiff, dry some MnO streaking, Nodules ML	0.0 / 8000		SVP263747 @ 1334		
	7		0.0 / 7600				
ML			0.0 / 7600	4.8/48			
	8	Same As Above ML	0.0 / 7700	45/48			
			0.0 / 7700				
	9		0.0 / 7700		SVP263748 @ 1342		
			0.0 / 7300				
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 743

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P43

HTRW DRILLING LOG (CONTINUATION SHEET)

P43

HOLE NUMBER: SVP263 743

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: John Dodd

Sheet 3 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	11	Silt, little clay, gray, med. plastic, v. stiff, dry, some MnO staining/Nodules ≥1mm laminations throughout ML	0.0 7300; 0.0 7500; 0.0 7700; 0.0 7500	45/48; 43/48	SVP263749 @ 1344	NA	Background 7200 CPM (CPM - Counts per minute; CPMs are gross numbers)
NR	12	NO RECOVERY		NO RECOVERY			NO RECOVERY
ML	13	Silt, few clay, gray, non-plastic, soft, MnO nodules & streaks V. Moist.	0.0 7600; 0.0 7800; 0.0 7500; 0.0 7600; 0.0 7500; 0.0 7600; 0.0 7600; 0.0 7300	48/48; 48/48	SVP263750 @ 1354; SVP263751 @ 1356	NA	
ML	17	Silt, trace clay, gray, non-plastic, stiff, wet ML	0.0 7400; 0.0 7500; 0.0 7500; 0.0 7500; 0.0 7400; 0.0 7200	42/48; 42/48	SVP263752 @ 1402; SVP263753 @ 1404		▽ 16.6 ft. bgs
NO Recovery	20	No Recovery		NO Recovery			

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 743

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

P43

HOLE NUMBER	Sheet	Sheets
SVP263 743	4 of 4	

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: [signature]

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	20	Silt, dark gray, non-plastic stiff, moist ML	0.0 / 7200	48/48			Background 7200 CPM (CPM - Counts per minute; CPMs are gross numbers)
			0.0 / 7100				
	21		0.0 / 7300				
ML		SAME AS ABOVE - Gastropod Shells 1.5-1.75 ML	0.0 / 7400		SVP263754 @1415		
	22	Some gastropod shells, 2.25-2.5 ML	0.0 / 7400		Archive @1417		22.25-22.75
			0.0 / 7300				
	23		0.0 / 7300				
		Same as above few roots/wood ML	0.0 / 7300	48/48	SVP263755 @1419		
	24	Borehole Terminated @ ~~18~~ 24 ft. bgs End: 1431					

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[signature] USACE

Boring Completed with commercial top soil JCD 11/7/22

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout; 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP263 743

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P43

START 0800 End 0910 P44

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP263 756
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 4 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P44 405 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085238.437 E 872127.509	
	9. SURFACE ELEVATION: 496.3 ft msl	
	10. DATE STARTED: 10/29/22	11. DATE COMPLETED: 10/29/22
	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 24 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	169246/174868	163863/167718
BKG: 0.0 ppm	BKG: 7655 CPM	BKG: 1260 CPM
CAL DATE: 01/19/23	CAL DATE: 2/22/23	CAL DATE: 3/3/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

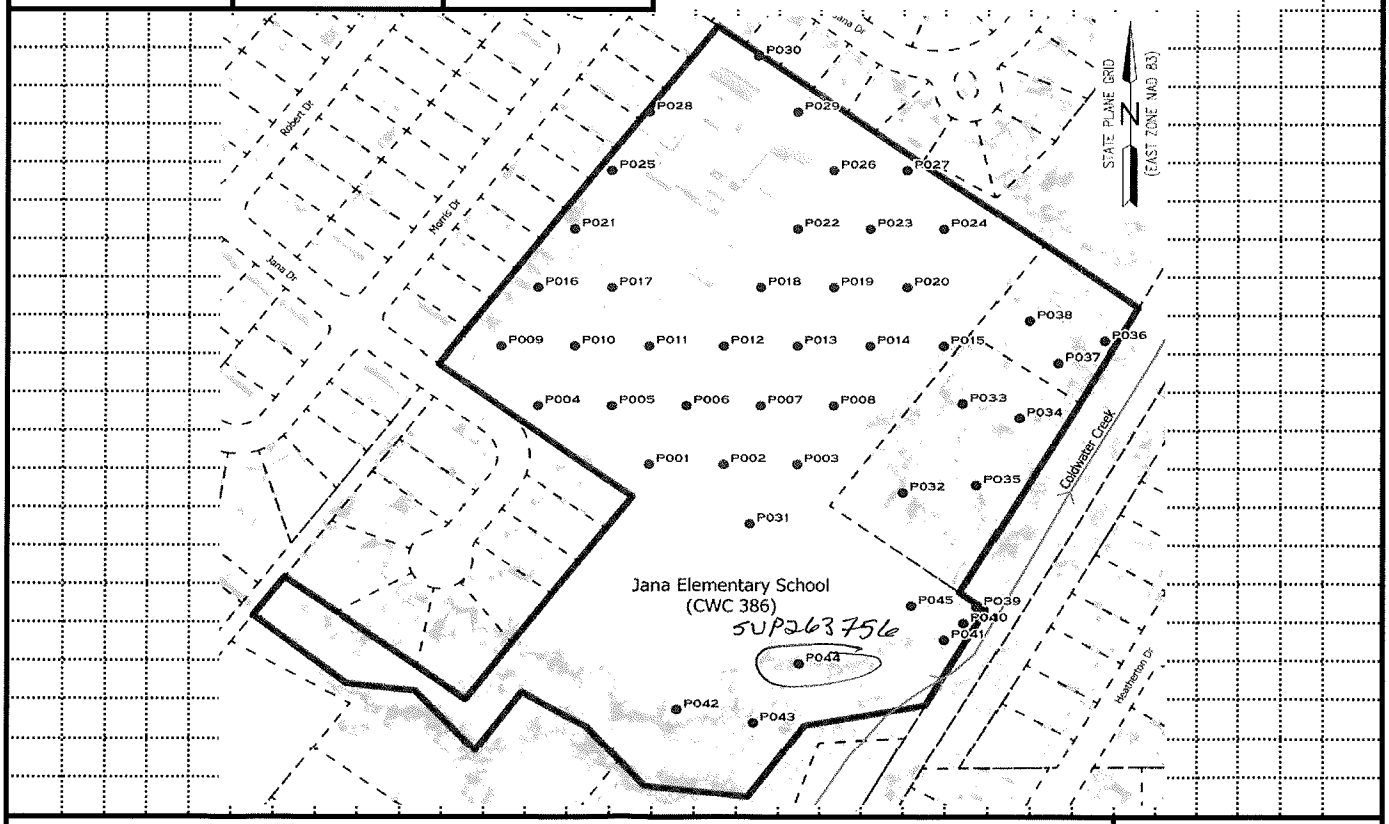
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 13	QA/QC - 0	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: Fred Carr SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 756

P44

HTRW DRILLING LOG (CONTINUATION SHEET)

P44

HOLE NUMBER: SVP263 756

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dolde

Sheet 2 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	silt, little clay, brown, non-plastic, crumbly, loose, dry, grass @ surface roots throughout	0.0 / 7600	48/48	SVP263754 @ 0804	NA	Background 7655 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1	silt, lt. brow, dark brown laminations 1-2 mm, non-plastic, stiff - breaks under moderate finger press. dry roots	0.0 / 7800				
		ML	0.0 / 7600				
	2		0.0 / 7800		SVP263757 @ 0806		
			0.0 / 7600				
	3		0.0 / 7701				
			0.0 / 7700		SVP263758 @ 0505		
	4	silt little clay dark brown, non-plastic, loose crumbly, dry	0.0 / 7600	48/48			
		ML	0.0 / 7700	48/48			
		SAME AS ABOVE					
CH	5	clay, some silt, dark brown, high plasticity moist, dry roots throughout,	0.0 / 7800		SVP263759 @ 0816		
		CH	0.0 / 7600				
			0.0 / 7800				
	6		0.0 / 8000		Archive @ 0818		
			0.0 / 8000				
	7		0.0 / 7900				
			0.0 / 8000	48/48	SVP263760 @ 0820		
	8	clay some silt, dark gray, med-high plastic v. stiff, dry roots throughout	0.0 / 7600	48/48			
		CL	0.0 / 8000				
	9		0.0 / 8000		SVP263761 @ 0829		
		silt few clay olive gray non-plastic, stiff dry ≥1 mm laminations	0.0 / 7780	↓		NA	
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout, 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 756

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P44

HTRW DRILLING LOG (CONTINUATION SHEET) P44

HOLE NUMBER SVP263 756

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: John Dodd

Sheet 3 of Sheets 4

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	11	Silt, few clay olive gray non-plastic, stiff, dry 2 mm laminations roots throughout interval ML	0.0 / 7900 0.0 / 7700 0.0 / 7700 0.0 / 7800	48/48 48/48	SVP263762 @ 0831	NA	Background 7655 CPM CPM - Counts per minute CPMs are gross numbers
	12	Same as above w/ 1-2 mm laminations FeO Nodule 12.4'-12.6' seam ML	0.0 / 7800 0.0 / 7900	48/48			
	13	FeO staining 13.4' 13.7' ML	0.0 / 8100 0.0 / 7700		SVP263763 @ 0844		
ML	14		0.0 / 7700 0.0 / 7600				
	15	Silt, trace clay, gray non-plastic, soft, moist 2 mm laminations some FeO nodules/staining ML	0.0 / 7600 0.0 / 8000	48/48	SVP263764 @ 0846		
	16	Same as above	0.0 / 7700 0.0 / 7700	42/48			
	17		0.0 / 7700		SVP263765 @ 0854		
ML	18		0.0 / 7500 0.0 / 7600 0.0 / 7500				
	19		0.0 / 7800	42/48	SVP263766 @ 0856		
No Recovery		No Recovery		No Recovery		NA	

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

ft. bgs: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 756

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P44

HTRW DRILLING LOG (CONTINUATION SHEET)

P44

HOLE NUMBER SVP263 756

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dodd

Sheet 4 of 4 Sheets

ft. bgs

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Silt trace Clay, tan non-plastic, soft, damp	0.0 / 7700			NA	Background 71655 CPM (CPM - Counts per minute; CPMs are gross numbers)
		ML	0.0 / 8000				
	21		0.0 / 8000		SVP263767 @ 0902		
ML		Silt, gray non-plastic med stiff, damp	0.0 / 8000				
		ML	0.0 / 8000				
	22		0.0 / 8000				
			0.0 / 8000		SVP263768 @ 0904		
	23		0.0 / 7700				
No Recovery	24	No Recovery		No Recovery		NA	No Recovery
		Borehole Terminated @ 24' bgs ENR0910					
	25						
				Greg Rakers, Jay Rakers 10/29/2022 0925			
							Backfilled with high solids (30%) grout & surface completed with commercial top soil JRD 11/1/22
							NOTES: SVP = St.APS Vicinity Property; NR = No Recovery; Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 756

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P44

START 0815 END 0913

HTRW DRILLING LOG

DISTRICT: St. Louis P4	HOLE NUMBER: SVP263 808	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P4 405 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085882.928 E 871718.127	
	9. SURFACE ELEVATION: 504.8 ft msl	
	10. DATE STARTED: 10/31/22	11. DATE COMPLETED: 10/31/22
	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	181740 / 109339/340 JZD	156376/164817
BKG: 0.0 ppm	BKG: 7217 CPM	BKG: 1209 CPM
CAL DATE: 01/19/23	CAL DATE: 8/25/23	CAL DATE: 11/20/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

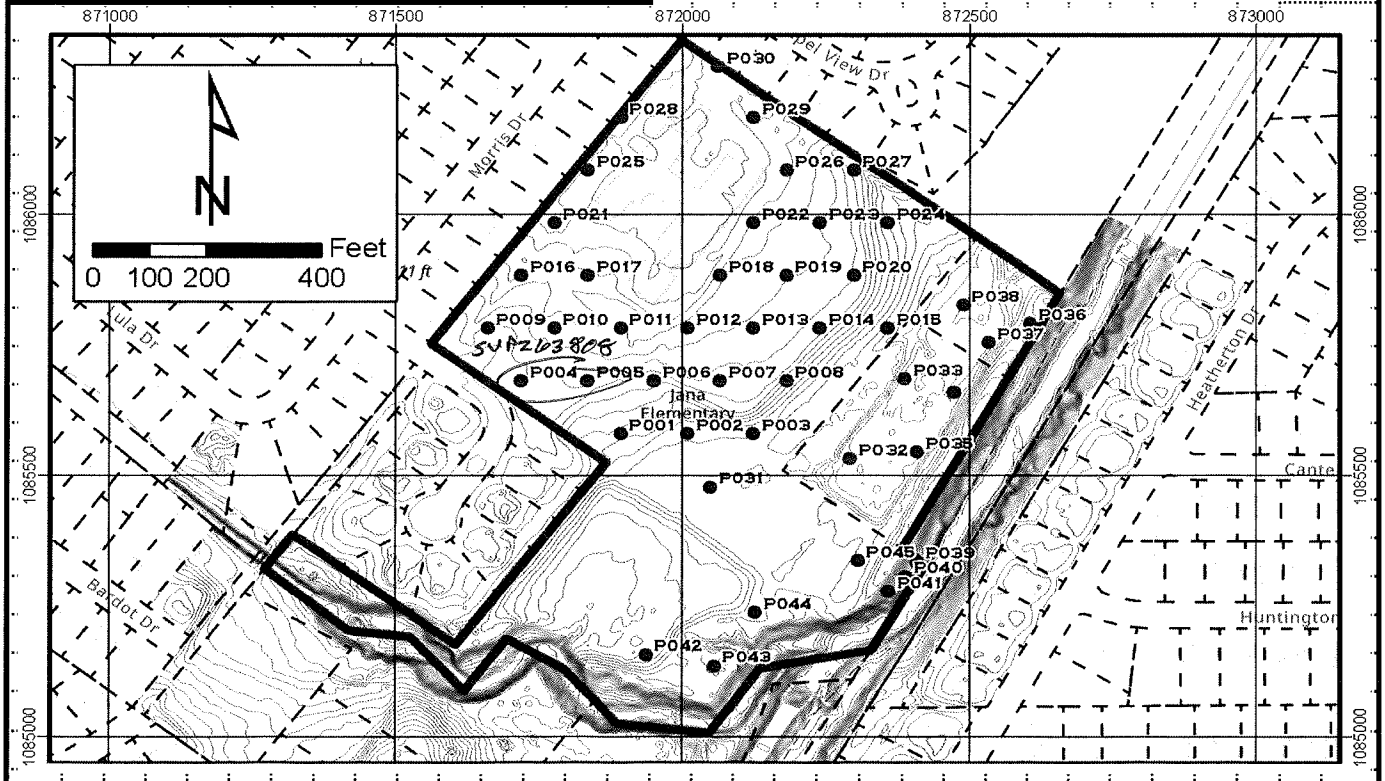
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 3	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: L. Reed QAR — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; ft. = Feet; msl = Mean Sea Level; cpm = Counts per minute; ppm = Parts per million; bgs = below ground surface; E = East; N = North



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 808

P4

HTRW DRILLING LOG (CONTINUATION SHEET) P4

HOLE NUMBER SVP263 808

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dodd

Sheet 2 of 3 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	0	Silt little clay Brown, non-plastic loose, crumbly dry, grass@surface roots throughout m	0.0 / 7000	48/48	SVP263808 @0830	NA	Background 7217 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1	Silt Lt. Brown, nonplastic dry, 2-4 mm partings, blocky structure roots ML	0.0 / 6800		SVP263809		Samples SVP263809 1'-1.5' @0832
ML	2		0.0 / 7000		@0832 SLD		
			0.0 / 7100				
	3		0.0 / 6900				
		Silt, few clay, brown, non-plastic loose crumbly dry ML	0.0 / 6800		SVP263810 SLD		
	4		0.0 / 7000	48/48	@0834		
			0.0 / 7200	48/48	Archive @0846		
	5		0.0 / 7000				
		Silt, little clay lt. brown MnO nodules, low plastic soft, crumbly, dry, faint ≥1mm laminations	0.0 / 6900				
ML	6	ML	0.0 / 7000		SVP263811 0848		
			0.0 / 7000				
	7		0.0 / 6900				
			0.0 / 7000				
	8	Silt few clay, gray, MnO nodules, non-plastic soft. damp	0.0 / 7200	48/48	SVP263812 0850		
		Silt little clay light brown, MnO nodules, Fe0 staining, low plasticity, soft, damp	0.0 / 6700	48/48			
NV	9	ML	0.0 / 7000		SVP263813 @0858		
			0.0 / 7000				
	10		0.0 / 7000			NA	

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 808

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P4

HTRW DRILLING LOG (CONTINUATION SHEET)

P4

HOLE NUMBER SVP263 808

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: John Dolde

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		silt, little clay, light brown MnO, FeO nodules, staining low plastic, soft, dry	0.0 / 7300	48/48	SVP263814 @ 0900	NA	Background 7217 CPM (CPM - Counts per minute; CPMs are gross numbers)
		M	0.0 / 7100				
	11		0.0 / 7100				
			0.0 / 6900	48/48	Archive 0902		
	12	SAME AS ABOVE FeO cemented	0.0 / 6700	48/48			
ML			0.0 / 6700				
	13	ML	0.0 / 6900				
			0.0 / 7000		SVP263815 @ 0910		
	14		0.0 / 6700				
		FeO cemented silt, v. stiff orange-red, non-plastic, dry	0.0 / 7200				
	15	ML	0.0 / 7200		SVP263816 @ 0912		
			0.0 / 6800	48/48	Archive @ 0914	NA	
	16						
		Borehole Terminated @ 16' bgs End: 0913					
					0940	10/31/22	
							Borehole completed with commercial top soil JLD 11/7/22

John Dolde

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP263 808

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P4

Start 0927 End 1026

HTRW DRILLING LOG

DISTRICT: St. Louis PID

HOLE NUMBER: SVP263 817

SHEET: 1 of 3 SHEETS

1. COMPANY NAME	HGL
2. DRILLING SUBCONTRACTOR	HGL
3. PROJECT	Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO
4. LOCATION	PID 405 Jana Dr.
5. NAME OF DRILLER(S)	Travis Hearne, Cody Schwartz, Kevin Sutton
6. MANUFACTURER'S DESIGNATION OF DRILL	GeoProbe 7822DT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	GeoProbe 7822DT GH63 Percussion Hammer MC-7 3.5" OD DPT Sampler
8. HOLE LOCATION	N 1085789.807 E 871769.312
9. SURFACE ELEVATION	506.3 ft msl
10. DATE STARTED	10/31/22
11. DATE COMPLETED	10/31/22
15. DEPTH GROUNDWATER ENCOUNTERED	NA
12. OVERBURDEN THICKNESS	0 ft.
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED	NA
14. TOTAL DEPTH OF HOLE	16 feet bgs
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

PID	NaI	LUDLUM
592-601025	169239/185740	164817/156376
BKG: 0-0 ppm	BKG: 7217 CPM	BKG: 1/209 CPM
CAL DATE: 01/19/23	CAL DATE: 8/25/23	CAL DATE: 4/20/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

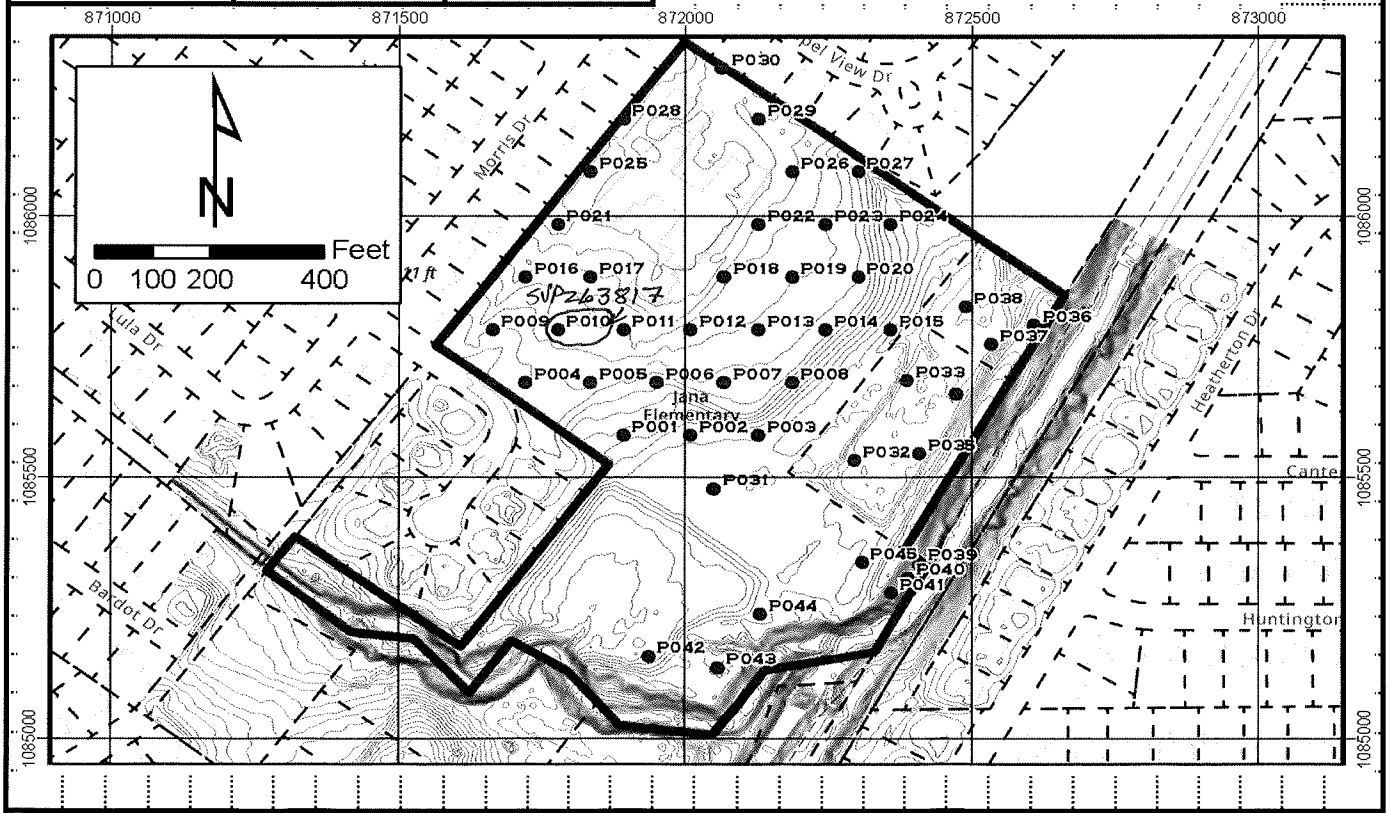
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K Reed Oak SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; ft. = Feet; msl = Mean Sea Level; cpm = Counts per minute; ppm = Parts per million; bgs = below ground surface; E = East; N = North



PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

HOLE NUMBER: SVP263 817

PID

HTRW DRILLING LOG (CONTINUATION SHEET)

P10

HOLE NUMBER SVP263 817

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dalde

Sheet 2 of 3 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	0	Silt little clay, brown, non-plastic, loose crumbly dry grass @ surface roots throughout ML	0.0 / 6600	48/48	SVP263817 @0943 -1,-2	NA	Background 7217 CPM (CPM - Counts per minute; CPMs are gross numbers)
			0.0 / 6800				Duplicate Sample 0-5' @ 0943 (-1,-2)
	1	Silt FEW CLAY, brown, low plastic, low stiffness, damp, FeO staining ML	0.0 / 6700				
ML			0.0 / 6800		1.5-2		SVP263818 @0945 1.5-2
	2		0.0 / 6900				
			0.0 / 6800				
	3		0.0 / 6900		3-3.5		SVP263819 @0947 3-3.5
			0.0 / 6700	48/48			
	4	SAME AS ABOVE ML	0.0 / 6800	48/48	4-4.5		Archive @0958 4-4.5
		Silt, few clay, light brown, non-plastic, SAME damp. stiff JRA ML	0.0 / 6700				
ML	5		0.0 / 6600				
		Silt few clay gray-brown, MnO/FeO nodules & staining, non-plastic, SAME ≥1 mm laminations ML	0.0 / 7000		5.5-6		SVP263820 @1000 5.5'-6
	6		0.0 / 6900				
			0.0 / 7080		6.5-7		SVP263821 @1002 6.5-7
	7		0.0 / 6700				
			0.0 / 6700	48/48			
	8	SAME AS ABOVE ML	0.0 / 6600	48/48			
ML			0.0 / 6700				
	9		0.0 / 6900		SVP263822 @1010 9-9.5		
		FeO nodule / FeO staining ML	0.0 / 6900			NA	
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 817

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P10

HTRW DRILLING LOG (CONTINUATION SHEET) P10

HOLE NUMBER SVP263817

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/NORCO

Inspector: John Dalle

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Silt trace clay gray, non-plastic, ~~soft~~ soft, damp, trace MnO nodules JLD	0.0 / 6900	48/48		NA	Background 7217 CPM CPM - Counts per minute CPMs are gross numbers
		ML	0.0 / 7000		SVP263823 @ 1012 10.5-11		
ML	11		0.0 / 6900				
			0.0 / 6800	48/48			
	12	SAME AS ABOVE ML	0.0 / 6700	39/48			
			0.0 / 6800				
	13		0.0 / 6800		13-13.5		SVP263824 @ 1024 13-13.5
ML			0.0 / 6600				
	14		0.0 / 6800				
			0.0 / 6800	39/48	14.7-15.2		SVP263825 @ 1026 14.7-15.2
	15		0.0 / 6600				
		No Recovery		No Recovery ~~39/48~~ JLD			No Recovery
	16						
		Borehole Terminated @ 16' bgs End: 1026					

La Patta 1038 10/31/2022

Borehole completed with commercial top soil JLD 11/7/22

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
JLD
~~Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water.~~
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water
Top soil completion
~~Backfilled with hydrated bentonite chips: 1 gallon water per 2 foot chips~~ JLD

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP263 817

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P10

START 1045 End 1143 P11

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP263 826
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P11 405 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085770.838 E 871882.065	
	9. SURFACE ELEVATION: 506.7 ft msl	
10. DATE STARTED: 10/31/22	11. DATE COMPLETED: 10/31/22	
15. DEPTH GROUNDWATER ENCOUNTERED: NA		
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	169039/188940	156376/164817
BKG: 0.0 ppm	BKG: 7217 CPM	BKG: 1/209 CPM
CAL DATE: 01/19/23	CAL DATE: 8/25/23	CAL DATE: 4/20/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

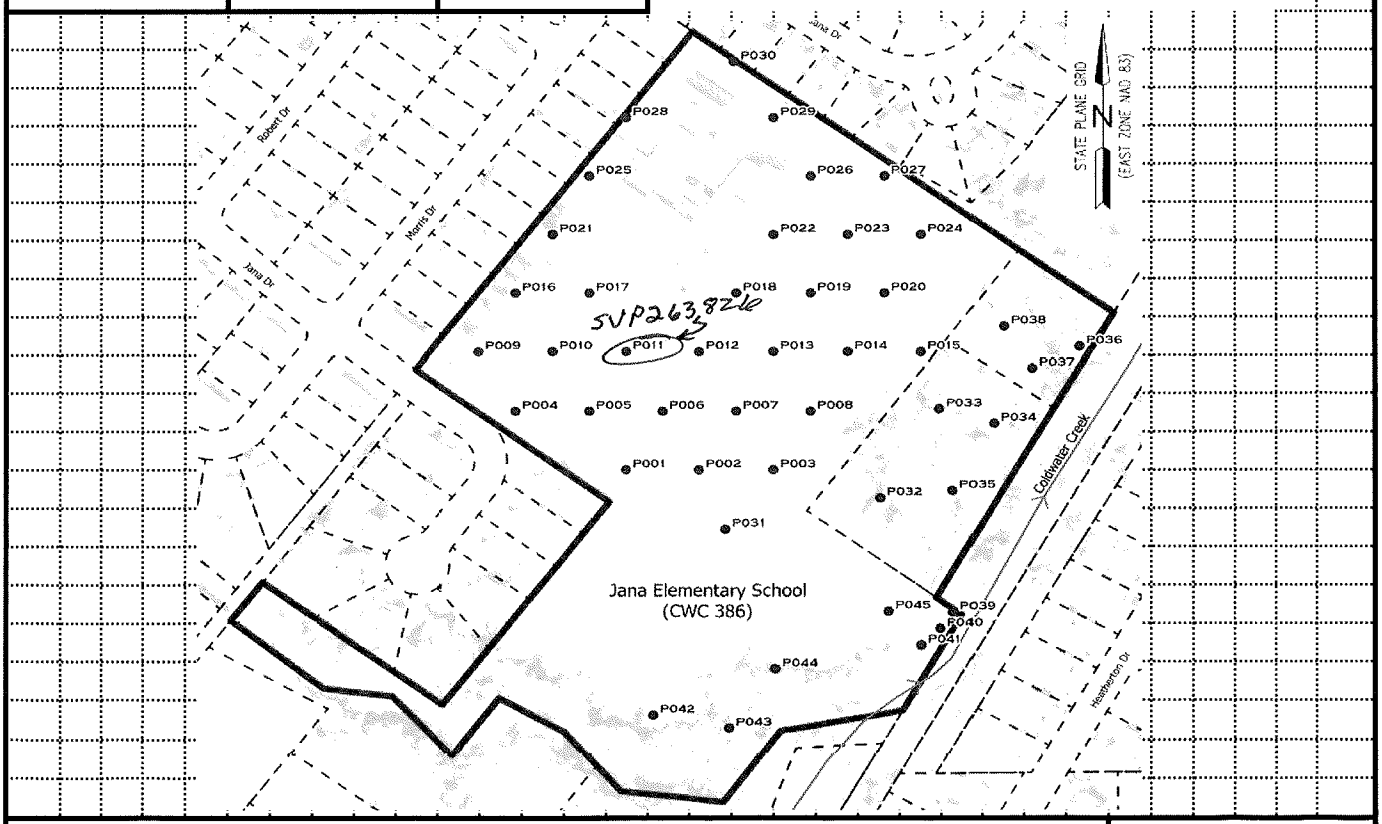
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 826

P11

HTRW DRILLING LOG (CONTINUATION SHEET)

P11

HOLE NUMBER SVP263 826

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: John Dolde

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Silt, little clay, brown, non-plastic, soft, crumbly, Grass @ surface Roots through out 0-4' interval	0.0 / 6500	48"/48"	SVP263826 @1104 -1, -2	NA	Background 7217 CPM CPM - Counts per minute CPMs are gross numbers
	1	Silt, few clay reddish brown, non-plastic, stiff breaks w/ moderate finger pressure, blocky structure dry, Roots	0.0 / 6600				Duplicate @ 0-0.5' (-1, -2 SVP263826
			0.0 / 6800				
ML		ML	0.0 / 6900		SVP-JLD 1.5'-2'		SVP263827 @1106
	2		0.0 / 7000				
			0.0 / 6800				
	3		0.0 / 6900				
			0.0 / 6900	48"/48"	3.5'-4'		SVP263828 @1108
	4		0.0 / 6600	48"/48"			
			0.0 / 7000				
	5	Silt, few clay, lt. brown, non-plastic - low plastic soft, few FeO stains, ≥1mm laminations Damp	0.0 / 6600				
			0.0 / 7000		5.5-6		SVP263829 @1118
	6	ML	0.0 / 6900				
			0.0 / 6900				
	7		0.0 / 6900				
ML			0.0 / 7000	48"/48"	7.5-8		SVP263830 @1120
	8		0.0 / 6700	48"/48"			
			0.0 / 7000				
	9		0.0 / 7000		SVP263831 @1129 9-9.5		
	10	Silt trace clay gray, non-plastic, soft, damp, MnO ned.	0.0 / 6700				

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

JLD

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water Tap

Soil completion

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips

JLD

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

HOLE NO. SVP263 826

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P11

HTRW DRILLING LOG (CONTINUATION SHEET)

P11

HOLE NUMBER: SVP263 826

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: John Dolde

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	10						Background 7217 CPM CPM - Counts per minute CPMs are gross numbers
	11	Silt, trace clay, gray, trace Mn,O nodules, non-plastic soft, damp ML	0.0 / 7000 0.0 / 7000 0.0 / 7000	48"/48"	11-11.5	NA	SVP263882 @ 1131 11-11.5
	12	Silt, red/orange, FeO cemented, non plastic, stiff dry Silt few clay, gray, FeO staining, non-plastic soft, damp, few MnO nodules ML	0.0 / 6800 0.0 / 6900 0.0 / 6800 0.0 / 6800	48"/48" 48"/48"	11.5-12		Archive @ 1133 11.5-12
ML	13						
	14	Silt trace clay, tan, trace yellow mottles, non-plastic, soft, moist ML	0.0 / 6900 0.0 / 6900		13.5-14		SVP263833 @ 1138
	15		0.0 / 6900 0.0 / 6800		14.5-15		SVP263834 @ 1140
	16		0.0 / 6800	48"/48"	15.5-16	NA	Archive @ 1142
	17	Borehole Terminated @ 16 ft bgs End: 1145					Seller 10/31-2022 @ 1150
	18						Borehole completed with commercial tap soil JD 11/1/22
	19						NOTES: SVP = SLAPS Vicinity Property NR = No Recovery JZH Backfilled with cement-strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water TAN soil completion Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips JZH
	20						

ft. bgs

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 826

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P11

START 1255 END 1400

HTRW DRILLING LOG

DISTRICT: St. Louis P21	HOLE NUMBER: SVP263 835	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P21 409 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085994.112 E 871780.736	
	9. SURFACE ELEVATION: 510.5 ft msl	
	10. DATE STARTED: 10/31/22	11. DATE COMPLETED: 10/31/22
	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 10 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	169239/185740	156376/164817
BKG: 0.0 ppm	BKG: 7217 CPM	BKG: 1209 CPM
CAL DATE: 01/19/23	CAL DATE: 8/25/23	CAL DATE: 4/20/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

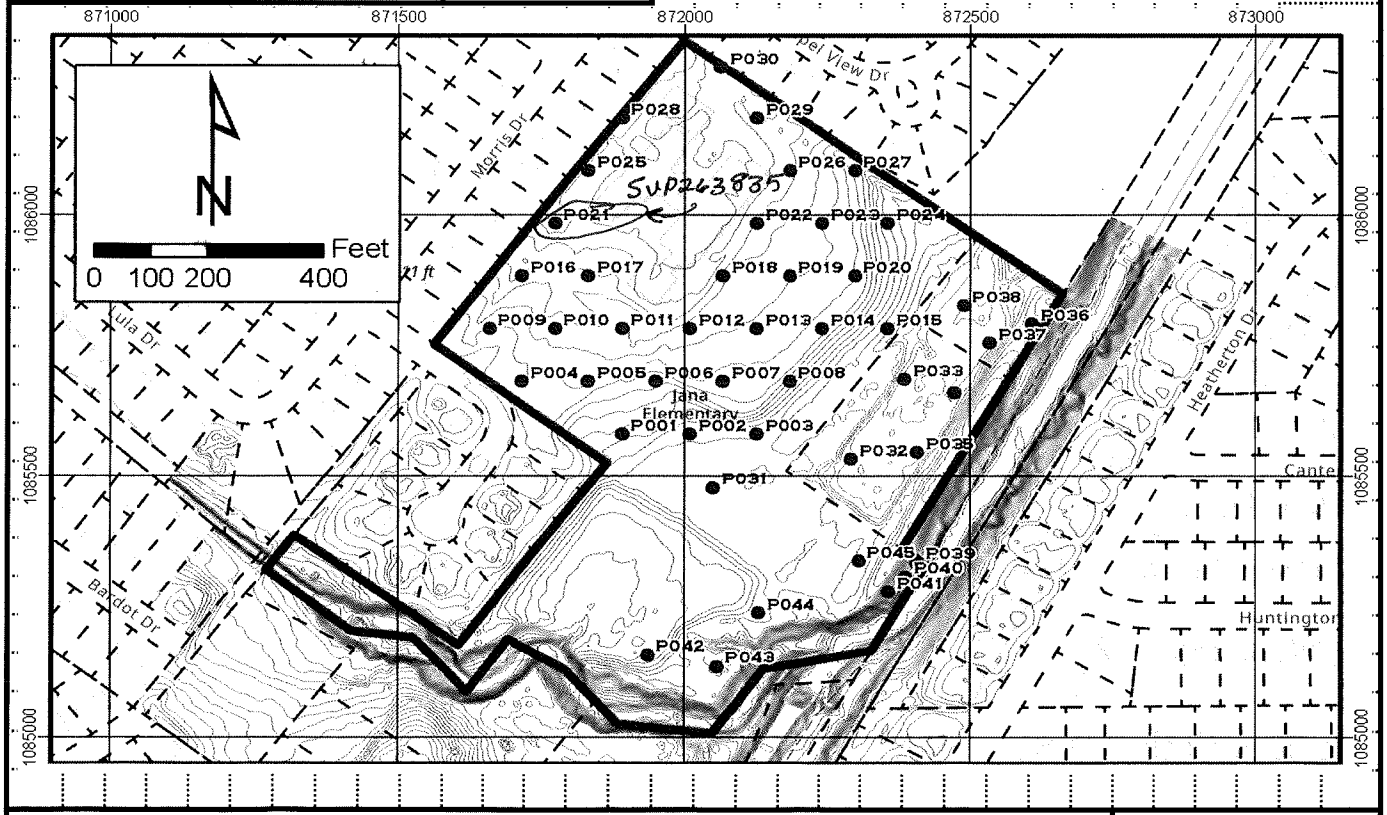
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT	HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	SVP263 835

P21

HTRW DRILLING LOG (CONTINUATION SHEET) P21

HOLE NUMBER SVP263 839

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: John Dolde

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt, little clay brown, non-plastic, crumbly, loose dry grass@surf. roots	0.0 / 6780	43/48	SVP263835 @1306	NA	Background 7217 CPM
							CPM - Counts per minute
							CPMs are gross numbers
	1	Silt few clay brown non-plastic, loose crumbly blocky structure, dry roots ML	0.0 / 6700				
			0.0 / 7000		1 - 1.5		SVP263836 @1308
	2		0.0 / 6900				
			0.0 / 6780				
			0.0 / 6700				
	3		0.0 / 6800		3.3 JLD 3.0		SVP263837 @1310
			0.0 / 6800	43/48	3.2 - 3.7		
	4	No Recovery		No Recovery			
ML		Silt, few clay lt. brown mn0/Fe0 stains, non-low plastic, soft, damp. Roots throughout interval ML	0.0 / 7000	48"/48"			
	5		0.0 / 7000				
			0.0 / 7000				
			0.0 / 7000		5.5 - 6		SVP263838 @1316
	6		0.0 / 7300		6 - 6.5		SVP263839 @1318
			0.0 / 7200				
	7		0.0 / 7200		7 - 7.5		Archive @1320
			0.0 / 7100	48"/48"			
	8	Silt, few JLD clay, lt. brown Little non-plastic, soft, few yellow-orange mottles, damp	0.0 / 8100	48"/48"			New Background 7216 cpm @1331
ML		ML	0.0 / 8100				
	9		0.0 / 8200				
			0.0 / 8600		SVP263840 @1335 9.5-10		
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 feet chips

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 839

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P21

HTRW DRILLING LOG (CONTINUATION SHEET)

P21

HOLE NUMBER: SVP263 835

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dodd

Sheet 3 of 3

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	11	Clayey silt, (silt, little clay) lt. brown, non plastic, soft, damp. ML	0.0 / 8600	48" / 48"		NA	Background 7666 CPM CPM - Counts per minute CPMs are gross numbers
			0.0 / 8400				
			0.0 / 8800		11-11.5		SVP263841 @ ~~1351~~ 1337 JLD
	12		0.0 / 8500	48" / 48"			
		SAME AS ABOVE ML	0.0 / 8900	48" / 48"			
			0.0 / 9100		JLD 12.5-13		SVP263842 @ 1330
	13		0.0 / 8700				
ML	14		0.0 / 8700				
			0.0 / 9200				
			0.0 / 9300		14.5-15		SVP263843 @ 1352
	15		0.0 / 9100				
			0.0 / 9000	48" / 48"	Archive 15.5-16		Archive @ 1354
	16	Borehole Terminated @ 16' bgs End: 1400					Marie V. Pascual OPT MARIA PASCUAL 31 OCT 2022 1403 USACE Witness
							Borehole completed with commercial top soil JLD 11/7/22
							NOTES: SVP = SLAPS Vicinity Property NR = No Recovery JLD Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips JLD

ft. bgs: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 ~~839~~ JLD 835

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P21

START 0805 End 0920 P12

HTRW DRILLING LOG

DISTRICT: St. Louis	HOLE NUMBER: SVP263 844	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P12
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085783.571 E 872007848
	9. SURFACE ELEVATION: 506.5 ft msl
	10. DATE STARTED: 11/01/22 — 11. DATE COMPLETED: 11/01/22
	15. DEPTH GROUNDWATER ENCOUNTERED: NA ft. bgs
12. OVERBURDEN THICKNESS: 0 ft. — 13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16.0 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	169246/174868	156886/150909
BKG: 0.0 ppm	BKG: 6750 CPM	BKG: 17/1439 CPM
CAL DATE: 01/19/23	CAL DATE: 2/22/23	CAL DATE: 2/23/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

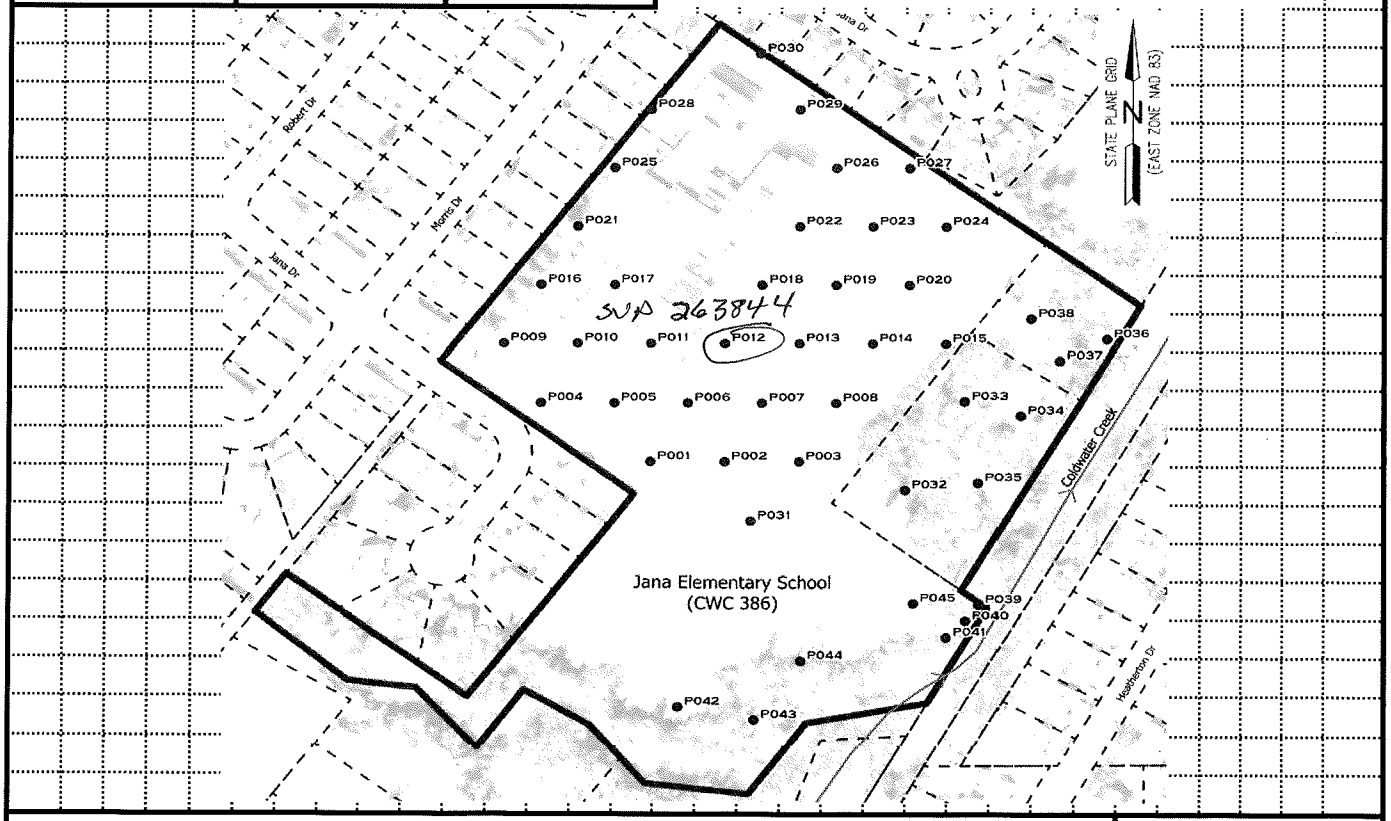
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QAR — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; ft. = Feet; msl = Mean Sea Level; cpm = Counts per minute; ppm = Parts per million; bgs = below ground surface; E = East; N = North



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 844

P12

HTRW DRILLING LOG (CONTINUATION SHEET) P12

HOLE NUMBER SVP263 844

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Doble

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	silt, little clay, brown non-plastic, soft crumbly, grass on surface, roots throughout ML	0.0 / 7100	48" / 48"	SVP263844 @0826 0-0.5	NA	Background 6750 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1	Silt, few clay, Red-brown, non-plastic, stiff, crumbly, blocky structure, roots throughout few MnO/FeO nodules/stains ML	0.0 / 6800				
			0.0 / 6900				
	2		0.0 / 7000		SVP263845 @0828 1.5-2		
			0.0 / 7000				
	3		0.0 / 7000				
			0.0 / 7000				
	4		0.0 / 7100	48" / 48"	SVP263846 @0830 3.5-4		
			0.0 / 6600	48" / 48"			
	5	silt, few clay, brown/ban non-plastic, soft, damp same red/orange FeO staing, little MnO nodules ≥1mm lamination	0.0 / 7000				
			0.0 / 6900				
	6	ML	0.0 / 7100		SVP263847 @0838 5.5-6		
			0.0 / 7100				
ML	7		0.0 / 7000				
			0.0 / 7000		SVP263848 @0840 7-7.5		
	8		0.0 / 6800	48" / 48"			
		SAME AS ABOVE ML	0.0 / 6900	48" / 48"			
	9		0.0 / 7000				
			0.0 / 7100		SVP263849 @0847 9-9.5		
	10		0.0 / 700				

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout; 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263844

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P12

HTRW DRILLING LOG (CONTINUATION SHEET)

P12

HOLE NUMBER SVP263844

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dodd

Sheet 3 of 3

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	11	Silt, few clay, brown, low-non-plastic, soft, damp some red/orange FeO staining, little MnO nodules ≥1mm laminations ML	0.0 / 6900 0.0 / 7100 0.0 / 7100	48" / 48"	SVP263850 @0849 11-11.5	NA	Background 6750 CPM CPM - Counts per minute numbers; CPMs are gross
	12	FeO nodule / layer, FeO cemented Silt hard, breaks with much finge pressure, dry ~12.0 Silt, trace clay, gray, non-plastic, soft, moist, little MnO nodules, ≥1mm laminations	0.0 / 6800 0.0 / 7100	48" / 48"			
	13	ML	0.0 / 7100 0.0 / 7100				
ML	14		0.0 / 7100 0.0 / 7000		SVP263851 @0854 13.5-14		
	15		0.0 / 6900 0.0 / 6900				
	16		0.0 / 7000	48" / 48"	SVP263852 @0856 15.5-16		
		Borehole Terminated @ 16' bgs End: 0900					USACE 11/1/2022 0910 Borehole completed with commercial top soil JDD 11/7/22

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 844

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P12

START: 0905 END: 0956 P18

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP263853
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P18 405 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085884.742 E 8720666.031	
	9. SURFACE ELEVATION: 507.4 JHD 507.3 ft msl	
	10. DATE STARTED: 11/01/22	11. DATE COMPLETED: 11/01/22
	15. DEPTH GROUNDWATER ENCOUNTERED: 6.0 ft. bgs	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16.0 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	169346/174868	156386/150909
BKG: 0.0 ppm	BKG: 6750 CPM	BKG: 17/1439 CPM
CAL DATE: 01/19/23	CAL DATE: 2/22/23	CAL DATE: 1/23/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

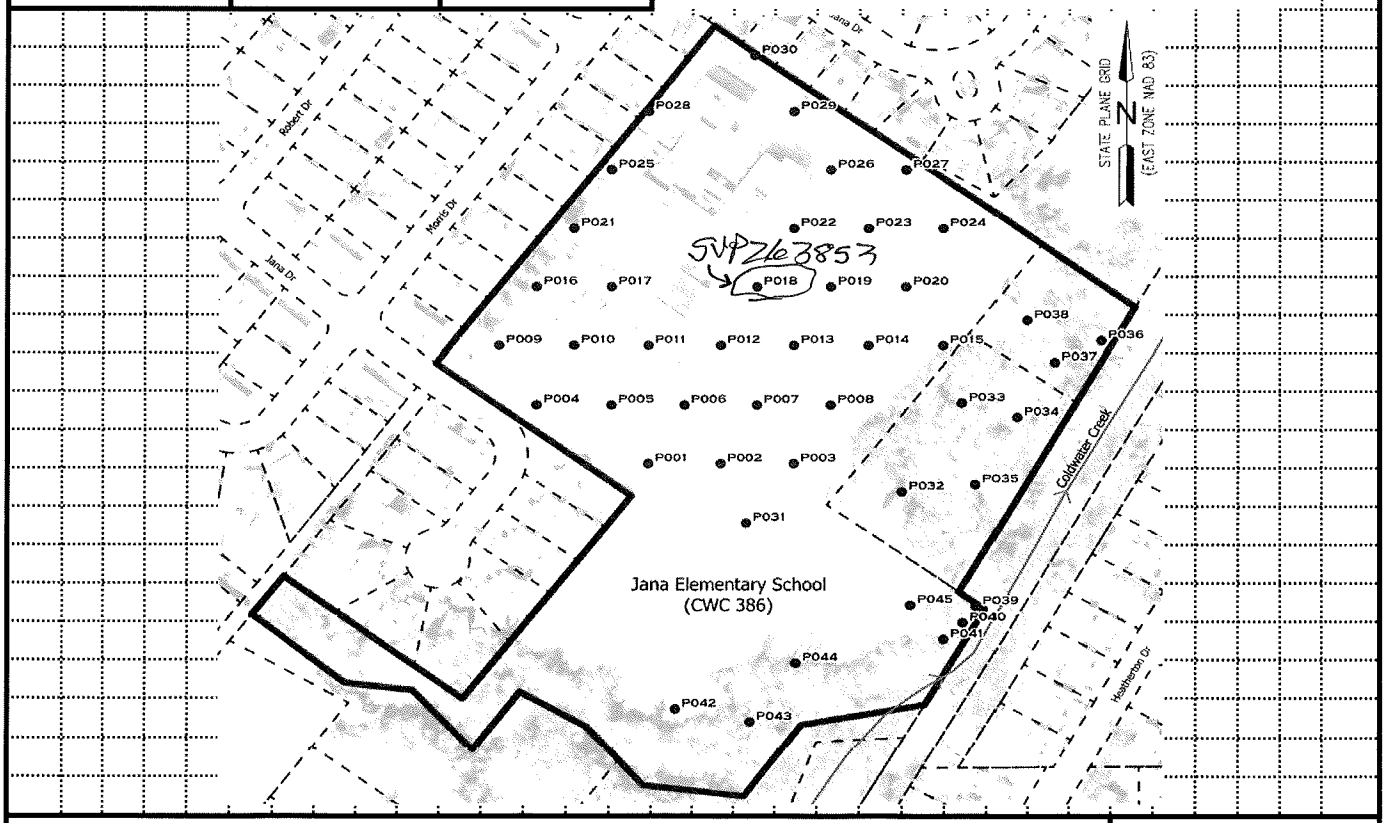
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263853

P18

HTRW DRILLING LOG (CONTINUATION SHEET) P18

HOLE NUMBER SVP263 853

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Goldd

Sheet 2 of 3

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt, little clay, brown, non-plastic, soft, crumbly, dry, grass @ surface roots ML	0.0 / 6900	48" / 48"	SVP263853 @0915 0-0.5	NA	Background 6750 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1		0.0 / 6900				
		Silt, few-trace clay, brown, non-plastic, stiff, blocky structure, breaks w/ moderate finger pressure, dry, roots ML	0.0 / 7100				
	2		0.0 / 7100		SVP263854 @0917 1.5-2		
			0.0 / 7000				
	3		0.0 / 7200				
			0.0 / 7300		SVP263855 @0919 3-3.5		
	4		0.0 / 7100	48" / 48"			
		SAME AS ABOVE ML	0.0 / 6900	48" / 48"			
	5		0.0 / 7000				
ML			0.0 / 7000				
	6		0.0 / 7100		SVP263856 @0920 5.5-6		▽ H2O 6.0 ft bgs
		Silt, gray, non-plastic, soft, wet ML	0.0 / 7100				
		Silt, little clay, lt. brown few orange mottles, non-plastic, low stiffness, damp ML	0.0 / 7100				
	7		0.0 / 7100				
			0.0 / 7100	48" / 48"	SVP263857 @0928 7.5-8		
	8		0.0 / 6900	48" / 48"			
		Silt, little clay, gray, few yellow/orange mottles, non-plastic, damp soft ML	0.0 / 7000				
ML	9		0.0 / 7000				
			0.0 / 7100		SVP263858 @0936 9.5-10		
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 853

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P18

HTRW DRILLING LOG (CONTINUATION SHEET)

P18

HOLE NUMBER	Sheet	Sheets
SVP263 853	3 of 3	

Project	Coldwater Creek Group 24 - Jana Elementary	FUSRAP/ NORCO	Inspector	John Dalde

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Silt, little clay, gray, few yellow/orange mottles, non-plastic, soft, damp	0.0 / 6900	48" / 48"		NA	Background 6750 CPM CPM - Counts per minute numbers CPMs are gross
ML		ML	0.0 / 7100				
	11		0.0 / 7200		SVP263859 @0938 11-11.5		
			0.0 / 7100	48" / 48"			
	12	SILT, gray, non-plastic stiff, wet, trace yellow-orange mottles	0.0 / 6900	48" / 48"			
		ML	0.0 / 6900				
	13		0.0 / 7000				
ML			0.0 / 7000		SVP263860 @0946 13.5-14		
	14		0.0 / 7000				
			0.0 / 7000				
	15		0.0 / 7100		SVP263861 @0948 15-15.5		
	16		0.0 / 7000	48" / 48"	Archive @0950 15.5-16		
		Borehole Terminated @ 16' bgs End 0956					USACE 11/1/2022 ~~09~~ 1005

Boring completed with commercial top soil
JLD 11/7/22

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project	Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	HOLE NO.	SVP263 853

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P18

START 1008 End; 1120

HTRW DRILLING LOG

DISTRICT: St. Louis PZZ	HOLE NUMBER: SVP263 862	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: PZZ 405 Jana Dr	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085986.032 E 872124.042	
	9. SURFACE ELEVATION: 507.8 ft msl	
	10. DATE STARTED: 11/01/22	11. DATE COMPLETED: 11/01/22
	15. DEPTH GROUNDWATER ENCOUNTERED: 8.0 ft. bgs	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16.0 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	169246 174868	156386 150909
BKG: 0.0 ppm	BKG: 6750 CPM	BKG: 17/1439 CPM
CAL DATE: 01/19/23	CAL DATE: 2/22/23	CAL DATE: 2/23/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

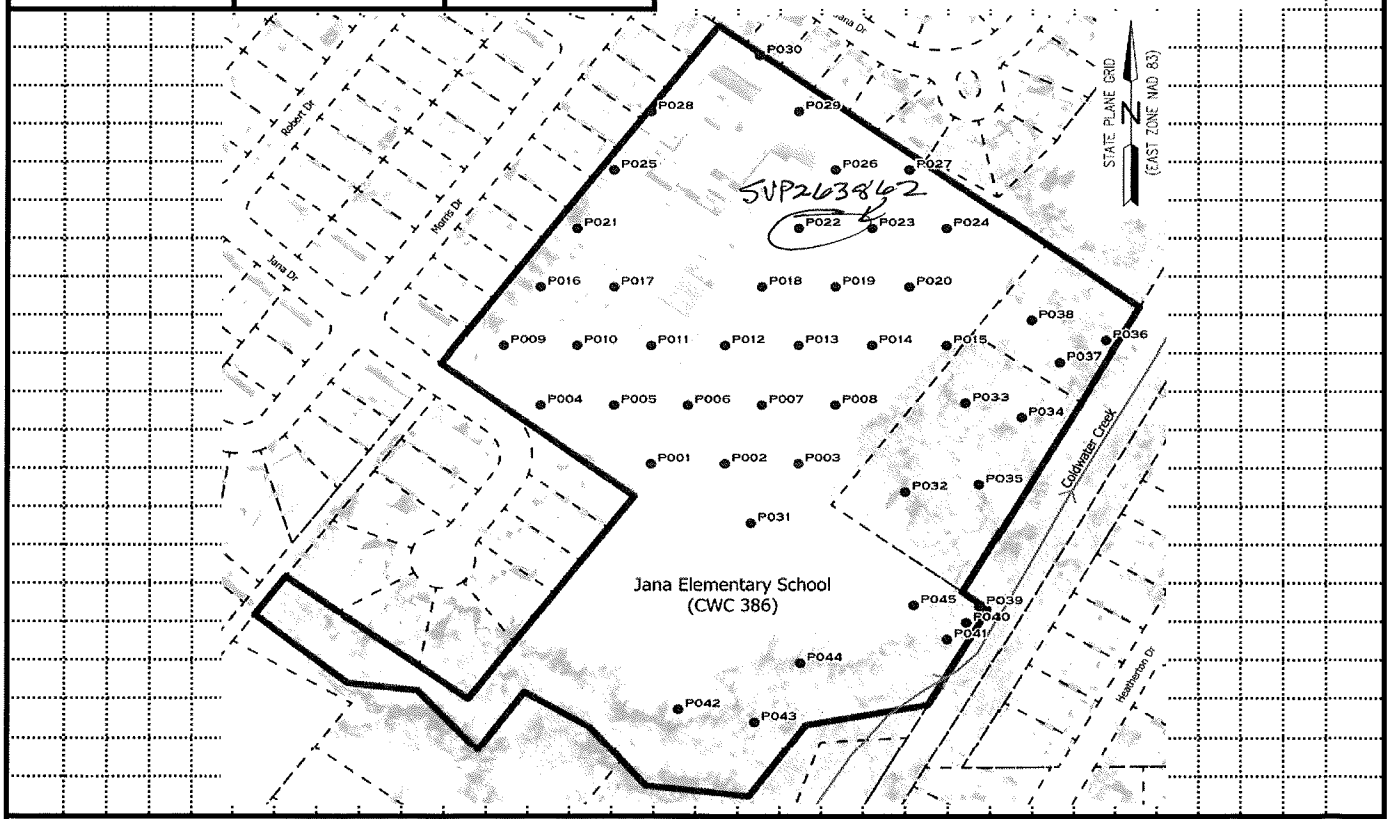
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed DAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 862

PZZ

HTRW DRILLING LOG (CONTINUATION SHEET) P22

HOLE NUMBER SVP263 862

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dalde

Sheet 2 of 3 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt, little clay, brown, non-plastic, low stiffness, crumbles with mod. finger pressure dry, grass @ surface roots throughout	0.0 / 6800	48" / 48"	SVP263862 @ 1020 0-0.5	NA	Background 6750 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1	Silt, few clay, gray-brown stiff, non-plastic, crumbly dry, blocky structure ML	0.0 / 6800				Duplicate @ SVP263862 0-0.5 (-1,-2)
			0.0 / 6800				
			0.0 / 6900		SVP263863 @ 1022 1.5-2		
	2		0.0 / 7100				
			0.0 / 7000				
	3		0.0 / 6800		SVP263864 @ 1024 3.2-3.7		
ML		Silt, gray, non plastic stiff, blocky, dry					
		Silt, little clay gray, low-nonplastic, stiff, damp. few red/orange FeO staing	0.0 / 6900	48" / 48"		JLA	
	4	Silt some clay, gray-brown med. plastic, v. stiff, few gray mottles	0.0 / 6800	48" / 48"			
			0.0 / 6900				
	5		0.0 / 7000				
		Silt, little clay, brown orange mottles, low-non plastic, soft, damp ML	0.0 / 7000		SVP263865 @ 1038 5.5-6		
	6		0.0 / 6900				
			0.0 / 6700				
	7		0.0 / 7100				
			0.0 / 7000	48" / 48"	SVP263866 @ 1038 7.5-8		
ML	8	Silt, trace clay, gray, non-plastic, stiff, few FeO staing, wet ML	0.0 / 6900	48" / 48"			∇ H_2O 8.0' bgs
			0.0 / 6700				
	9		0.0 / 7100		SVP263867 @ 1044 9-9.5		
			0.0 / 6900				
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. P22 SVP263 862

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

P22

HOLE NUMBER SVP263862

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dalde

Sheet 3 of 3 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	10	Silt trace clay, gray, non-plastic, stiff, few FeO stains wet ML	0.0 / 6900	48" / 48"		NA	Background 6750 CPM (CPM - Counts per minute; CPMs are gross numbers)
	11		0.0 / 7000				
			0.0 / 7000				
	12		0.0 / 7100	48" / 48"	SVP263868 @1046 11.5-12		
		Silt trace clay, gray non-plastic, stiff few yellow-orange mottles, dry ML	6700	42" / 48"			
	13		6900				
			6800				
ML	14		6900		SVP263869 @1054 13.5-14		
			6800				
	15		6700				
			6800	42" / 48"	SVP263870 @1056 15-15.5	NA	
	16	No Recovery	NR / NR	No Recovery	No Recovery		No Recovery
		Borehole Terminated @ 16 ft bgs End 1100					USACE 11/1/2022 1110
	17						
	18						Boring completed with commercial top soil (dry) w/water
	19						Backfilled with 30% solids grout
	20						NOTES: SVP = SLAPS Vicinity Property; NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263862

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P22

Start: 1255 End: 1351 P27

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP263 871
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P27 405 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1086679.997 E 872291.376	
PID: 592-601025; BKG: 0.0 ppm; CAL DATE: 01/19/23	NaI: 169246/174868; BKG: 6750 CPM; CAL DATE: 2/22/23	LUDLUM: 150386/150909; BKG: 17/1439 CPM; CAL DATE: 2/28/23
9. SURFACE ELEVATION: 504.123 ~~504.0~~ JLA ft msl		
10. DATE STARTED: 11/01/22	11. DATE COMPLETED: 11/01/22	
15. DEPTH GROUNDWATER ENCOUNTERED: NA ~~504~~ JLA ft. bgs		
12. OVERBURDEN THICKNESS: 8 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16. feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA
18. GEOTECHNICAL SAMPLES	DISTURBED: NA	UNDISTURBED: NA; 19. TOTAL NUMBER OF CORE BOXES: NA

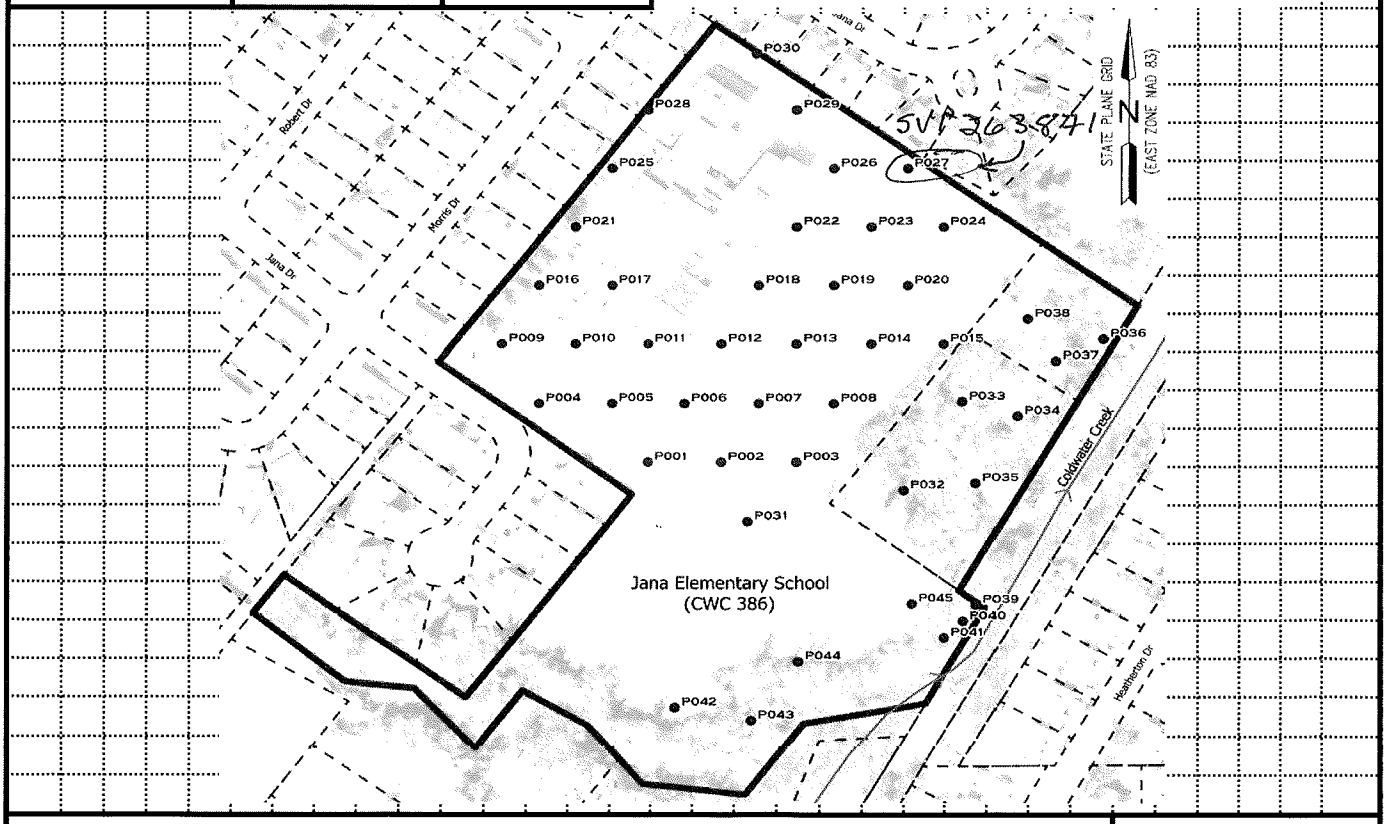
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: Reed Cox SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 871

P27

HTRW DRILLING LOG (CONTINUATION SHEET) P27

HOLE NUMBER: SVP263 871

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Waldo

Sheet 2 of 3

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt, little clay brown, non-plastic, ~~stiff, blocky~~ loose crumbly, grass @ surface roots, MR	0.0 / 6400	48" / 48"	SVP263871 @ 1310 0-0.5(-1-2)	NA	Background 6752 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1	Silt, few-trace clay brown, non-plastic, v. stiff, blocky, crumbles with moderate finger pressure. ML	0.0 / 6300				Duplicate @ 0-0.5' SVP263871(-1,-2)
			0.0 / 6700		SVP263872 @ 1312 1-1.5		
	2		0.0 / 6500				
			0.0 / 6900				
	3		0.0 / 6900				
			0.0 / 6900				
			0.0 / 6900	48" / 48"	SVP263873 @ 1314 3.5-4		
	4						
ML		Silt, little SAME AS ABOVE ML	0.0 / 6500	48" / 48"			
			0.0 / 6500				
	5		0.0 / 6500				
			0.0 / 6500		SVP263874 5.5-6 @ 1321		
	6	Silt, little clay, brown Mn0/Fe0 streaks, non-plastic, stiff, dry, ≥1 mm laminations ML	0.0 / 6600				
			0.0 / 6500				
	7		0.0 / 6600				
ML			0.0 / 6700	48" / 48"	SVP263875 @ 1323 7.5-8		
	8						
		Silt, trace clay gray few orange-yellow mottles nonplastic, soft 1-3mm laminations damp-moist	0.0 / 6800	48" / 48"			
			0.0 / 6700				
	9		0.0 / 6900				
			0.0 / 7000		SVP263876 @ 1332 9.5-10	NA	
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 871

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P27

HTRW DRILLING LOG (CONTINUATION SHEET)

P27

HOLE NUMBER SVP263 871

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: John Dolde

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	11	silt, trace clay, gray few orange-yellow mottles non-plastic, soft, 1-3mm laminations, damp-moist ML	0.0 / 6900	48"/48"		NA	Background 6750 CPM (CPM - Counts per minute; CPMs are gross numbers)
			0.0 / 6900		SVP263877 @ 1334 10.5-11		
			0.0 / 6700				
	12		0.0 / 6800	48"/48"	Archive @ 1336 11.5-12		
		Same As Above ML	0.0 / 6600				
ML	13	silt grading to brown non-plastic, stiff, dry 1-2 mm laminations ML	0.0 / 6700				
			0.0 / 6800				
	14		0.0 / 6800		SVP263878 @ 1344 13.5-14		
			0.0 / 6800				
	15	FeO cemented silt dark reddish brown 1-3mm laminations ML	0.0 / 6700		SVP263879 @ 1346 14.75-15.25		
			0.0 / 6700				
	16		0.0 / 6800		Archive @ 1348 15.5-16	NA	
		Borehole Terminated @ 16 ft bgs End 1351					USACE 11/1/2022 1600 NE 1400
							Borehole completed with commercial top soil JLD 11/7/22

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP263 871

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P27

Start: 1400 End 1455

P19

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP263 880
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P19 405 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085884.584 E 872182.357	
	9. SURFACE ELEVATION: 506.1 ft msl	
10. DATE STARTED: 11/01/22	11. DATE COMPLETED: 11/01/22	
	15. DEPTH GROUNDWATER ENCOUNTERED: NA ft. bgs	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16.0 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	174868/169246	156386/150989
BKG: 0.0 ppm	BKG: 6750 CPM	BKG: 17439 CPM
CAL DATE: 01/19/23	CAL DATE: 2/22/23	CAL DATE: 2/23/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

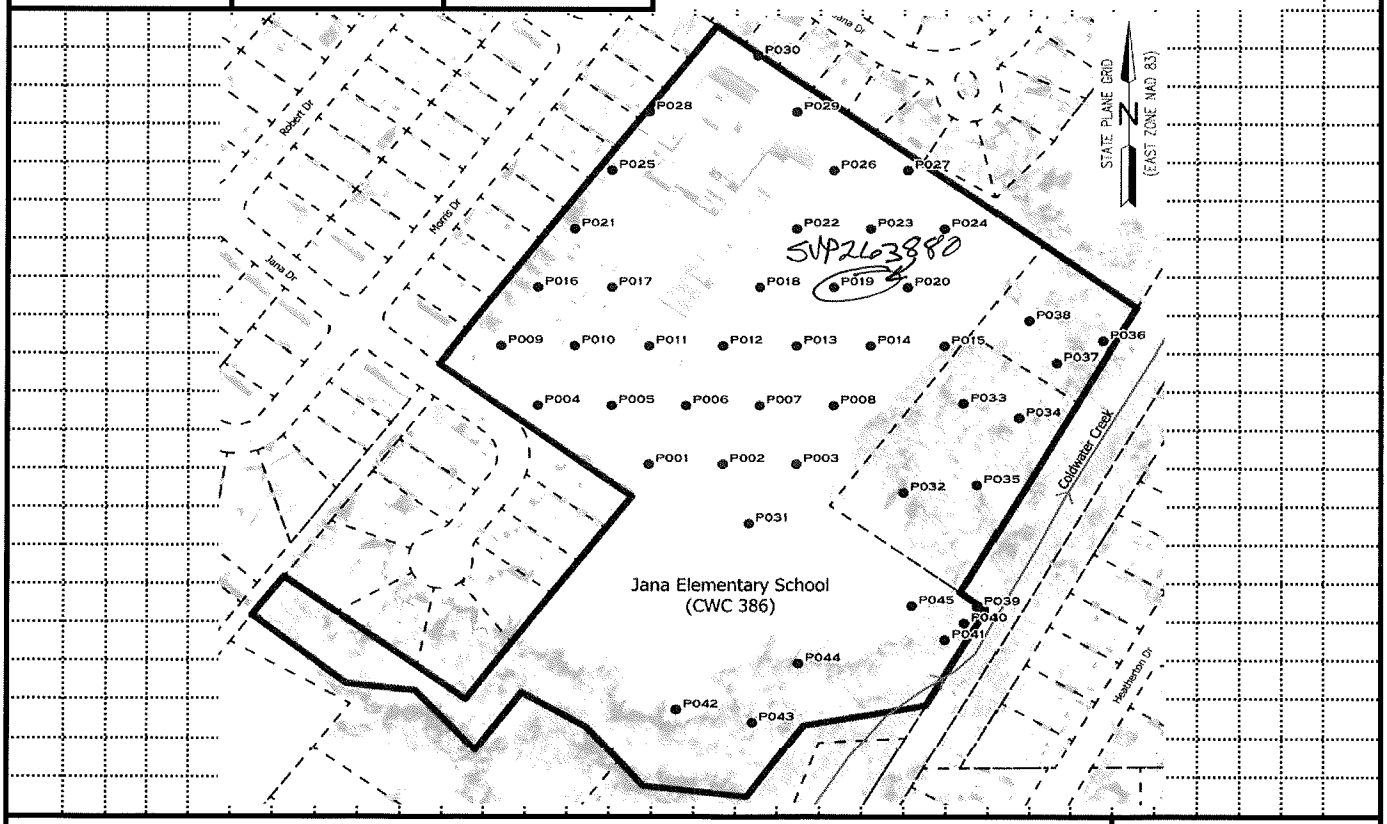
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	John Dolde

LOCATION SKETCH / COMMENTS / WITNESSED BY: L. Reed QAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 880

P19

HTRW DRILLING LOG (CONTINUATION SHEET) P19

HOLE NUMBER SVP263 880

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dalld

Sheet 2 of 3

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt, little clay, brown, non-plastic, loose crumbly, blocky structure, dry grass at surface, roots throughout ML	0.0 / 6300	48" / 48"	SVP263880 @ 1419 0-0.5	NA	Background 6750 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1	Silt, trace clay, brown, ~~trace mica~~ JLD non-plastic v. stiff, breaks with moderate finger pressure little gray mottles roots throughout interval ML	0.0 / 6600				
			0.0 / 6800		SVP263881 @ 1421 1-1.5		
	2		0.0 / 6600				
			0.0 / 6500				
	3		0.0 / 6700				
			0.0 / 6700				
			0.0 / 6900	48" / 48"	SVP263882 @ 1423 3.5-4		
ML	4	Silt, trace clay brown, non-plastic, soft, moist-wet, ML	0.0 / 6500	48" / 48"			
			0.0 / 6400				
	5		0.0 / 6500				
			0.0 / 6700		SVP263883 @ 1427 5.5-6		
	6		0.0 / 6900				
			0.0 / 6700				
	7	Silt, little clay brown MnO/FeO staining/nodules low-non-plastic, soft damp ML	0.0 / 6800				
			0.0 / 6800	48" / 48"	SVP263884 @ 1429 7.5-8		
ML	8	Same as Above MV	0.0 / 6600	48" / 48"			
			0.0 / 6700				
	9		0.0 / 6700				
			0.0 / 7000		SVP263885 @ 1436 9.5-10		
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 880

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P19

HTRW DRILLING LOG (CONTINUATION SHEET)

P19

HOLE NUMBER SVP263 880

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: John Dolde

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Silt, little clay, brown, MnO1 FeO stains/nodules, low-non-plastic, soft ML	0.0 / 6700	48"/48"			Background 6750 CPM (CPM - Counts per minute; CPMs are gross numbers)
			0.0 / 6600				
ML	11		0.0 / 6700				
			0.0 / 6800	48"/48"	~~SVP263886 @ 1480 JLD 14.5-12 JLD~~ JLD		SVP263886 14:40 11.5-12
	12	SAME AS ABOVE ML	0.0 / 6500	48"/48"			
			0.0 / 6800		SVP263887 @ 1446 12.5-13		
	13		0.0 / 6600				
ML	14		0.0 / 6700		JLD		
			0.0 / 6500				
	15		0.0 / 6600		SVP263888 1448 14.5-15		
			0.0 / 6500				
	16	FeO cemented silt, 1-3 mm laminations hard breaks, mod. finger pressure dry	0.0 / 6500	48"/48"	Archive 1450 15.5-16		
		BOREHOLE Terminated @ 16ft. bgs End 1455					USACE 11/1/2022 1505
							Borehole completed with commercial top soil JLD 11/7/22

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery
Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP263 880

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Start 0830 End 1017 P14

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP263 889
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 4 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P14 489 Jana Dr.
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085783.394 E 872240.783
	9. SURFACE ELEVATION: 504.3 ft msl
	10. DATE STARTED: 11/02/22 — 11. DATE COMPLETED: 11/02/22
	15. DEPTH GROUNDWATER ENCOUNTERED: 14.10 ft. bgs
12. OVERBURDEN THICKNESS: 0 ft. — 13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 28.0 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	169245 / 174494	156376 / 164817
BKG: 0.0 ppm	BKG: 6523 CPM	BKG: 1/1048 CPM
CAL DATE: 01/19/23	CAL DATE: 11/30/22	CAL DATE: 4/21/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

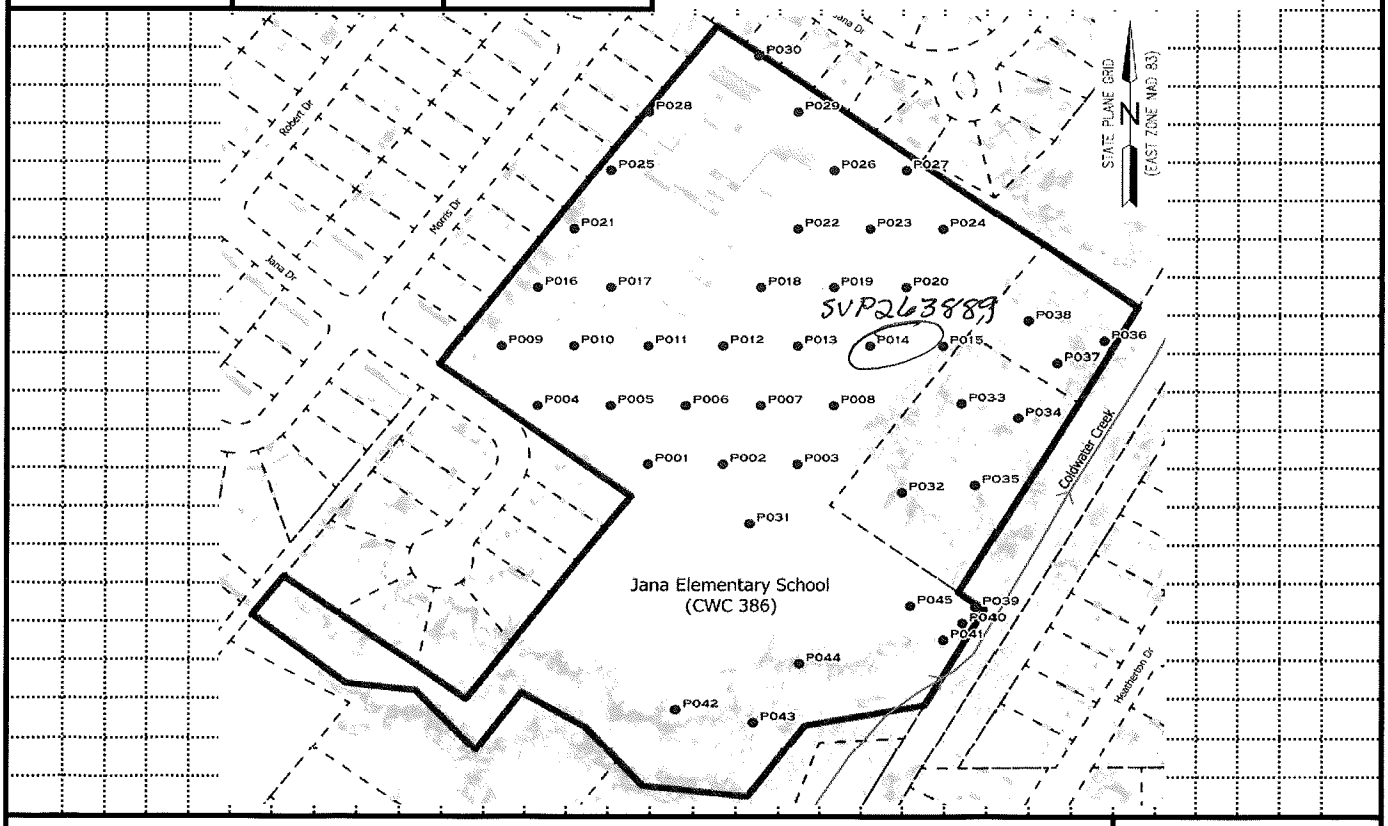
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 15	QA/QC - 2	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QA — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 889

P14

HTRW DRILLING LOG (CONTINUATION SHEET) P14

HOLE NUMBER SVP263 889

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dodd

Sheet 2 of 4

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt, little clay brown non-plastic loose, crumbly, grass & roots, rough at surface ML	0.0 / 6800	48" / 48"	SVP263889 @ 0850 0-0.5 (-1,-2)	NA	Background 6523 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1	Silt, trace clay orangish-brown, non-plastic, stiff crumbles w/moderate finger pressure, dry, roots blocky structure ML	0.0 / 7100		SVP263890 @ 0852 0.5-1		SVP263889 0-0.5 - Dup. -1,-2 @ 0850
			0.0 / 7000				
	2		0.0 / 7000		Archive @ 0854 1-2.5		Archive collected to capture middle part of 0-4' interval
			0.0 / 7000				
	3		0.0 / 7200				
			0.0 / 7200				
			0.0 / 7200	48" / 48"	SVP263891 @ 0856 3.5-4		
	4	SAME AS ABOVE ML	0.0 / 7200	48" / 48"			
ML	5	Silt little clay, brown low plasticity, stiff, dry 1 mm laminations Few FeO stains ML	0.0 / 7200		SVP263892 @ 0905 4.5-5		
			0.0 / 7000				
			0.0 / 7000				
	6		0.0 / 6900				
		Silt, little clay, lt. brown-gray, trace MnO streaks low plastic, soft, moist ML	0.0 / 7000		SVP263893 @ 0907 6.5-7		
	7		0.0 / 6900				
ML			0.0 / 6700	48" / 48"			
	8	SAME AS ABOVE ML	0.0 / 7000	48" / 48"			
		FeO nodule/replacement at burrow/disturbated materials ML	0.0 / 6900 / 7900				
	9		0.0 / 7000				
			0.0 / 7000		SVP263894 @ 0919 9.5-10		
	10						NOTES: SVP = SLAPS Vicinity Property; NR = No Recovery

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 889

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P14

HTRW DRILLING LOG (CONTINUATION SHEET) P14

HOLE NUMBER SVP263 889

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: John Dodd

Sheet 3 of 4 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	10	Silt, trace clay, gray few mn nodules, non-plastic, stiff, damp ML	0.0 / 7000	48" / 48"		NA	Background CPM (CPM - Counts per minute; CPMs are gross numbers)
	11		0.0 / 7000		SVP263895 @0921 10.5-11		
			0.0 / 6800				
			0.0 / 6700	48" / 48"			
	12	SAME AS ABOVE JCD	0.0 / 7000	48" / 48"			
ML			0.0 / 7000				
	13		0.0 / 7000				
			0.0 / 7100		SVP263896 @0928 13.5-14		
	14	FeO cemented silt	0.0 / 7100				▽ Possible H_2O table @ 14.10 ft bgs
		Silt, tan, non-plastic stiff, moist, ≥1 mm laminations ML	0.0 / 6900				
			0.0 / 6900				
	15		0.0 / 7100		SVP263897 @0930 15-15.5		
			0.0 / 7000	48" / 48"			
	16		0.0 / 6500	42" / 48"			
		SAME AS ABOVE ML	0.0 / 6700				
ML			0.0 / 6900				
	17		0.0 / 6900		SVP263898 @0937 17.5-18		
	18		0.0 / 7200		SVP263899 @0939 18-18.5		
			0.0 / 7100				
	19		0.0 / 6800	42" / 48"	Archive @0941 19-19.5		Archive collected due to non-recovery at 19.5-20' interval
	20	No Recovery	X	NO Recovery	NO Recovery		NOTES: SVP = SLAPS Vicinity Property; NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 889

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P14

HTRW DRILLING LOG (CONTINUATION SHEET)

P14

HOLE NUMBER: SVP263 889

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dodd

Sheet 4 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	21	Silt, trace clay, tan, non-plastic, stiff, damp some FeO staing / orange mottling ML	0.0 / 6700	48" / 48"		NA	Background 6523 CPM CPM - Counts per minute numbers CPMs are gross
			0.0 / 6800				
	22		0.0 / 6900		SVP263900 @0947 21-21.5		
			0.0 / 6800				
ML			0.0 / 6800				
	23		0.0 / 6800		SVP263901 @0949 22.5-23		
			0.0 / 6700				
			0.0 / 6700	48" / 48"			
	24	SILT some clay, Olive gray, med. plastic, V. stiff dry ML	0.0 / 6800	42" / 48"			
			0.0 / 6800				
	25		0.0 / 6800				
			0.0 / 6900		SVP263902 @ 1008 25.5-26		SVP263902@1008 -1, -2 Duplicate/split disp. collected
ML	26		0.0 / 7000				
			0.0 / 7000				
	27		0.0 / 6900	42" / 48"	SVP263903 @ 1010 27-27.5		Boring completed with Commercial tap soil JLD 11/2/22
				NO Recovery			
	28					NA	
		Borehole Open Terminated @ 28 ft bgs End 1017 John Dodd					Boring back-filled with high solids (30%) grout. USACE 11/2/2022 1025

NOTES: SVP = SLAPS Vicinity Property; NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 889

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P14

START: 1025 End 1155 P24

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP263 904
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of SHEETS: 4

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P24 405 Jana Dr.
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085985.956 E 872355.863
	9. SURFACE ELEVATION: 499.0 ft msl
	10. DATE STARTED: 11/02/22 — 11. DATE COMPLETED: 11/02/22
	15. DEPTH GROUNDWATER ENCOUNTERED: 7.25 ft. bgs
12. OVERBURDEN THICKNESS: 0 ft. — 13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 28 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	169245 / 174494	156376 / 164817
BKG: 0.0 ppm	BKG: 0523 CPM	BKG: 1/1048 CPM
CAL DATE: 01/19/23	CAL DATE: 11/30/22	CAL DATE: 4/20/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

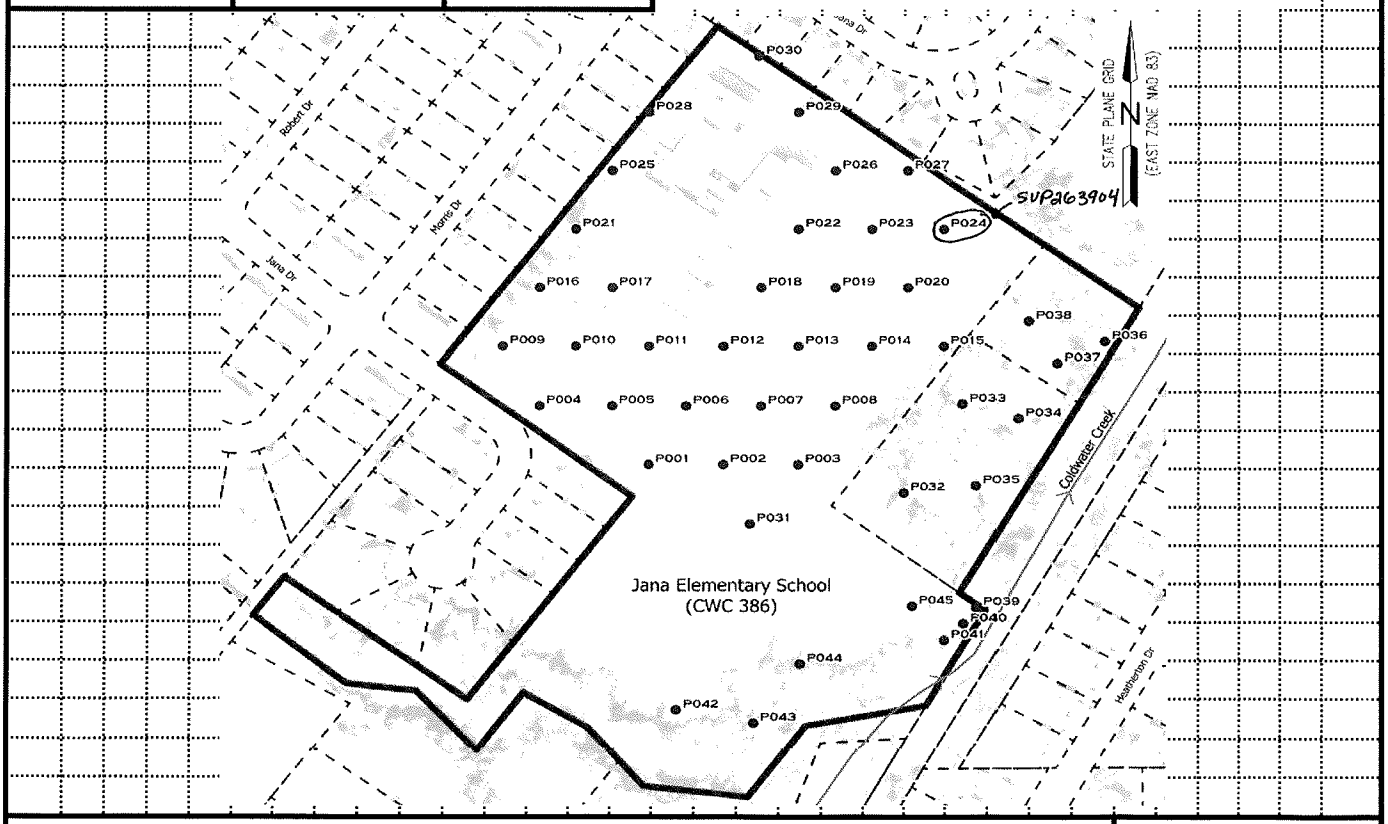
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 15	QA/QC - 0	Archive - 3	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: [illegible] SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 904

P24

HTRW DRILLING LOG (CONTINUATION SHEET) P24

HOLE NUMBER SVP263 904

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dalde

Sheet 2 of 4 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt, little clay brown, non-plastic, crumbly, med. stiff, grass @ surface roots throughout ML	0.0 / 6400	48" / 48"	SVP263904 @1034 0-0.5	NA	Background 6523 CPM (CPM - Counts per minute; CPMs are gross numbers)
	1		0.0 / 6500				
		some FeO staining/ yellow-orange mottles ML	0.0 / 6400				
ML			0.0 / 6500		SVP263905 @1036 1.5-2		
	2		0.0 / 6400				
			0.0 / 6600		SVP263906 @1038 2.5-3		
	3		0.0 / 6500				
			0.0 / 6400	48" / 48"			
	4	Silt, little clay, brown some FeO staining, non-plastic, med. stiffness, dry ML	0.0 / 6100	48" / 48"			
ML			0.0 / 6500		SVP263907 @1045 4.5-5		
	5		0.0 / 6300				
			0.0 / 6300		Archive @1047 5.5-6		Archive collected to evaluate FeO cemented seam
	6	FeO cemented silt seam					
			0.0 / 6200				
	7		0.0 / 6400				H_2O ▽ 7.25
			0.0 / 6200				
		Silt, trace clay, tan-gray non-plastic, soft, wet ML	0.0 / 6400	48" / 48"	SVP263908 @1049 7.5-8		
ML	8	SAME AS ABOVE ML	0.0 / 6800	48" / 48"			
			0.0 / 6400				
	9		0.0 / 6700		SVP263909 @1055 8-9.5		
		FeO stains grades to pinkish brown	0.0 / 6500				
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO

HOLE NO. SVP263 904

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

P24

HTRW DRILLING LOG (CONTINUATION SHEET) P24

HOLE NUMBER SVP263904

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dalld

Sheet 3 of 4 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	10	Silt trace clay plastish brown, non-plastic stiff, wet ML	0.0 / 6500	48"/48"		NA	Background 6523 CPM CPM - Counts per minute numbers; CPMs are gross
			0.0 / 6500		SVP263910 @1057 10.5-11		
	11		0.0 / 6400				
			0.0 / 6400	48"/48"			
	12	Silt, trace clay, light brown, non-plastic, stiff few FeO stains/mottles wet-moist ML	0.0 / 6400	48"/48"			
			0.0 / 6500		911		
	13		0.0 / 6700		SVP263916 @1110 JD 13-13.5		
			0.0 / 6600				
	14		0.0 / 6400				
			0.0 / 6700		SVP263912 @1112 14.5-15		
	15		0.0 / 6400				
			0.0 / 6400	48"/48"			
	16	Same As Above ML some FeO nodules + staining throughout 16-19 foot interval ML	0.0 / 6200	48"/48"			
ML			0.0 / 6400				
	17		0.0 / 6500				
			0.0 / 6500		SVP263913 @1120 17.5-18		
	18		0.0 / 6200				
			0.0 / 6200				
	19		0.0 / 6200		SVP263914 @1122 19-19.5 JD		
CL		Clay some silt, gray, med-high plastic, v. stiff, dry CL	0.0 / 6200	48"/48"		NA	NOTES: SVP = SLAPS Vicinity Property NR = No Recovery
	20		0.0 / 6200				

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 904

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P24

HTRW DRILLING LOG (CONTINUATION SHEET) P24

HOLE NUMBER SVP263 904

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: John Dalke

Sheet 4 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
CL	21	Clay, some silt, olive gray, med plastic V. stiff, dry CL	0.0 / 6100	48" JLD 42" / 48"		NA	Background 6523 CPM (CPM - Counts per minute numbers; CPMs are gross)
			0.0 / 6500				
			0.0 / 6500				
	22		0.0 / 6600		SVP263913 @ 1135 21.5-22		
			0.0 / 6500				
			0.0 / 6400				
	23	clay some silt, olive gray, med-high plastic, Hard dry	0.0 / 6300	42" JLD	SVP263914 @ 1137 23-23.5		
		No Recovery JLD	0.0 JLD	48" / 48"			No Recovery.
CH	24	Clay, little silt, olive gray, high plasticity V. Hard, dry JLD CH	0.0 / 6300	48" / 48"			
			0.0 / 6400				
	25		0.0 / 6500		SVP263917 @ 1146 25-25.5		
			0.0 / 6300				
	26		0.0 / 6500		SVP263918 @ 1148 26-26.5		
			0.0 / 6400				
	27		0.0 / 6400				
			0.0 / 6400	48" / 48"	Archive @ 1150 27.5-28	NA	Archive bottom of hole
	28	Borehole Terminated @ 28 ft. bgs END 1155 John Dalke					JLD 11/2/2022 1205 Backfill with high solids (30%) grout. Surface completion with commercial tap soil JLD 11/7/22

NOTES: SVP = SLAPS Vicinity Property; NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 904

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P24

START 1438 END 1500 P053

HTRW DRILLING LOG

DISTRICT: St. Louis	HOLE NUMBER: SVP263 ~~985~~ JLD 984	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 2 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P053 405 Jana Dr.	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe ~~7822DT~~ 3126 GT JLD	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe ~~7822DT~~ 3126 GT JLD; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N E	
	9. SURFACE ELEVATION: ft msl	
PID: 592-601025; BKG: [illegible] ppm; CAL DATE: 01/19/23	NaI: 169234 185740; BKG: 7353 CPM; CAL DATE: 8/25/23	LUDLUM: 156838 167711; BKG: 6/1212 CPM; CAL DATE: 8/11/23
10. DATE STARTED: 11/03/22	11. DATE COMPLETED: 11/03/22	
15. DEPTH GROUNDWATER ENCOUNTERED: NA ft. bgs		
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 6 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

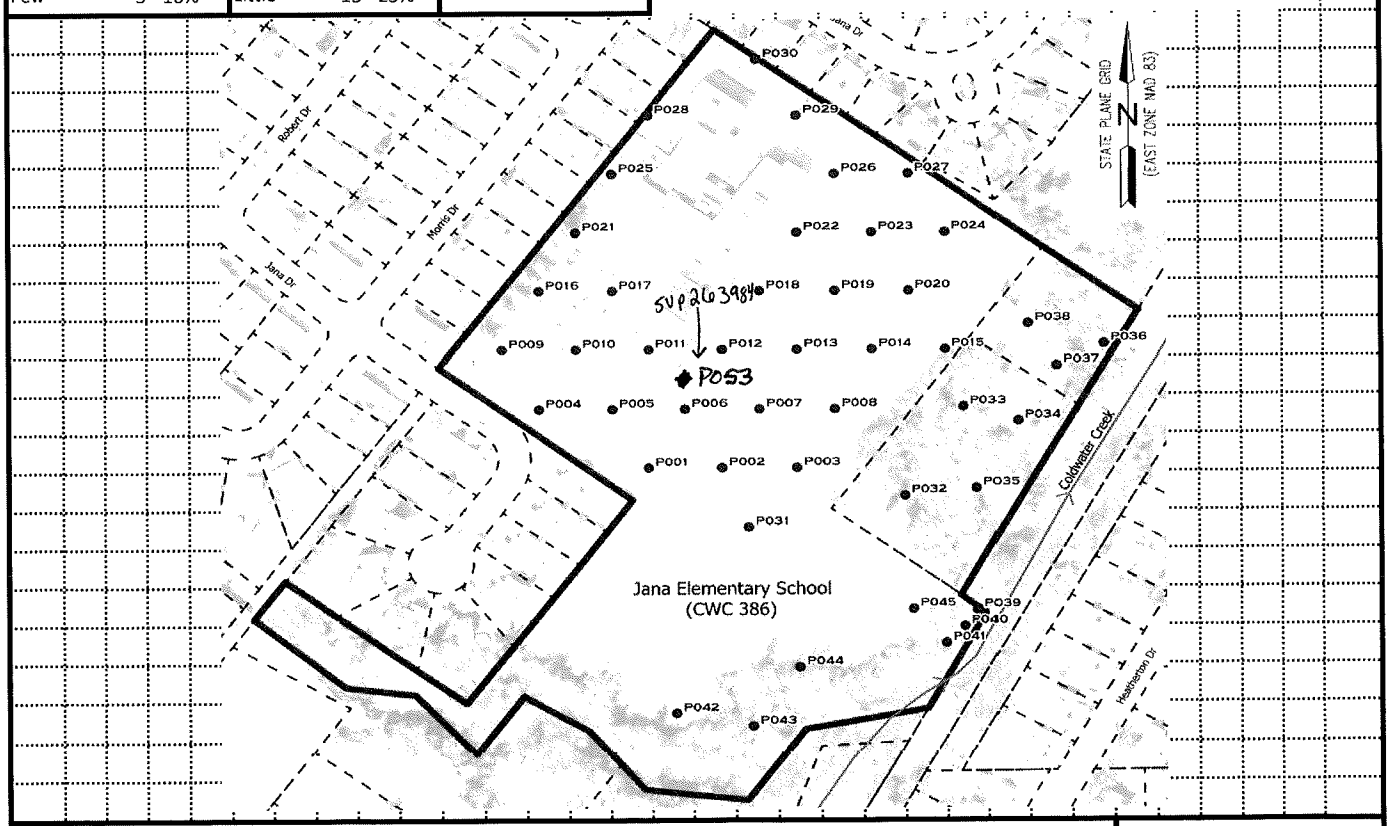
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 2	QA/QC - 0	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	John Dodd

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. REED QAP SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP263 985

P053

HTRW DRILLING LOG (CONTINUATION SHEET) P053

HOLE NUMBER SVP263 984

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: John Dolde

Sheet 2 of 2 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	0	Silt little clay Brown, non-plastic, soft, crumbly, dry roots ML	0.0 / 7300	48" / 48"	SVP263984 @1450 0-0.5	NA	Background 7353 CPM (CPM - Counts per minute numbers; CPMs are gross)
	1	Silt little-few clay Brown non-plastic stiff, blocky crumbles mod. finger press dry JLD slight ML	0.0 / 7300				
			0.0 / 7600		SVP263985 @1452 1-1.5		
	2	Silt, trace clay, orangish-brown, some MnO nodules, non-plastic stiff, blocky crumbles with mod moderate finger pressure Roots throughout ML	0.0 / 7400				
			0.0 / 7300				
	3		0.0 / 7200				
			0.0 / 7300	48" / 48"	Archive @1454 3-3.5		Per direction of PDI MGR.
ML	4	Same As Above ML	0.0 / 7000	24" / 24"			
			0.0 / 7300				
	5		0.0 / 7500				
			0.0 / 7600		Archive @1458 5-5.5		Per direction of PDI mgr.
	6		0.0 / 7500	24" / 24"		NA	
		Borehole Terminated @ 6 ft. Bgs END 1500 John Dolde					USACE 11/3/2022 1510 Completed with commercial tap soil JLD 11/7/22 Backfilled with Bentonite high-solids chips & hydrated
	7						
	8						
	9						
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP263 984

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P053

START 08:48 END 09:58

P009

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 000
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P009
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe ~~7822DT~~ 3126
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe ~~7822DT~~ 3126; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085777.453 E 871665.368
	9. SURFACE ELEVATION: 504.6 ft msl
PID: 592-601025; BKG: 0 ppm; CAL DATE: 01/19/23	NaI: Mat: 163695, Det: 174870; BKG: 6157 CPM; CAL DATE: 5/16/23
	LUDLUM: Mat 141319, Det 167718; BKG: 1234 CPM; CAL DATE: 7/25/23
10. DATE STARTED: 10/31/2022	11. DATE COMPLETED: 10/31/2022
12. OVERBURDEN THICKNESS: 0-5 0 ft.	13. DEPTH DRILLED INTO ROCK: NA
15. DEPTH GROUNDWATER ENCOUNTERED: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

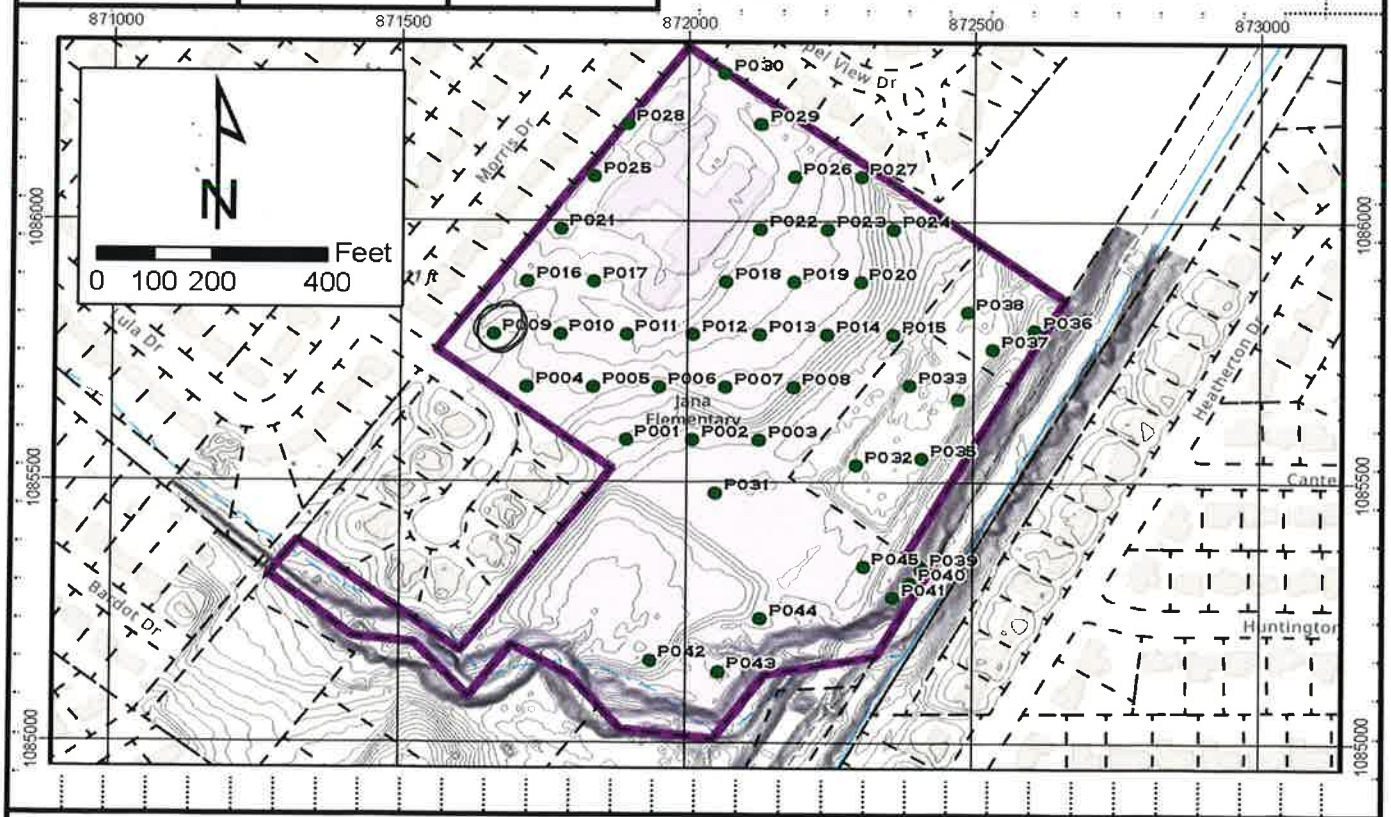
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: L. Reed QAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

HOLE NUMBER: SVP264 000

P009

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 000

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		-Overburden - Cover material Asphalt NC	0 / 5800	OB		NA	Background 6157 CPM CPM - Counts per minute CPMs are gross numbers
ml		Mostly silt, little clay, some gravel. Light tan, damp, not plastic, firm ml	0 / 6200	4/4	SVP 264000 0848		
ml		Mostly silt, few clay, firm, damp, medium plastic. Dark brown. FeOx stained clast from 1.0'-1.3' ml	0 / 6400		SVP264001 0850		
			0 / 6500				
			0 / 6600		SVP264002 0852		
ml		Mostly silt, some clay, firm, medium plastic, Medium brown and damp. FeOx nodules grading from 0.1" to 0.25" top to bottom. ml	0 / 6400				
			0 / 6500				
			0 / 6400				
			0 / 6300	4/4			
		- few clay, generally grading to lighter color, Light brown and grey, increasing water content with depth. ml	0 / 6400				
			0 / 6500		SVP 264003 0908		
		> FeOX Fracture w/staining.	0 / 6200				
			0 / 6300				
		- increased water content, very damp	0 / 6300				
			0 / 6400		SVP 264004 0910		
			0 / 6400				
		- damp	0 / 6200	3.7/4.0			
			0 / 6200		SVP264005 0930		
			0 / 6200				
			0 / 6100				

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP264 000

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Begin 10:15 END 11:11 P016

HTRW DRILLING LOG

DISTRICT: St. Louis	HOLE NUMBER: SVP264 009	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P016	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe ~~7822DT~~ 3126	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe ~~7822DT~~ 3126; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085882.062 E 871722.146	
PID 592-601025; BKG: 0 ppm; CAL DATE: 01/19/23	NaI M-163695 D-174870; BKG: 6157 CPM; CAL DATE: 5/16/2023	LUDLUM M-141319 D-167718; BKG: 1/234 CPM; CAL DATE: 7/25/23
9. SURFACE ELEVATION: 507.3 ft msl	10. DATE STARTED: 10/31/2022	11. DATE COMPLETED: 10/31/2022
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

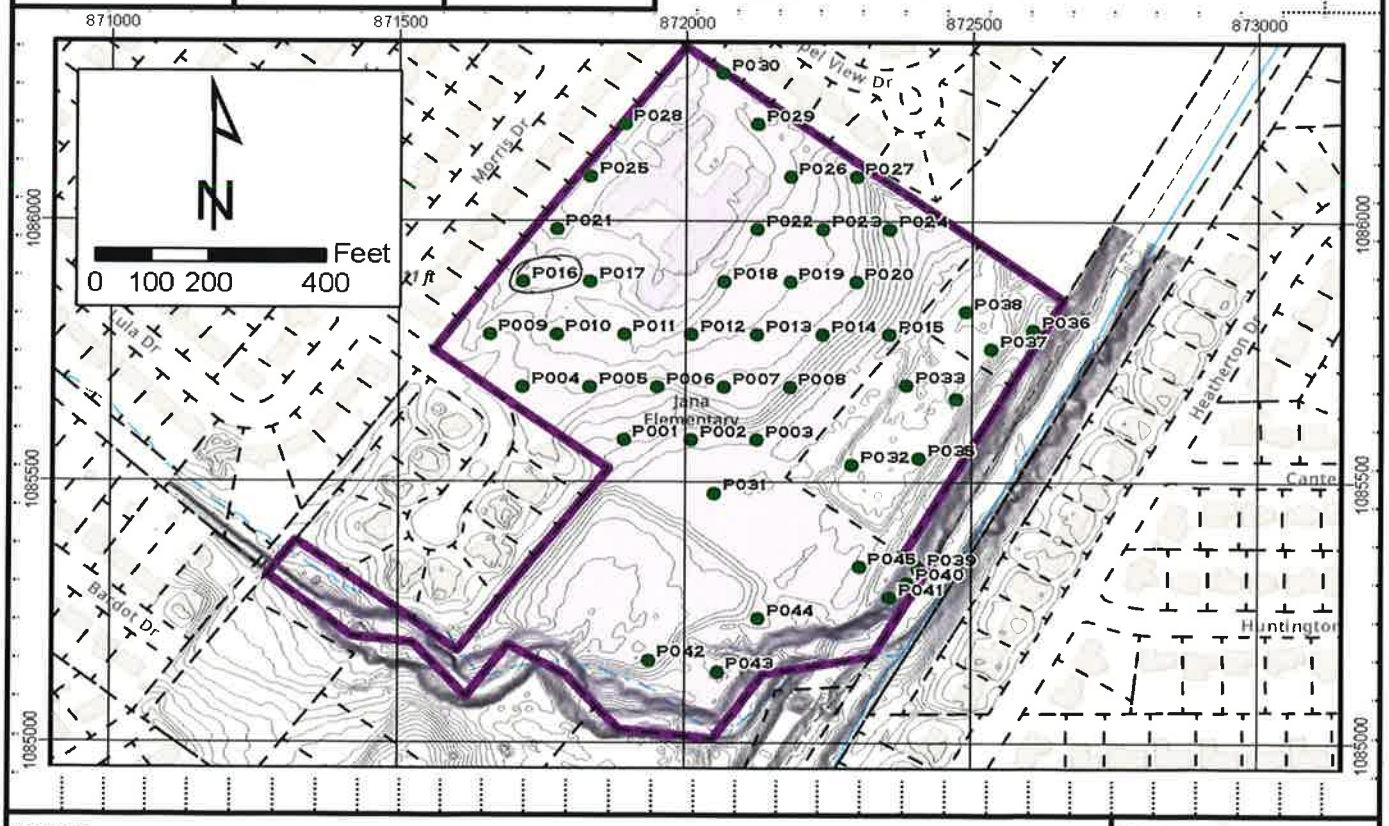
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	[signature]

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed Car SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East; ft. = Feet; ppm = Parts per million; N = North; msl = Mean Sea Level; bgs = below ground surface



PROJECT	HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	SVP264 009

P009

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 000

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		As Previously described, ml	0/6400	(3.7/4.0)		NA	Background 6157 CPM
		Strong FeOX staining on Fractured zone, less firm	0/6200		SVP264006 0932		CPM - Counts per minute
		- Weak FeOx continues	0/6200				CPMs are gross numbers
			0/6100	NR			
			0/6400				
			0/6600		SVP264007 0953		SVP264007 -1, -2 (QA/QC)
			0/6300	3.0/4.0			
ml		mostly silt, Few clay, medium Firm, low plastic, damp. Grey with FeOx stain mottling throughout. ml	0/6400				
			0/6600		SVP264008 0955		
			0/6000				offset approx 1ft NW recovery failed again. Called, suction.
			X	NR			
			X				
		TD = 16' EOB 09:58					Back capped w/ asphalt
		10/31/22 1020					

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 000

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P016

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264009

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		~~Overburden~~ Cover material Asphalt, fine sand, silt, gravel	0 / 5900			NA	Background 6157 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 6200				
ml		Silt, trace clay. Firm, damp, medium plastic. Light brown, uniform texture and color. ml	0 / 6300		SVP264009 10:28		
			0 / 6000	4.0/4.0	SVP264010 1030		
			0 / 6200				
			0 / 6400		SVP264011 10:32		
			0 / 6100				
		- FeOx nodules and mottling / staining. Nodules approx 0.2 inch diameter. ml	0 / 6200				
		- little clay ml	0 / 6000				
			0 / 6400				
			0 / 6500	4.0/4.0			
			0 / 6500		SVP264012 1042		
			0 / 6500				
			0 / 6600		SVP264013 1044		
			0 / 6300				
			0 / 6100				
		- slightly reduced firmness, medium-firm ml	0 / 6400				
			0 / 6300				
			0 / 6500	3.6/4.0	SVP264014 1056		
			0 / 6400				

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP264009

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P016

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 009

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / Nal	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Same as previously described ml rc	0 6900	3.6/4.0		NA	Background 6157 CPM
			0 6200		SVP264015 1058		CPM - Counts per minute
			0 6100				CPMs are gross numbers
			0	NR			
			0 6500	4.0/4.0	SVP264016 1109		
		> FeOx staining ml rc	0 6300				
			0 6200				
			0 6200				
			0 6500		SVP264017 1111		
			0 6300				
			0 6200				
			0 6000				
		TD: 16' EOB: 11:11					Capped w/ Asphalt

Lon Patton USACE

1130 10/31/2022

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 009

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Begin: 1120 END: 13:14 P017

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 018
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 3 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

4. LOCATION: P017

5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton

6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe ~~7822DT~~ 3126

7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe ~~7822DT~~ 3126; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler

8. HOLE LOCATION: N 1085885.753 E 871834.032

9. SURFACE ELEVATION: 507.7 ft msl

PID	NaI	LUDLUM
592-601025	M-163695 D-174870	M-141319 D-167718
BKG: 0 ppm	BKG: 6157 CPM	BKG: 1234 CPM
CAL DATE: 01/19/23	CAL DATE: 5/16/23	CAL DATE: 7/25/23

10. DATE STARTED: 10/31/22

11. DATE COMPLETED: 10/31/22

15. DEPTH GROUNDWATER ENCOUNTERED: NA

12. OVERBURDEN THICKNESS: ft.

13. DEPTH DRILLED INTO ROCK: NA

16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA

14. TOTAL DEPTH OF HOLE: 16 feet bgs

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES: DISTURBED NA; UNDISTURBED NA

19. TOTAL NUMBER OF CORE BOXES: NA

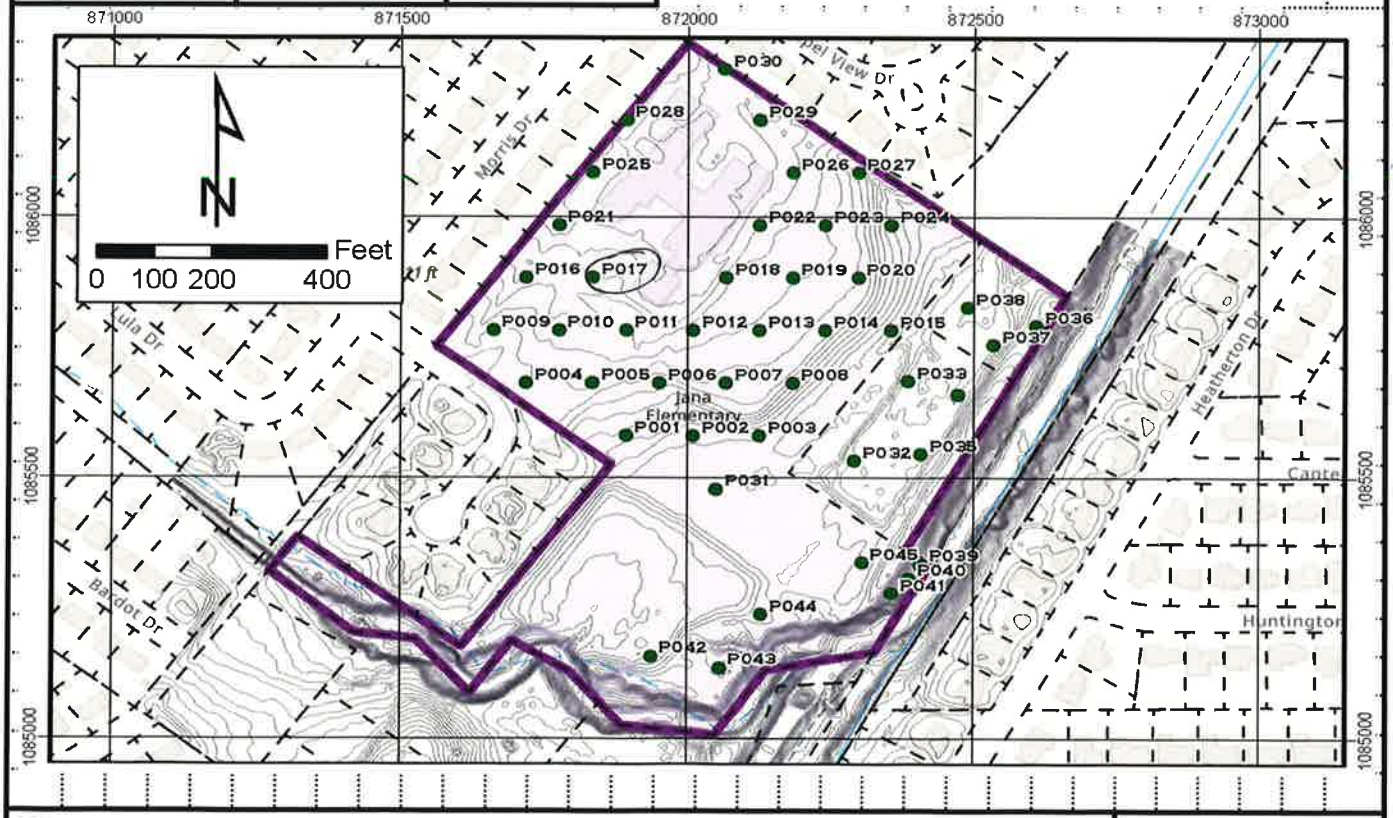
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QM SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264 018

P017

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 018

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: Phil Ciuffini

Sheet 2 of 3 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	0	Overburden Asphalt: Subgrade Asphalt on top of fine sand, silt, gravel	0 / 5600			NA	Background 6157 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 5600				
ml	1	Mostly silt, few clay, firm, damp, mst weakly plastic. Mostly light brown w/ light tan mottling (approx 5%). Very weak FeOx nodules/stain. ml	0 / 5900	4.0/4.0	SVP264018 1139		
			0 / 6400		SVP264019 1141		
	2		0 / 6400		SVP264020 1143		
			0 / 6200				
	3	- soft ml	0 / 6200				
			0 / 6000				
	4		0 / 6200				
			0 / 6100				
	5		0 / 6100	4.0/4.0	SVP264021 1150		
			0 / 6300				
	6		0 / 6500				
		increased FeOx nodule concentration. ml	0 / 6500		SVP264022 1152		
	7		0 / 6400				
			0 / 6200				
	8		0 / 5900				
			0 / 6300				
	9		0 / 6300	4.0/4.0	SVP264023 1258		
		q, sf - 10' slightly increased FeOx staining.	0 / 6200				
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 018

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P017

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 018

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Same as previously described, ml (pc)pc	0 6100 / 0 6300 / 0 6300 / 0 6300	4.0/4.0	SVP264024 1300	NA	Background 6157 CPM CPM - Counts per minute CPMs are gross numbers
			0 6600 / 0 6700		SVP264025 1312		
		→ Very consistent color and texture, minor FeOx nodules. (pc)pc	0 6500 / 0 6500 / 0 6200 / 0 6400 / 0 6500 / 0 6300		SVP264026 1314		
		TD: 16' EOB: 1314		Pueller 10/31/2022			Capped w/ pc Asphalt. To be capped with asphalt. pc

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 018

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Begin: 13:25 End: 14:45 P025

HTRW DRILLING LOG

DISTRICT: St. Louis	HOLE NUMBER: SVP264 027	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P025	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1086081.549 E 871842.371	
PID: 592-601025; BKG: 0 ppm; CAL DATE: 01/19/23	NaI: M-163695, D-174870; BKG: ~~6157~~ 7916 CPM; CAL DATE: 5/16/23	LUDLUM: M-141319, D-167718; BKG: 1/234 CPM; CAL DATE: 7/25/23
9. SURFACE ELEVATION: 509.8 ft msl	10. DATE STARTED: 10/31/22	11. DATE COMPLETED: 10/31/22
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

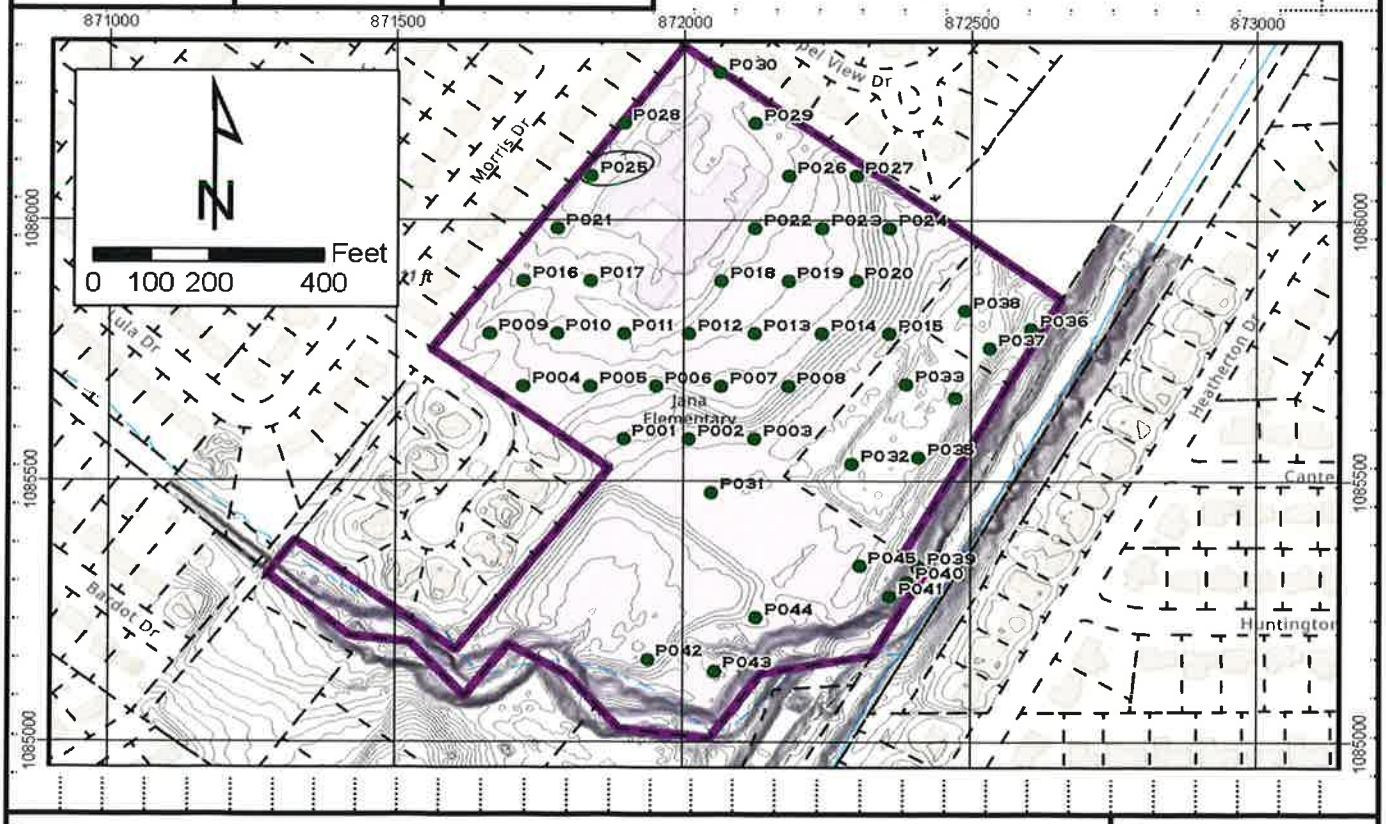
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	[signature]

LOCATION SKETCH / COMMENTS / WITNESSED BY: K Reed QAR SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East; ft. = Feet; ppm = Parts per million; N = North; msl = Mean Sea Level; bgs = below ground surface



PROJECT	HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	SVP264 027

P025

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264027

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/NORCO

Inspector: Phil Ciuffini

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Asphalt & Subgrade Asphalt, fine sand, gravel	0 / 9000			NA	Background 7916 CPM CPM - Counts per minute CPMs are gross numbers
ml		Silt with clay, medium firm, damp, weakly plastic. Light brown. Weak FeOx nodules approx 5%. FeOx staining around nodules up to 0.5 inch. ml	0 / 8600	4.0/4.0	SVP264027 1350	0.7'-1.2'	
			0 / 8400				
			0 / 8400		SVP264028 1352		Svp 264027 -1, -2 QARC Dup
			0 / 8300				
			0 / 8400		SVP264029 1358		
			0 / 8300				
			0 / 8300				
			0 / 7700 ~~7700~~ nr				
			0 / 7900 ~~8000~~ nr		~~SVP264030~~ nr SVP264032 ~~1416~~ 1434 nr		
			0 / 7600 ~~7800~~ nr	4.0/4.0			
		Stronger FeOx nodules? nr staining. ml	0 / 7600 ~~7900~~ nr				
		Soft ~~ml~~ nr	0 / 7500 ~~8100~~ nr				
			0 / 7400 ~~8100~~ nr		~~SVP264031~~ nr ~~1418~~		
			0 / 7700 ~~8000~~ nr		SVP264033 1436		
			0 / 7300 ~~7600~~ nr				
			0 / 7700				
			0 / 8000	4.0/4.0	SVP264030 ~~SVP264029~~ 1416 ~~1358~~ nr		
		Stronger FeOx nodules! staining ml	0 / 7800				
			0 / 7900				

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP264027

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P025

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 027

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ML	10	- soft ML, same as previously described.	0 / 8100	4.0/4.0	SVP264031 1418		Background 7916 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 8100				
	11		0 / 9000				
			0 / 7600				
	12		0 / 7300	3.5 ~~4.0~~ pr /4.0			
			0 / 7100				
	13		0 / 7100		SVP264034		
			0 / 7300		~~SVP264033~~ 1443		
	14	- fewer FeOx nodules ML	0 / 7300				
			0 / 7100		SVP264035		
	15		0 / 7400		~~SVP264033~~ 1445		
			~~0~~ X	NR			
	16						
		TD: 16' EOB: 14:45					will be capped w/ asphalt
	17						
	18						
	19						
	20						

Fuller 10/31/2022 0500

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Backfilled with cement strengthened grout: 2 bags grout, 1 bag cement, & 40 gallons water

Backfilled with 30% solids bentonite grout: 1 bags grout & 14-gallons water

Backfilled with hydrated bentonite chips: 1-gallon water per 2 foot chips

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 027

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B0818 E0859 P028

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264036
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P028	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 3126GT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 3126GT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1086172.67 E 871912.27	
	9. SURFACE ELEVATION: 510.2 ft msl	
10. DATE STARTED: 11/1/2022	11. DATE COMPLETED: 11/1/2022	
15. DEPTH GROUNDWATER ENCOUNTERED: NA		
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID: 592-601025 — BKG: 0 ppm — CAL DATE: 01/19/23

NaI: M-157033 D-171378 — BKG: 6752 CPM — CAL DATE: 9/7/23

LUDLUM: M156377 D164822 — BKG: 1177 CPM — CAL DATE:

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

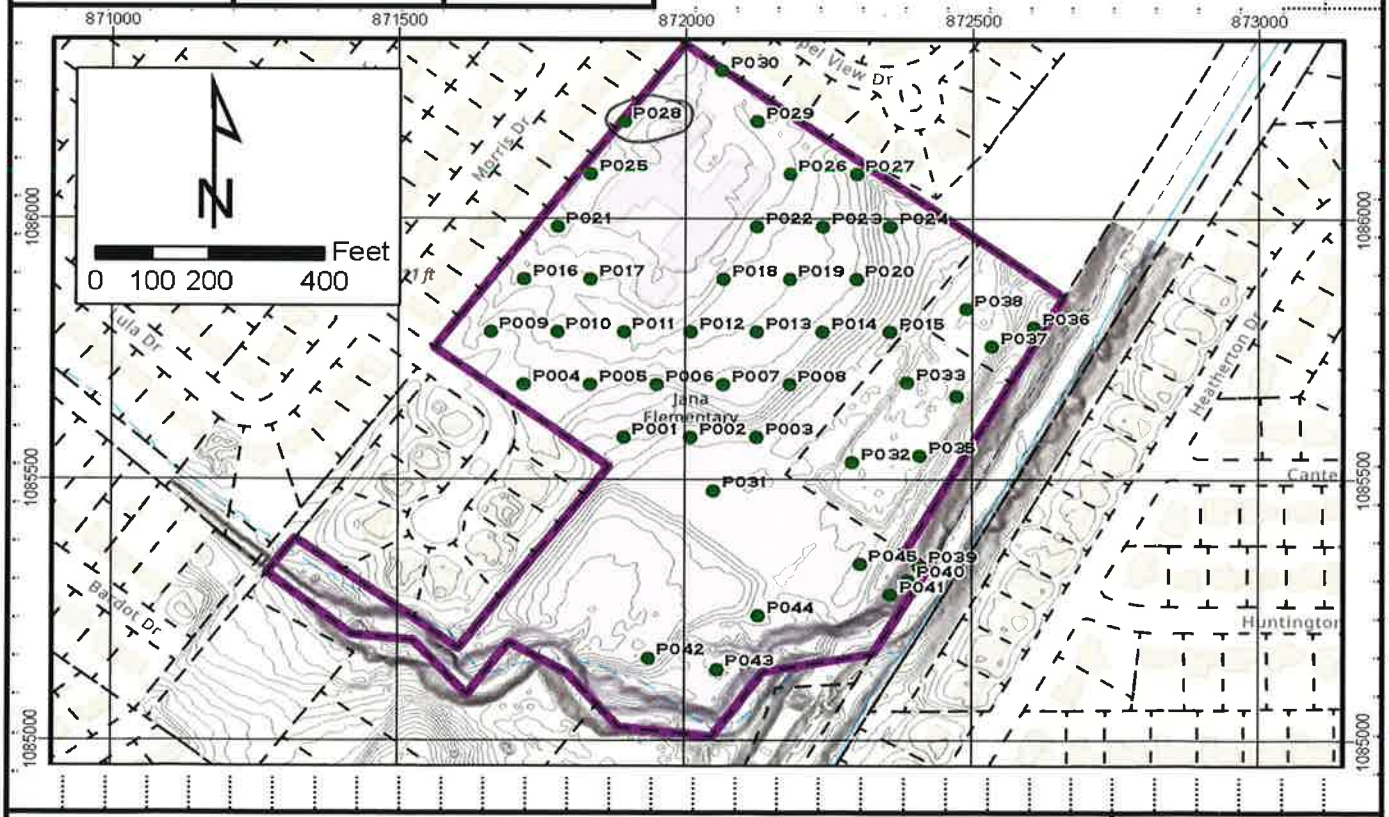
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed COR — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; ft. = Feet; msl = Mean Sea Level; cpm = Counts per minute; ppm = Parts per million; bgs = below ground surface; E = East; N = North



PROJECT: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NUMBER: SVP264036

P028

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 036

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Asphalt and Subbase. fine sand and gravel.	0 / 6600			NA	Background 6752 CPM CPM - Counts per minute CPMs are gross numbers
		No Recovery - either void or soft pushed laterally.	0 / ~~6600~~	NR			
ml		Silt with clay, homogeneous with <1% FeOx nodules, minimal halo staining around grains. Light brown, firm, weak plasticity. Damp (ml)	0 / ~~6600~~ 6900	~~4.0~~ 3.5 / 4.0	SVP264036 0833		
			0 / ~~6900~~ 7000		SVP264037 0835		
			0 / 7000		SVP264038 0837		
		- soft (ml)	0 / ~~7000~~ 6400				
			0 / 6800				
			0 / 6900				
		- medium firm (ml)	0 / 6700				
			0 / 6900		SVP264039 0842		
		- increase to approx 5% FeOx nodules, moderate halo staining around nodules (ml)	0 / 6700	3.5 / 4.0			
			0 / 6600				
			0 / 6900				
			0 / 6900				
			0 / 7000		SVP264040 0844		
			X	NR			
			0 / 6800	4.0 / 4.0			
			0 / 6800				
			0 / 7300		SVP264041 0850		
			0 / 7100				

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 036

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P028

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 036

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3 Sheets

ft. bgs

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		> FeOx rich boundary layer. Brittle, firm, silt. (ml) - reduced to <1% FeOx nodules, weak halo staining.	0 / 7200	4.0 / 4.0	SVP264042 0852	NA 10.3' - 10.8'	Background 6752 CPM
			0 / 7100				CPM - Counts per minute
			0 / 6800				CPMs are gross numbers
			0 / 6700				
			6700	4.0 / 4.0			
			6800				
			6900		SVP264043 0858		
		> moderate FeOx nodules w/ halo staining (ml)	6900				
			6800				
			6900		SVP264044 0859		
			6700				
			6500				
		TD: 16' EOB: 0859					To be backfilled with high solid bentonite slurry strength grout and capped with Asphalt.

USACE 11/1/2022 0910

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 036

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B: 09:56 E: 1028 P030

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 045
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

4. LOCATION: P030

5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton

6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 3126GT

7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 3126GT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler

8. HOLE LOCATION: N 1086270.681 E 872052.793

9. SURFACE ELEVATION: 509.61 ft msl

PID	NaI	LUDLUM
592-601025	MI 57033 D171378	M156377 D164822
BKG: 0 ppm	BKG: 6752 CPM	BKG: 1177 CPM
CAL DATE: 01/19/23	CAL DATE: 9/7/2023	CAL DATE: 8/1/2023

10. DATE STARTED: 11/1/2022

11. DATE COMPLETED: 11/1/2022

15. DEPTH GROUNDWATER ENCOUNTERED: NA

12. OVERBURDEN THICKNESS: 0 ft.

13. DEPTH DRILLED INTO ROCK: NA

16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA

14. TOTAL DEPTH OF HOLE: 16 feet bgs

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES: DISTURBED: NA; UNDISTURBED: NA

19. TOTAL NUMBER OF CORE BOXES: NA

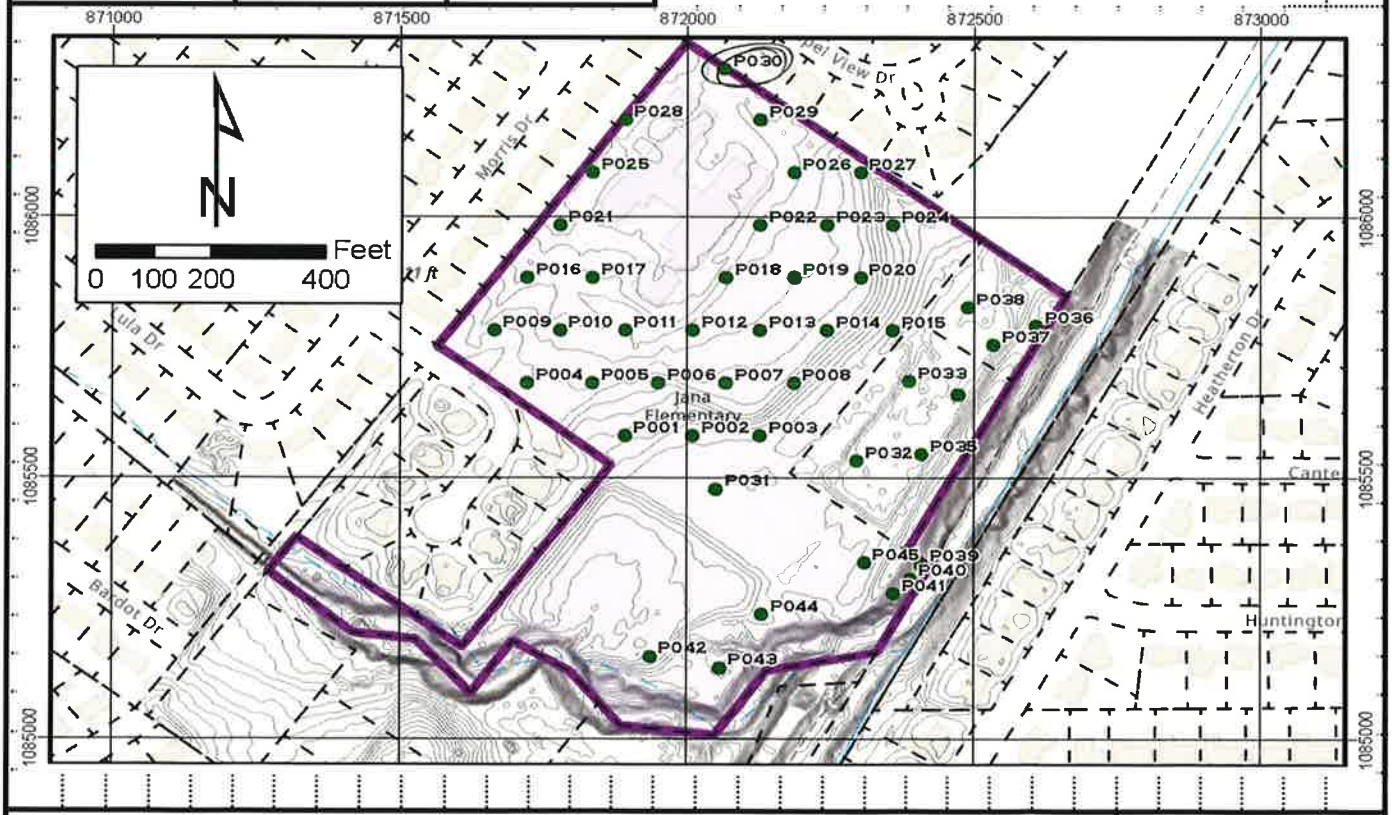
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QAP — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NUMBER: SVP264 045

P030

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 045

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of Sheets 3

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Silty loam, dark brown, damp, not plastic, firm, <1% organics/ roots in top 0.2 feet. (ml)	0 / 7000	4.0 / 4.0	SVP264045 0956	NA	Background 6752 CPM CPM - Counts per minute CPMs are gross numbers
ml		Silt, very little clay. Not plastic, firm, dark brown with <1% FeOx nodules w/halo staining. damp. (ml)	0 / 6900		SVP264045 0956 RE		SVP264045 -1, -2 QA/QC
			0 / 6900		SVP264046 0938		
			0 / 6800				
			0 / 6900				
			0 / 7000				
			0 / 7000				
			0 / 7100		SVP264047 1000		
			0 / 6600				
		Silt with clay, very weakly plastic, medium firm, brown, moderate FeOx staining and nodules, approx 1%. Very damp (ml)	0 / 7200	4.0 / 4.0	SVP264048 1009		
			0 / 7100				
			0 / 7000				
			0 / 7000				
			0 / 7000				
			0 / 7200		SVP264049 1011		
			0 / 6700				
			0 / 6700				
		FeOx nodules are fewer, but larger - up to 0.5 inches. (ml)	0 / 6800	4.0 / 4.0			
			0 / 7200		SVP264050 1019		
			0 / 6900				

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 045

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P030

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 045

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml	10	As Previously described (ml)	0 / 7100	4.0 / 4.0	SVP264051 1021	NA	Background 6752 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 6800				
	11		0 / 7000				
			0 / 6900				
	12		0 / 6700				
		FeOX nodules are fewer and larger, up to 0.5 inches. (ml)	0 / 6700				
	13		0 / 6800	4.0 / 4.0			
			0 / 6900		SVP264052 1026		
	14		0 / 6900				
			0 / 6800				
	15		0 / 6900				
			0 / 6900		SVP264053 1028		
	16						
		TD: 16'					To be backfilled with high solids slurry grout and capped w/ commercial top soil.
		EOB: 1028					USACE 11/1/2022 1035
	17						
	18						
	19						
	20						NOTES: SVP = SLAPS Vicinity Property NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 045

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B: 1112 E: 1144

P029

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 054
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P029	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 3126GT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 3126GT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1096193.416 E 872110.582	
	9. SURFACE ELEVATION: 508.79 ft msl	
	10. DATE STARTED: 11/1/2022	11. DATE COMPLETED: 11/1/2022
	15. DEPTH GROUNDWATER ENCOUNTERED: 5.4 ft BGS	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID 592-601025 — BKG: 0 ppm — CAL DATE: 01/19/23

NaI M.157033 D-171378 — BKG: 6752 CPM — CAL DATE: 9/7/23

LUDLUM M-156377 D-164822 — BKG: CPM — CAL DATE: 8/1/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

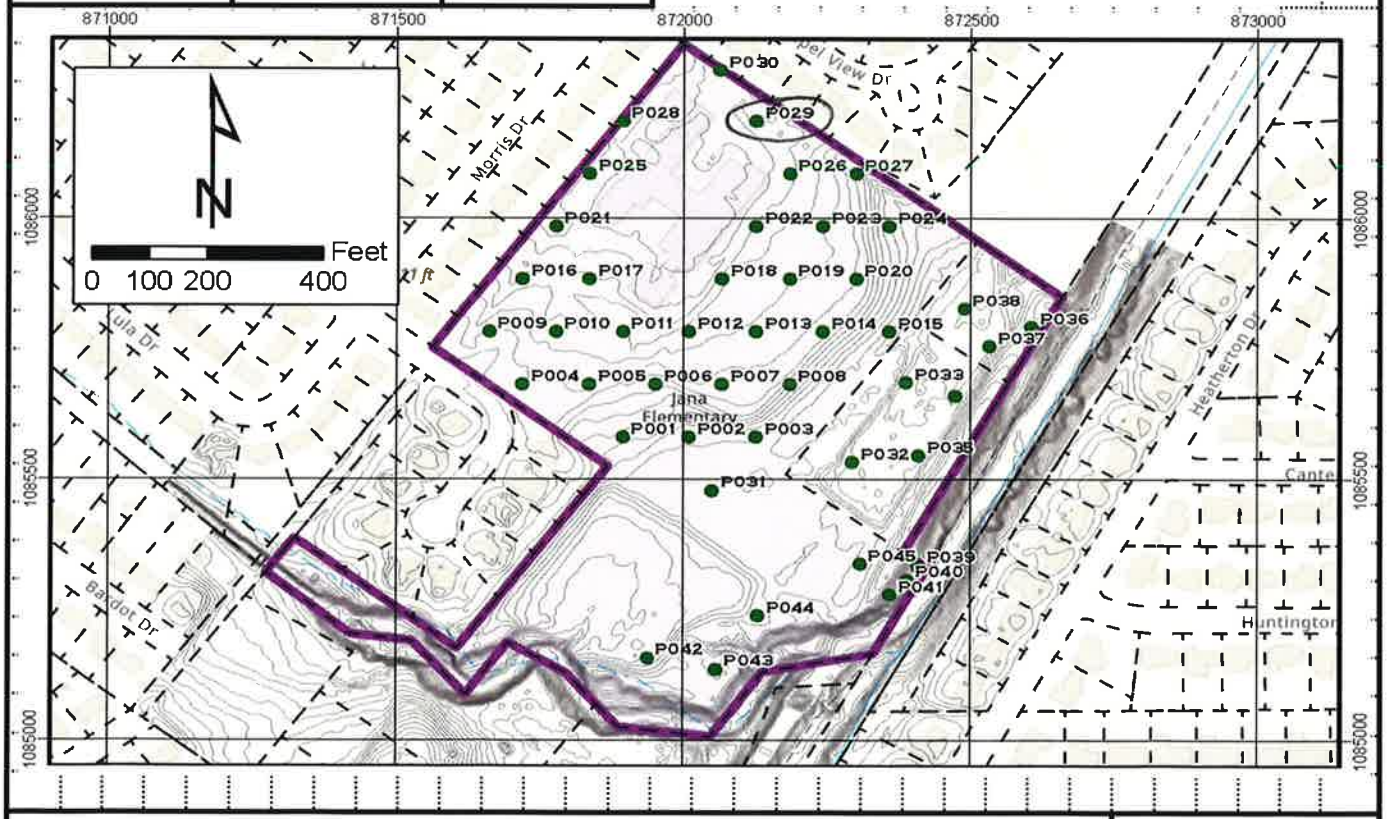
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 8	QA/QC - 0	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K Reed QAR — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; ft. = Feet; msl = Mean Sea Level; cpm = Counts per minute; ppm = Parts per million; bgs = below ground surface; E = East; N = North



PROJECT	HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	SVP264 054

P029

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER SVP264-02-054

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: Phil Ciuffini

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Silty loam, dark brown w/ weak organics in top 0.2 feet. Damp. (ml)	0 / 6300	/12	SVP264054 1112		Background 6752 CPM CPM - Counts per minute CPMs are gross numbers
ml		Silt, very little clay, firm, damp, not plastic, Brown with light tan streaks, <1% FeOx nodules w/ weak halo staining. damp. Increasing coltness with depth. (ml)	0 / 6200 0 / 6300 0 / 6700 0 / 6600 0 / 6500 0 / 6300	3.5/4.0	SVP264055 1114 SVP264056 1116		Recovery issues throughout, offset and redrilled w/ same recovery. Very wet soil, too soft.
		- soft (ml)	0 / 12	NR			
		- very soft, wet (ml)	0 / 6200 0 / 6400 0 / 6400 0 / 6600	2.0/4.0	SVP264057 1123		GW ▼
				NR			- entire interval missed for sample. See recovery notes above.
			0 / 6400 0 / 6300 0 / 6500 0 / 6400	2.5/4.0	SVP264058 1133		

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

ft. bgs: 0 1 2 3 4 5 6 7 8 9 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 054

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P029

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 054

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Same as described above.	0 / 6400		SVP264059 1135	NA	Background 6752 CPM CPM - Counts per minute CPMs are gross numbers
			X	NR			
			X				
			X				
		- soft	0 / 6300	4.0/4.0			
			0 / 6600				
			0 / 6900				
			0 / 6900		SVP264060 1142		
		- medium firm, damp	0 / 6700				
			0 / 6500				
			0 / 6700		SVP264061 1144		
			0 / 6600				
		TD: 16'					To be Filled backfilled w/ high solids bentonite slurry grout and capped with commercial top soil.
		EOB: 1144					

Robin Parks
Robin Parks
USACE witness
11-1-22
1155 hrs

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 054

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B: 1318 ~~1382~~ m E: 1402 P026

HTRW DRILLING LOG

DISTRICT: St. Louis	HOLE NUMBER: SVP264 062	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P026	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 3126GT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 3126GT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1086086.609 E 872181.882	
PID: 592-601025; BKG: 0 ppm; CAL DATE: 01/19/23	NaI: M-157033, D-171378; BKG: 6752 CPM; CAL DATE: 9/7/23	LUDLUM: M-156377, D-164822; BKG: 1/177 CPM; CAL DATE: 8/1/23
9. SURFACE ELEVATION: 508.21 ft msl	10. DATE STARTED: 11/1/2022	11. DATE COMPLETED: 11/1/2022
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

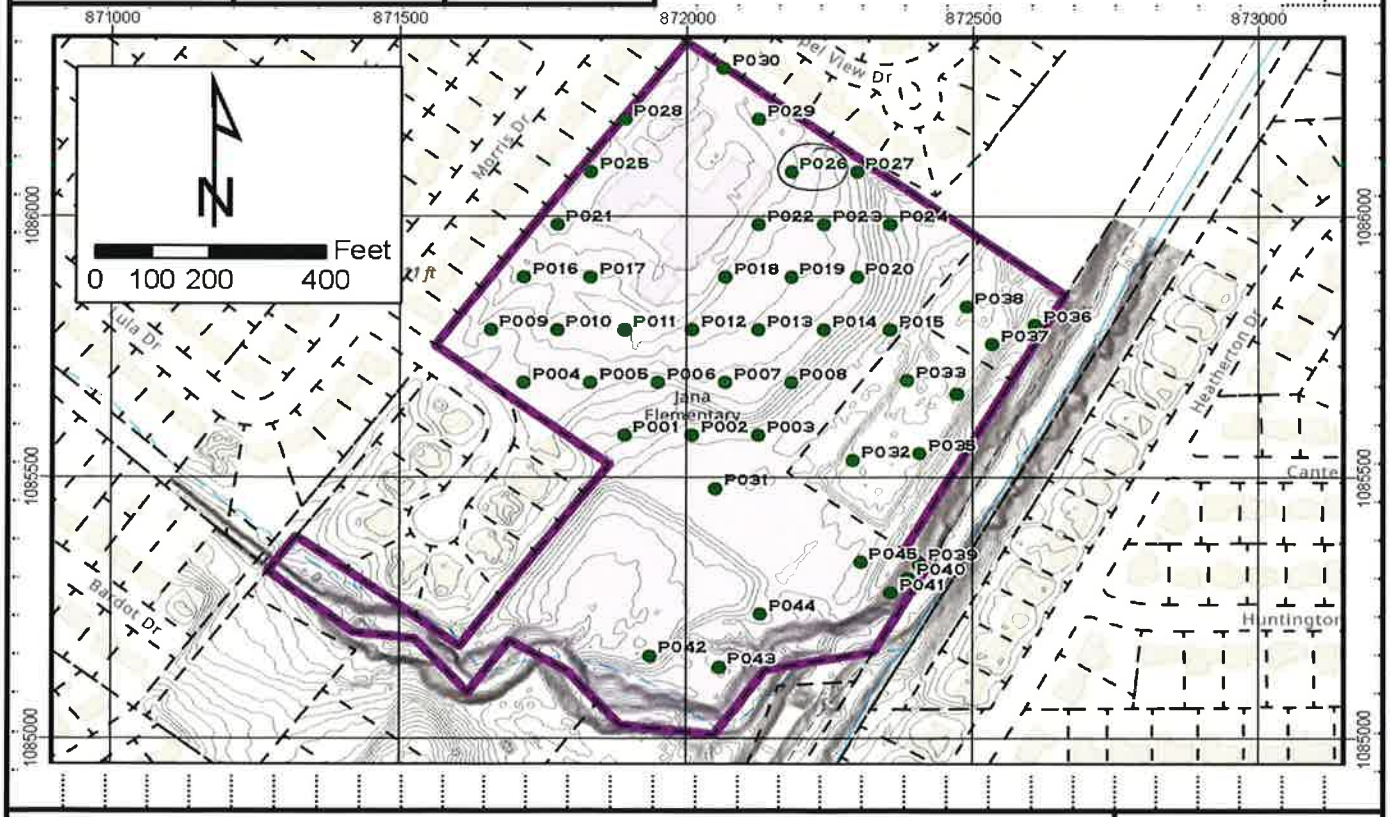
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	[signature]

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed Oak SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT	HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	SVP264 062

P026

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 062

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of Sheets 3

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Asphalt & Gravel sub base	0 / 6500	4.0 / 4.0		NA	Background 6752 CPM CPM - Counts per minute CPMs are gross numbers
ml		Silt, not plastic, firm, damp, light brown. >1% FeOx nodules, no halo staining. (ml)	0 / 6500 0 / 6400 0 / 6400 0 / 6900 0 / 6800 0 / 7100 0 / 7000		SVP 264062 1318 SVP264063 SVP264063 1320 SVP264064 1322	0.7-1.2	SVP264063 -1, -2 QA QC
		- increase to ~3% FeOx nodules w/ halo staining up to 0.25 inches. (ml)	0 / 6500 0 / 6800 0 / 6900 0 / 6700 0 / 6500 0 / 6700 0 / 6500 0 / 6600	4.0 / 4.0	SVP264065 1335 SVP264066 1337		
		FeOx nodules decrease in number, larger in size. (ml)	0 / 6200 0 / 6300 0 / 6400 0 / 6700	4.0 / 4.0	SVP264067 SVP264068 DUP 1345		NOTES: SVP = SLAPS Vicinity Property NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 062

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P026

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 062

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		FeOx nodules as described above. (ml)	0 / 6600	4.0/4.0	SVP264068 ~~SVP264067~~ 1348		Background 6752 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 6700				
		As described above (ml)	0 / 6600				
			0 / 6600				
			0 / 5800				
			0 / 6000				
		- FeOx nodules fewer in number and larger in size, up to 0.5" with halo staining. (ml)	0 / 6500	3.5/4.0			
			0 / 6500		SVP264069 1358		
			0 / 6800		SVP264070 1400		
			0 / 6600				
			0 / 6600		ARCHIVE 1402		
			X	NR			
		TD: 16' EOB: 1402					To be backfilled with high solids bentonite strength grout and capped with asphalt. [signature] USACE 11/1/2022 1410

ft. bgs: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP264 062

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B: 1412 E: 1459 P023

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 071
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO

4. LOCATION: P023

5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton

6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 3126GT

7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 3126GT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler

8. HOLE LOCATION: N 1085986.050 E 872240.330

9. SURFACE ELEVATION: 506.03 ft msl

PID	NaI	LUDLUM
592-601025	M 157033 D 171378	M 156377 D 164822
BKG: 0 ppm	BKG: 6752 CPM	BKG: 1177 CPM
CAL DATE: 01/19/23	CAL DATE: 9/7/23	CAL DATE: 8/1/23

10. DATE STARTED: 11/1/2022

11. DATE COMPLETED: 11/1/2022

15. DEPTH GROUNDWATER ENCOUNTERED: NA

12. OVERBURDEN THICKNESS: 0 ft.

13. DEPTH DRILLED INTO ROCK: NA

16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA

14. TOTAL DEPTH OF HOLE: 16 feet bgs

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES: DISTURBED: NA; UNDISTURBED: NA

19. TOTAL NUMBER OF CORE BOXES: NA

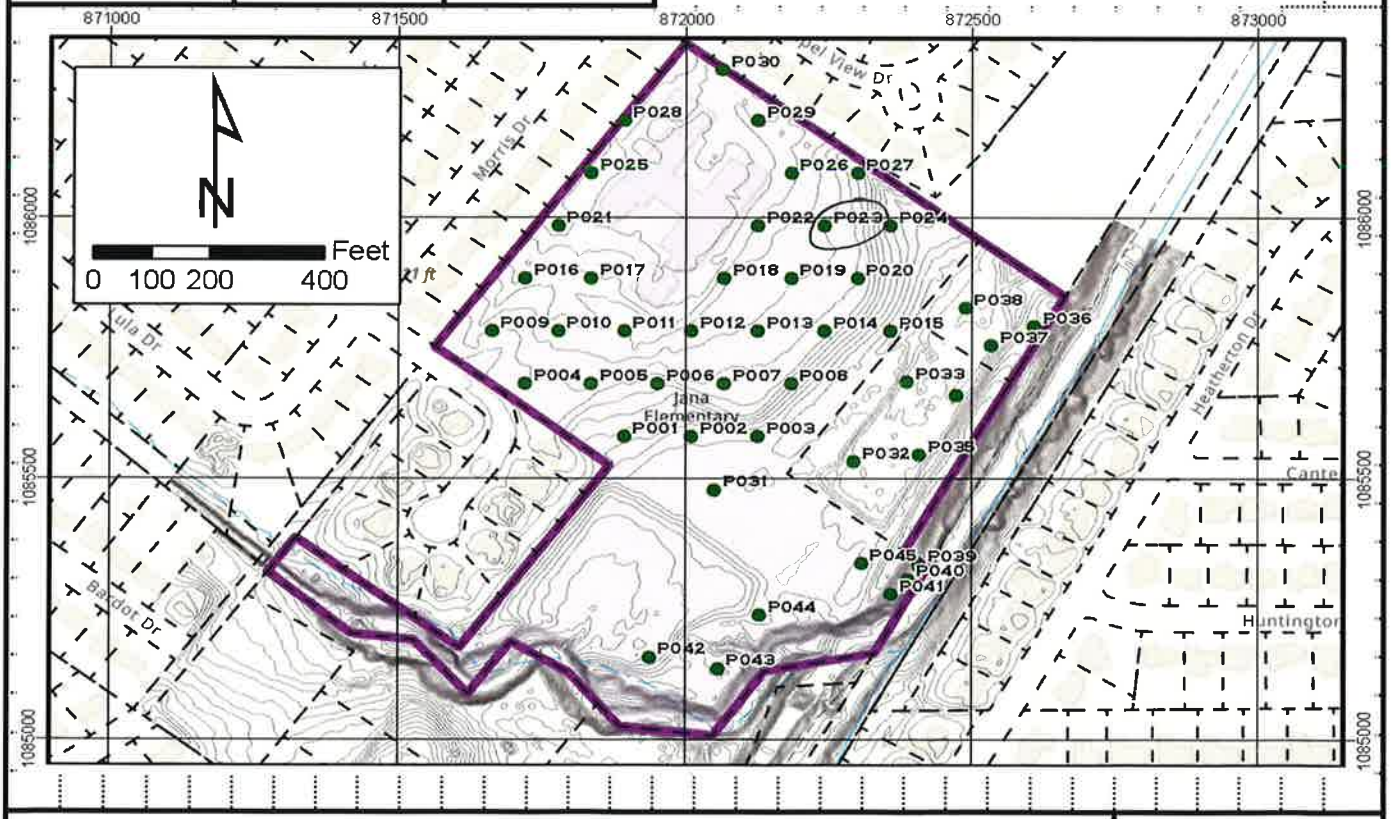
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	Photo Not

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264071

P023

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 071

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Silt, firm, Dark brown, damp, not plastic. Trace roots in top 0.5 feet. (ml)	0/6200	4.0/4.0	SVP264071 1425	NA	Background 6752 CPM CPM - Counts per minute CPMs are gross numbers
		- Light brown (ml)	0/6500				Likely fill material from 0'-3.3'.
			0/6600				
			0/6800		SVP264072 1427		
			0/6600				
			0/6700		SVP264073 1429		
		- Dark Grey mottling	0/6600		ARCHIVE 1431		
ml		Silt with clay, dark grey, damp, not plastic, Firm. Homogeneous. (ml)	0/6400				
ml		Silt, firm, damp, not plastic, homogeneous Light Brown. (ml)	0/6500	4.0/4.0			
			0/6600				
			0/6600				
			0/6600		SVP264074 1436		
			0/6700		SVP264075 1438		
			0/6400				
			0/6400				
		- Begin FeOx nodules w/halo staining, dark & light mottled color brown mottling. (ml)	0/6400				
			0/6500	4.0/4.0			
			0/6600		SVP264076 1449		
ml		Silt, weakly plastic, damp, medium firm, light green/grey. FeOx nodules approx 3% moderate halo staining.	0/6500				
			0/6500				

ft. bgs: 0 1 2 3 4 5 6 7 8 9 10

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 071

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P023

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 071

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		As Previously described. (ml)	0 / 6600	4.0 / 4.0		NA	Background 6752 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 6500				
			0 / 6500				
			0 / 6500		SVP264077 1451		
			0 / 6400	4.0 / 4.0			
			0 / 6700		SVP264078 1457		
			0 / 6400				
		- no feOX nodules (ml)	0 / 6500				
			0 / 6600				
		- soft (ml)	0 / 6500				
			0 / 6500		SVP264079 1459		
			0 / 6100				
		TD: 16'					TO Be backfilled with high-solids bentonite grout and capped w/ commercial top soil.
		EOB: 1459					11/1/2022 1515

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

ft. bgs: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 071

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B: 0840 E: 0941 P013

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 080
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 3 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P013
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 3126GT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 3126GT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085785.226 E 872124.260
	9. SURFACE ELEVATION: 505.59 ft msl
	10. DATE STARTED: 11/2/2022 — 11. DATE COMPLETED: 11/2/2022
	15. DEPTH GROUNDWATER ENCOUNTERED: NA
12. OVERBURDEN THICKNESS: 0 ft. — 13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	M157033 D171378	M141319 D167718
BKG: 0 ppm	BKG: 6438 CPM	BKG: 1227 CPM
CAL DATE: 01/19/23	CAL DATE: 9/7/23	CAL DATE: 7/25/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

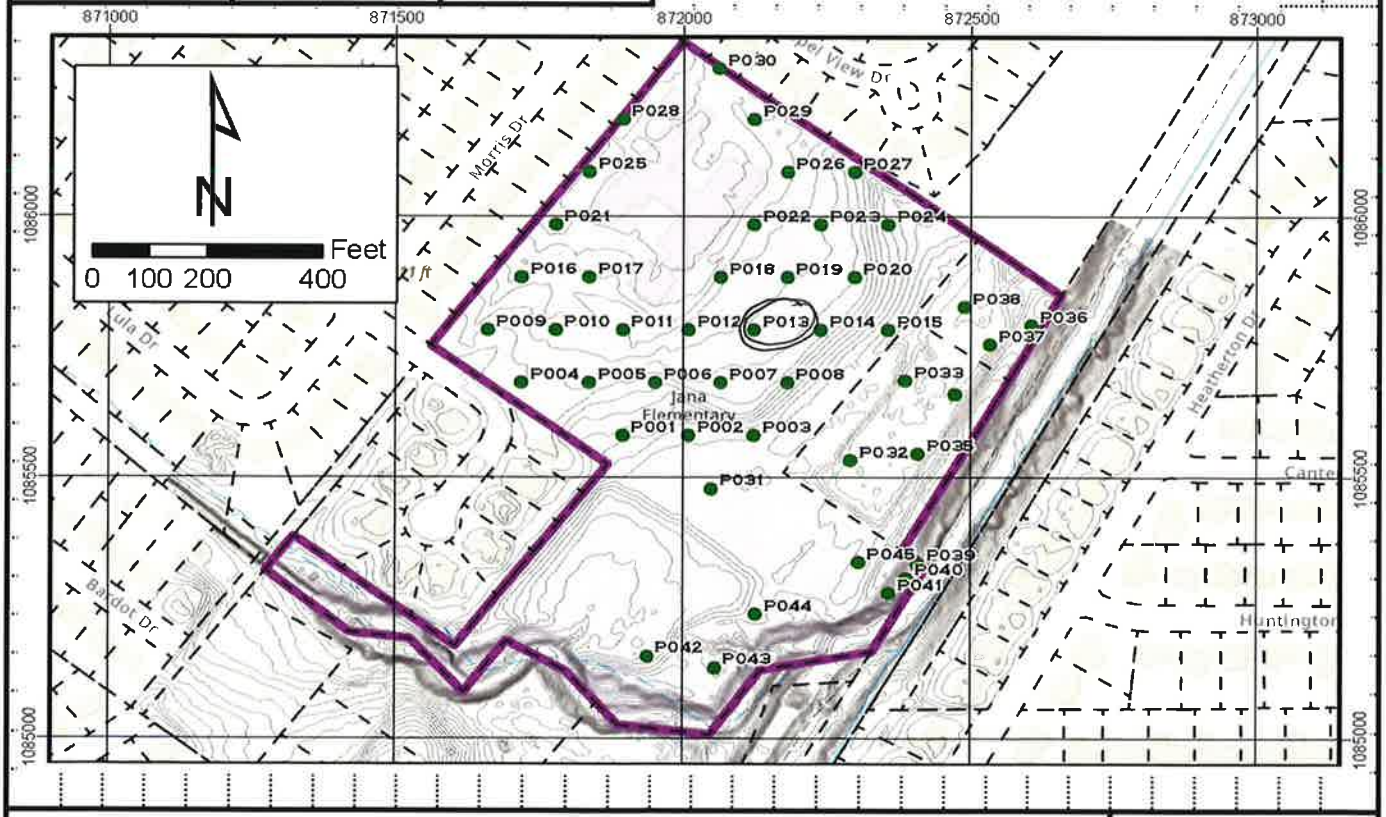
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 1	Archive - 1	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	Phillip Cue

LOCATION SKETCH / COMMENTS / WITNESSED BY: Kevin Cue — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable	cpm = Counts per minute	E = East
ft. = Feet	ppm = Parts per million	N = North
msl = Mean Sea Level	bgs = below ground surface	



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264 080

P013

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264080

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Silt. Homogeneous light brown with trace grass roots in top 0.3'. Damp, firm, not plastic. (ml)	0/6400	4.0/4.0	SVP264080 0854	NA	Background 6438 CPM CPM - Counts per minute CPMs are gross numbers SVP264080 -1, -2 QAQC
			0/6600				
			0/6500				
			0/6600		SVP264081 0856		
			0/6600				
			0/6700				
			0/6700		SVP264082 0858		
			0/6600				
			0/6500	4.0/4.0			
			0/6800				
			0/6400		SVP264083 0907		
			0/6500				
			0/6700				
			0/6800		SVP264084 0909		
		- FeOx nodules <1%, weak halo staining. Approx 0.1" diameter. (ml)	0/6700				
			0/6600				
			0/6900	2.0/2.0			OFFSET and redrill 8'-12' Due to poor recovery. Refusal done in 2' intervals. offset approx 1.5' to the north.
		- FeOx nodules increase in size to 0.5 inches. Also Vertical FeOx staining for approx 1'- Assume worm burrow. (ml)	0/6900		SVP264095 0935		
			0/6700				
			0/6500				

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 080

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P013

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264080

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml	10	As described above - vertical FeOx stain (burrow) - soft, very damp (ml)	0 / 6600	2.0 / 2.0			Background 6438 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 6500				
	11		0 / 6500		SVP264086 0941		
			0 / 6500				
	12		0 / 6600				12'-16' Logged ahead of 8'-12' while waiting on redrill of 8'-12'.
			0 / 6900	3.7 / 4.0			
	13		0 / 6600				
			0 / 7000		SVP264087 0921		
	14	> FeOx stained boundary layer. Firm, crumbly (ml)	0 / 6800		SVP264088 0923		
			0 / 6600				
	15		0 / 6800		ARCHIVE 0925		
			0 / 6600	NR			
	16						To be backfilled w/ high solids bentonite slurry grout and capped w/ commercial top soil
		TD: 16'					
		EOB:					
	17	Witness By: Pedro A. Rosario 11/02/22 USACE 0955					
	18						
	19						
	20						NOTES: SVP = SLAPS Vicinity Property NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 080

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B1012 E1127 P020

HTRW DRILLING LOG

DISTRICT: St. Louis	HOLE NUMBER: SVP264 089	
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 4 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P020
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 3126GT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 3126GT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085884.670 m E 872298.095 m
	9. SURFACE ELEVATION: 504.851 ft msl
	10. DATE STARTED: 11/2/2022 — 11. DATE COMPLETED: 11/2/2022
	15. DEPTH GROUNDWATER ENCOUNTERED: NA
12. OVERBURDEN THICKNESS: 0 ft. — 13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 28 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	M157033 D171378	M141319 D167718
BKG: 0 ppm	BKG: 6438 CPM	BKG: 1227 CPM
CAL DATE: 01/19/23	CAL DATE: 9/7/23	CAL DATE: 7/25/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

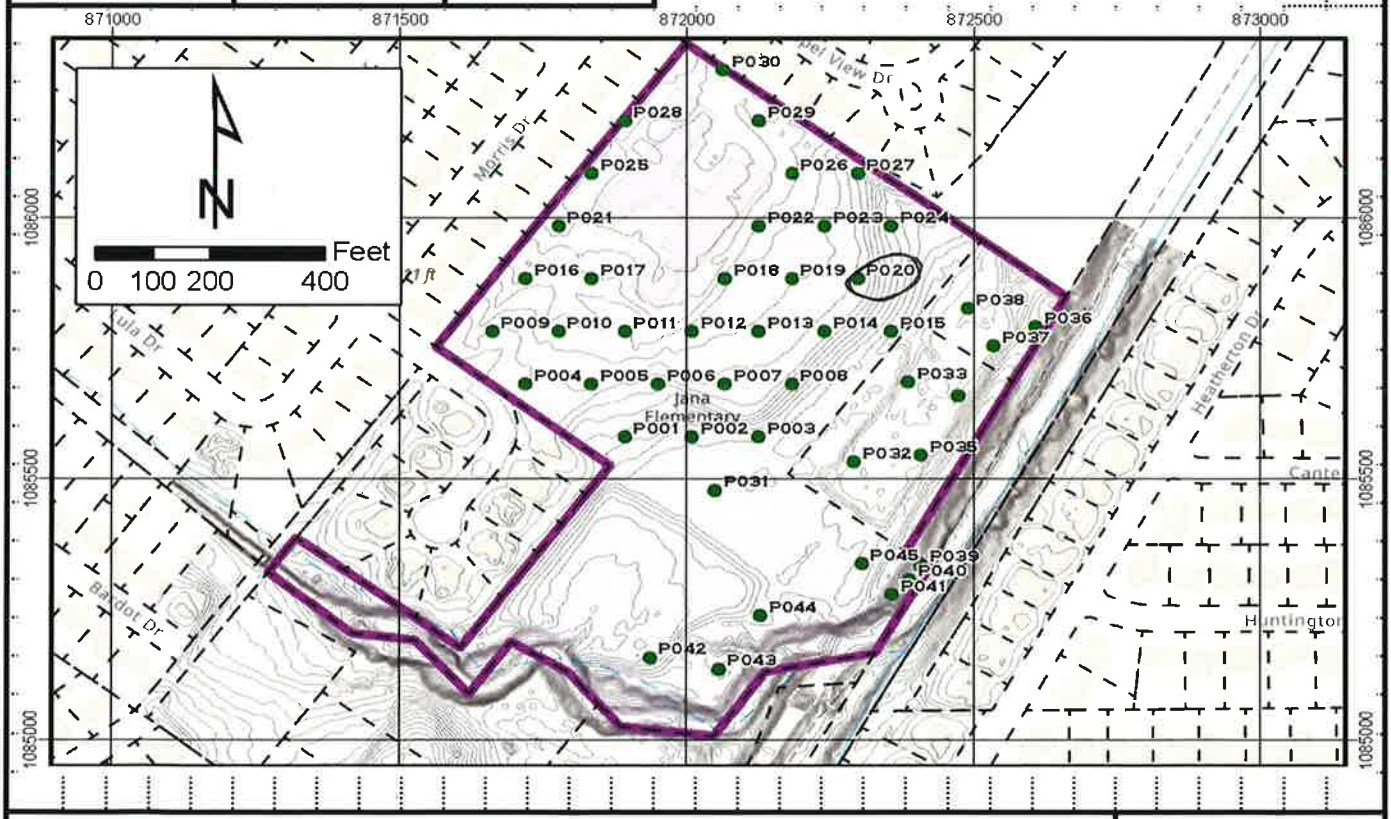
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 15	QA/QC - 0	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: KFRD CRAP — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264 089

P020

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264089

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Silt, homogeneous light brown with trace organics from 0.0 – 0.4' BGS. Damp, Firm, not plastic. (ml)	0 / 6200	4.0/4.0	SVP264089 1015	NA	Background 6438 CPM CPM - Counts per minute CPMs are gross numbers Likely fill material from 0' → 8.5'
			0 / 6300				
			0 / 6400				
			0 / 6400		SVP264090 1016		
			0 / 6300				
			0 / 6500		SVP264091 1018		
			0 / 6400				
			0 / 6400				
			5700	4.0/4.0			
			0 / 6200				
		– weakly plastic, moderately firm. FeOx nodules < 1%, < 0.1" diameter. (ml)	0 / 6600		SVP264092 1026		
			0 / 6500				
			0 / 6400				
			0 / 6200				
			0 / 6400				
			0 / 6400		SVP264093 1028		
			0 / 6400		SVP264094 1036		
		Silt, tan/grey w/light brown mottling. FeOx nodules up to 0.5" diameter, halo staining around nodules. Trace vertical FeOx traces (burrows). Moderately firm, weakly plastic, damp. (ml)	0 / 6000	4.0/4.0	~~Archive~~ NR		
			0 / 6300				
			0 / 6200				

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

ft. bgs: 0 1 2 3 4 5 6 7 8 9 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264089

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P020

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 089

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: Phil Liffiej

Sheet 3 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		As described Previously (ml)	0 / 6100	4.0 / 4.0		NR	Background 6438 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 6200				
			0 / 6300		SVP264095 1038		
			0 / 6200				
		- vertical FeOX "burrows" up to 1.0" (ml), approx 3%	0 / 6100				
			0 / 6100	3.5 / 4.0			
			0 / 6100		SVP264096 1050		
			0 / 6000				
			0 / 6000				
		- reduce FeOX nodules to approx <1% (ml)	0 / 6000				
			0 / 6200		SVP264097 1052		
			0 / 6100				
			0 / m	NR			
		- FeOx nodules 0% homogeneous light brown. damp, medium firm. (ml)	0 / 6200				
			0 / 6200	3.5 / 4.0			
			0 / 6100				
			0 / 6200		SVP264098 1102		
			0 / 6200				
			0 / 6300		SVP264099 1104		
			0 / 6100				
			0 / m	NR			

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

ft. bgs: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 089

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P020

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264089

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 4 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		As previously described. (ml)	0 / 6000	3.5/4.0		NA	Background 6438 CPM CPM - Counts per minute CPMs are gross numbers
		FeOx nodules Approx 3% up to 0.3" diameter (ml)	0 / 6300		SVP264100 1112		
			0 / 6200				
			0 / 6200				
			0 / 6000				
			0 / 5800				
			0 / 6000		SVP264101 1113		
			X	NR			
			0 / 5800	4.0/4.0			
			0 / 6000				
			0 / 6100		SVP264102 1125	25.3-25.8	
ml		clayey silt, very firm, moderately plastic, damp. Green grey, homogenious. (ml)	0 / 6300				
			0 / 6100				
			0 / 6000		SVP264103 1127		
			0 / 5900				
			0 / 5900				
		TD: 28'					To be backfilled w/ high solids bentonite slurry grout and capped w/ Commercial top soil.
		EOB: 1127					
		Witness By: Pedro A. Rosario 11/02/22 USACE 1140					

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264089

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B: 1142 E: 1335 P015

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 104
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 4 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P015
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 3126GT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 3126GT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1045784.643 E 872357.287
	9. SURFACE ELEVATION: 496.242 ft msl
	10. DATE STARTED: 11/2/2022 — 11. DATE COMPLETED: 11/2/2022
	15. DEPTH GROUNDWATER ENCOUNTERED: NA
12. OVERBURDEN THICKNESS: 0 ft. — 13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 24 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	M157033 D171378	M141319 D167718
BKG: ppm	BKG: 6438 CPM	BKG: 1227 CPM
CAL DATE: 01/19/23	CAL DATE: 9/7/23	CAL DATE: 7/25/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

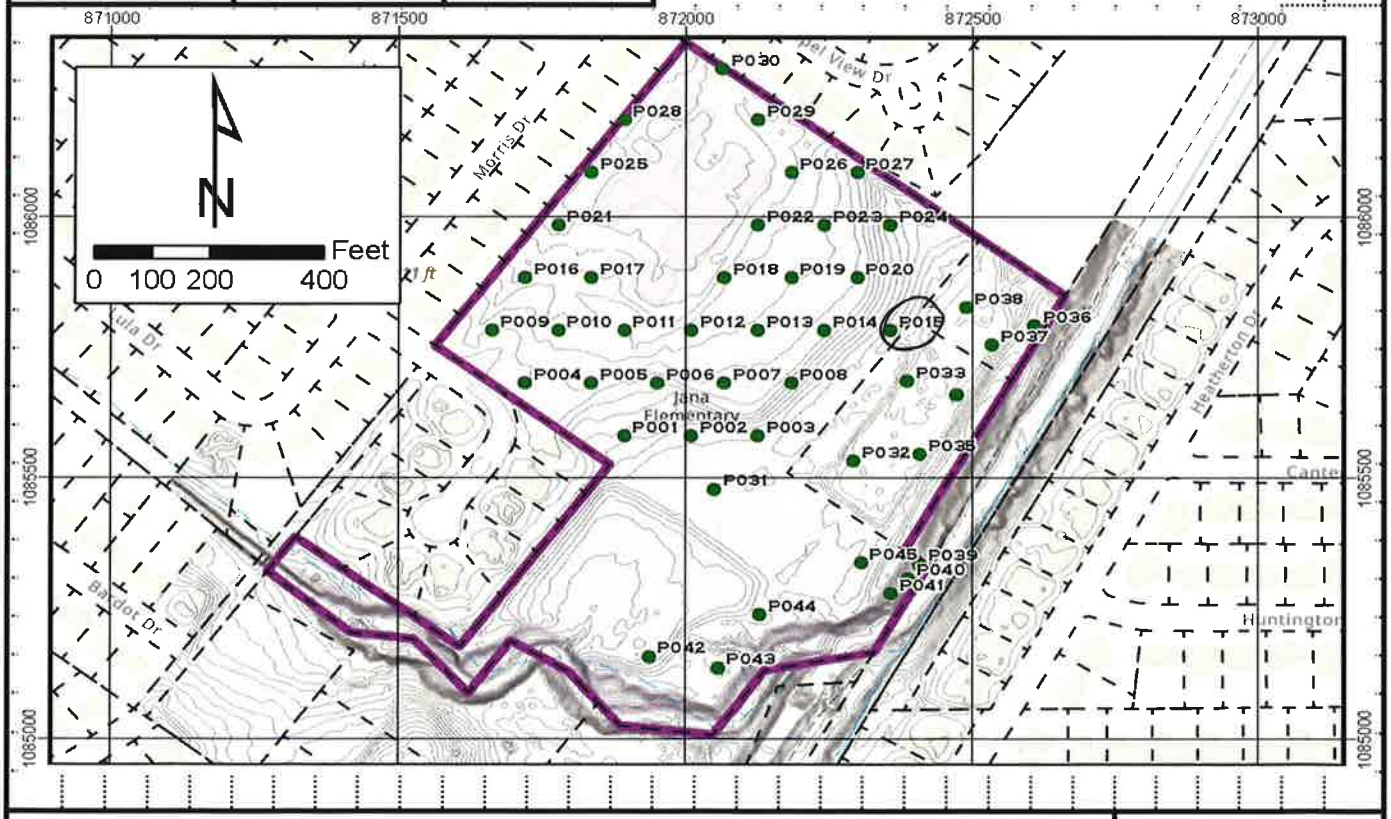
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 13	QA/QC - 1	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QAR — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264 104

P015

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 104

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Silt. Firm, not plastic, damp, homogeneous brown with trace organics from 0.0-0.3' bgs.	0 / 6000	4.0 / 4.0	SVP264104 1142	NA	Background 6438 CPM CPM - Counts per minute CPMs are gross numbers SVP 264104 -1, -2 QAQC
			0 / 6000				
			0 / 6200				
			0 / 6300		SVP264105 1148		
			0 / 6200				
			0 / 6300				
			0 / 6400				
			0 / 6400		SVP 264106 1150		
		10% FeOx nodules w/ staining throughout (ml)	0 / 5900				
		- slightly lighter brown (ml)	0 / 6000				
			0 / 6000	3.7 / 4.0			
			0 / 6100		SVP264107 1248		
		- brown w/ <1% FeOx nodules. (ml)	0 / 6400		SVP264108 1250		
			0 / 6000				
			0 / 6200				
			X	NR			
			0 / 5800				
			0 / 5800	4.0 / 4.0			
			0 / 6000				
			0 / 6200		SVP264109 1258		

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 104

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P015

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264104

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: Phil Ciuffini

Sheet 3 of 4 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml	10	As previously described (ml)	0 / 6000	4.0/4.0		NA	Background 6438 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 6000				
	11		0 / 6100		SVP264110 1300		
			0 / 6000				
	12		0 / 6000	4.0/4.0			
			0 / 6100		SVP264111 1311		
	13		0 / 6000				
			0 / 5900				
	14	Trace vertical FeOX "burrows"	0 / 6000				
			0 / 6000				
	15		0 / 6000		SVP264112 1313		
			0 / 5700				
	16		0 / 6200	4.0/4.0			Offset and repushed 16'-24' due to low recovery (bent shoe)
			0 / 6100				
ml	17	clayey silt, damp, moderately plastic, very stiff, grey/green. (ml) homogeneous	0 / 6000		SVP264113 1326		
			0 / 6000				
	18		0 / 6000				
			0 / 6100				
	19		0 / 6400		SVP264114 1328		
ch		silty clay, greenish blue very firm, damp, high plasticity, homogeneous. crumbly. (ch)	0 / 6100				
	20						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264104

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P015

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 104

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet: 4 of 4 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
Ch		As previously described. (Ch)	0/6400 0/6200 0/6100 0/6100 0/6000 0/6200 0/6200 0/6000	4.0/4.0	SVP264115 1333 SVP264116 1335	NA	Background 6438 CPM CPM - Counts per minute CPMs are gross numbers
		TD: 24' EOB: 1335 Witnessed By: Pedro A. Rosario 11/02/22 USACE 1348					To be backfilled w/ high solids bentonite slurry grout and capped with commercial top soil.

ft. bgs: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 104

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B: 1015 E: 1024 P052

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 145
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 2 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P052
5. NAME OF DRILLER(S): ~~Travis Hearne, Cody Schwartz, Kevin Sutton~~ Cody Hearne	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe ~~3126GT~~ 7822DT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe ~~3126GT~~ 7822 DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1086150.669 E 872185.982
	9. SURFACE ELEVATION: 508.214 ft msl
	10. DATE STARTED: 11/3/2022 — 11. DATE COMPLETED: 11/3/2022
	15. DEPTH GROUNDWATER ENCOUNTERED: NA
12. OVERBURDEN THICKNESS: 0 ft. — 13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 6 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	M157033 D171378	M156386 D150909
BKG: 0 ppm	BKG: 7050 CPM	BKG: 2/306 CPM
CAL DATE: 01/19/23	CAL DATE: 9/7/23	CAL DATE: 2/23/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

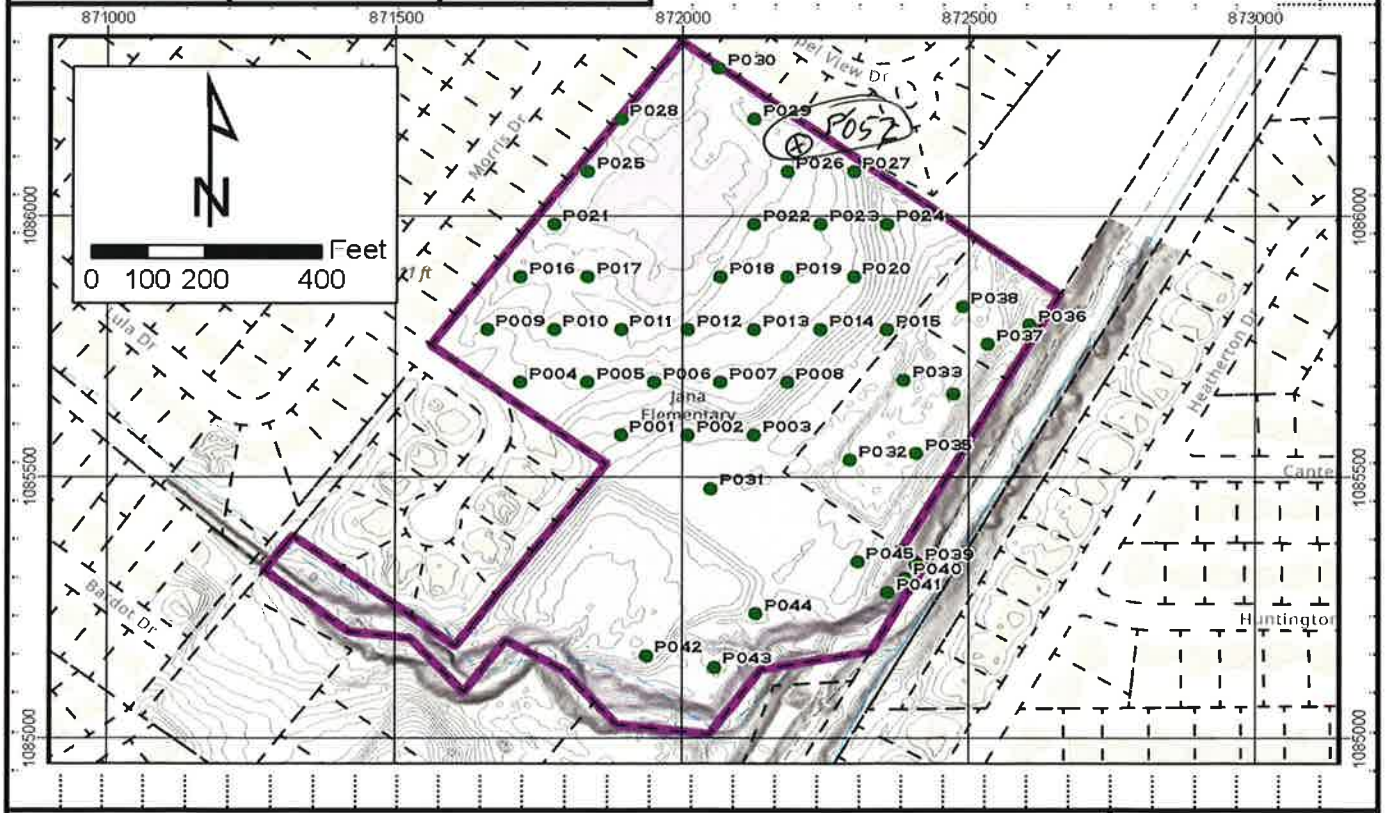
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 2	QA/QC - 0	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	Phillip Cupo

LOCATION SKETCH / COMMENTS / WITNESSED BY: T. Reed QAR — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable	cpm = Counts per minute	E = East
ft. = Feet	ppm = Parts per million	N = North
msl = Mean Sea Level	bgs = below ground surface	



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264 145

P052

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264145

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of 2 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	0	Mulch & organic soil	0 / 7100	4.0 / 4.0	SVP264145 1015	NA	Background 7050 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 7000		SVP264146 1017		
	1	Limestone chip					
ml		Silt. Damp, light brown, medium firm, not plastic. Mostly Homogeneous, very faint bedding. (ml)	0 / 7000				
	2		0 / 7200				
			0 / 6900				
			0 / 7400		ARCHIVE 1019		
	3		0 / 7300				
			0 / 7300				
	4		0 / 7200	2.0 / 2.0			
		- trace FeOx nodules (ml)	0 / 7300		ARCHIVE 1024		
	5		0 / 7000				
			0 / 7000				
	6						
		TD: 6'					To be backfilled with bentonite hydrated chips, capped w/ commercial top soil and covered with in-situ mulch.
		EOB: 1024					USACE 11/3/2022 1030
	7						
	8						
	9						
	10						NOTES: SVP = SLAPS Vicinity Property; NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264145

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B: 1101 E: 1110 P051

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 147
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 2 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P051	
5. NAME OF DRILLER(S): ~~Travis Hearne, Cody Schwartz, Kevin Sutton~~ Cody Hearne	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe ~~3126GT~~ 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe ~~3126GT~~ 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1086185.269 E 872146.364	
PID: 592-601025; BKG: 0 ppm; CAL DATE: 01/19/23	NaI: M157033 D171378; BKG: 7050 CPM; CAL DATE: 9/7/23	LUDLUM: 377 M156~~386~~ D ~~L50909~~ 164822; BKG: ~~2/306~~ 1/200 CPM; CAL DATE: 2/23/23
9. SURFACE ELEVATION: 508.648 ft msl	10. DATE STARTED: 11/3/2022	11. DATE COMPLETED: 11/3/2022
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA
14. TOTAL DEPTH OF HOLE: 6 feet bgs	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

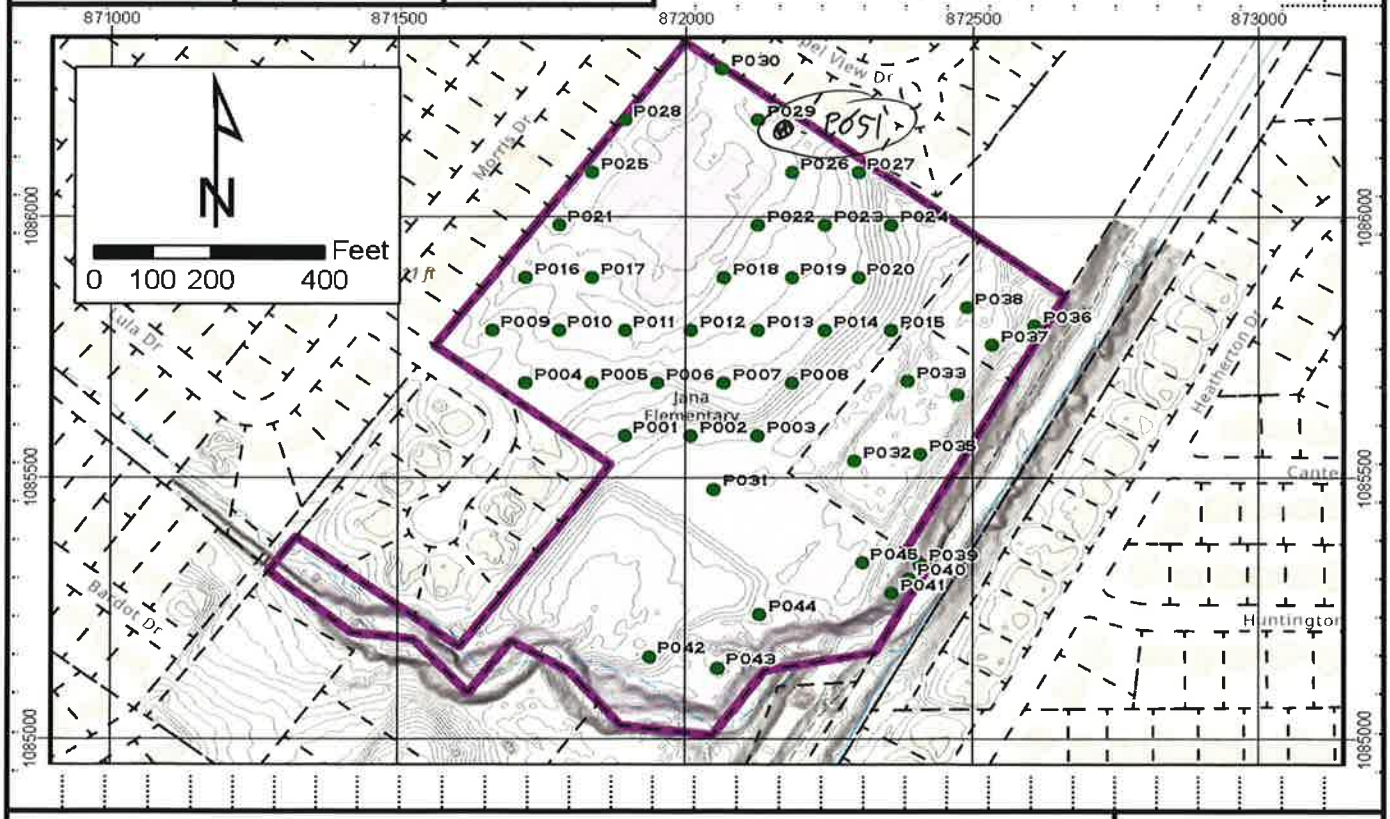
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 2	QA/QC - 0	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	[signature]

LOCATION SKETCH / COMMENTS / WITNESSED BY: SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East; ft. = Feet; ppm = Parts per million; N = North; msl = Mean Sea Level; bgs = below ground surface



PROJECT	HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	SVP264 147

P051

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 147

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: Phil Ciuffini

Sheet 2 of 2

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Mulch & organic soil	0 / 6900	4.0/4.0	SVP264147 1101	NA	Background 7050 CPM CPM - Counts per minute CPMs are gross numbers
		Pea gravel / limestone chip	0 / 7200				
ml		Silt. Light brown, homogeneous, damp. Firm, not plastic. (ml)	0 / 7300				
			0 / 7600		SVP264148 1103		
		-slightly lighter in color, <1% FeOX nodules (ml)	0 / 7000				
			0 / 7400		ARCHIVE 1105		
			0 / 7100				
			0 / 7300				
			7000 /	2.0/2.0			
			7500				
		-Light brown (ml)	7700		ARCHIVE 1110		
			7500				
		TD: 6'					USACE 11/3/2022 1120
		EOB: 1110					To be backfilled w/ hydrated bentonite chips and capped with commercial top soil.

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 147

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B: 1136 E: 1147 P050

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 / 149
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 2 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P050
5. NAME OF DRILLER(S): ~~Travis Hearne~~, Cody Schwartz, Kevin Sutton — Cody Hearne	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe ~~3126GT~~ 7822DT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe ~~3126GT~~ 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1086299.129 E 872004.806
	9. SURFACE ELEVATION: 510.411 ft msl
	10. DATE STARTED: 11/3/2022 — 11. DATE COMPLETED: 11/3/2022
	15. DEPTH GROUNDWATER ENCOUNTERED: NA
12. OVERBURDEN THICKNESS: 0 ft. — 13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 6 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	M157033 D171378	M156377 D164822
BKG: 0 ppm	BKG: 7050 CPM	BKG: 1/200 CPM
CAL DATE: 01/19/23	CAL DATE: 9/7/23	CAL DATE: 2/23/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

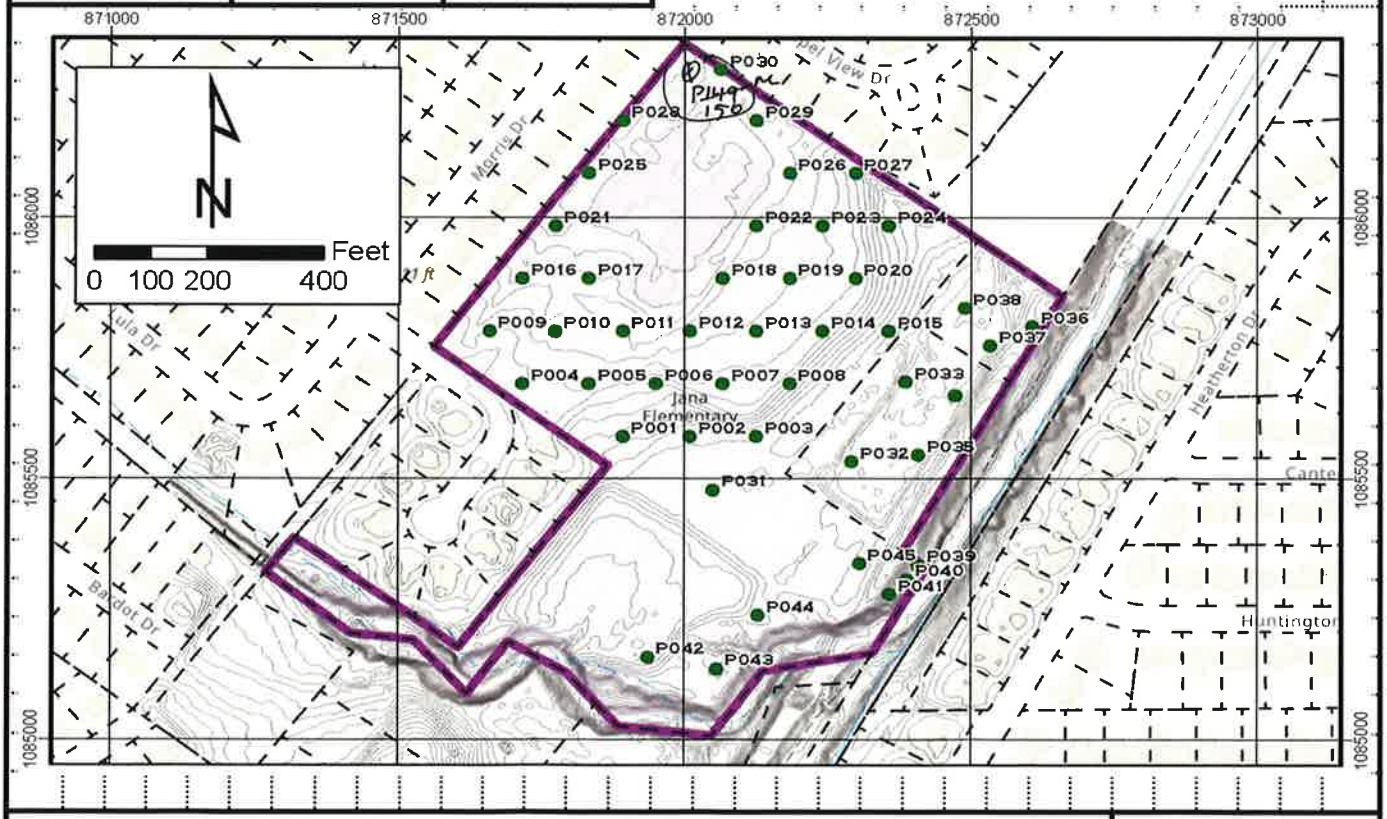
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 2	QA/QC - 1	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QAM — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264 / 149

D050

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 149

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of 2 Sheets

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	0	Mulch & Organic soil	0 / 6900	4.0 / 4.0	SVP264149 1136	NA	Background 7050 CPM CPM - Counts per minute CPMs are gross numbers
		Pea gravel, limestone chip, sand					
ml	1	Silt. Trace roots in top 0.3'. Firm, damp, not plastic. Light brown / Light grey w/ <1% FeOX staining. (ml	0 / 7100 0 / 7400		SVP264150 1138		SVP264149 -1, -2 QA-QC
	2		0 / 7200 0 / 7400		ARCHIVE 1140		
	3		0 / 7400 0 / 7400				
	4	- <1% FeOX nodules. Weak halo staining.	0 / 7100 0 / 7000	2.0 / 2.0			
	5		0 / 7200 0 / 7200				
	6		0 / 7200		ARCHIVE 1147		
		TD: 6' EOB: 1147					to be backfilled w/ hydrated bentonite chips and capped w/ commercial top soil.
	7						USACE 11/3/2022 1205
	8						
	9						
	10						

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 149

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B: 1318 E: 1326 P048

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 151
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 2 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P048
5. NAME OF DRILLER(S): ~~Travis Hearne, Cody Schwartz, Kevin Sutton~~ Cody Ikem	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe ~~3126GT~~ 7822DT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe ~~3126GT~~ 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1086142.526 E 871930.507
	9. SURFACE ELEVATION: 511.033 ft msl
	10. DATE STARTED: 11/3/2022 — 11. DATE COMPLETED: 11/3/2022
	15. DEPTH GROUNDWATER ENCOUNTERED: NA
12. OVERBURDEN THICKNESS: 0 ft. — 13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 6 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	M157033 D171378	M156377 D164822
BKG: 0 ppm	BKG: 7050 CPM	BKG: 1200 CPM
CAL DATE: 01/19/23	CAL DATE: 9/7/23	CAL DATE: 8/1/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

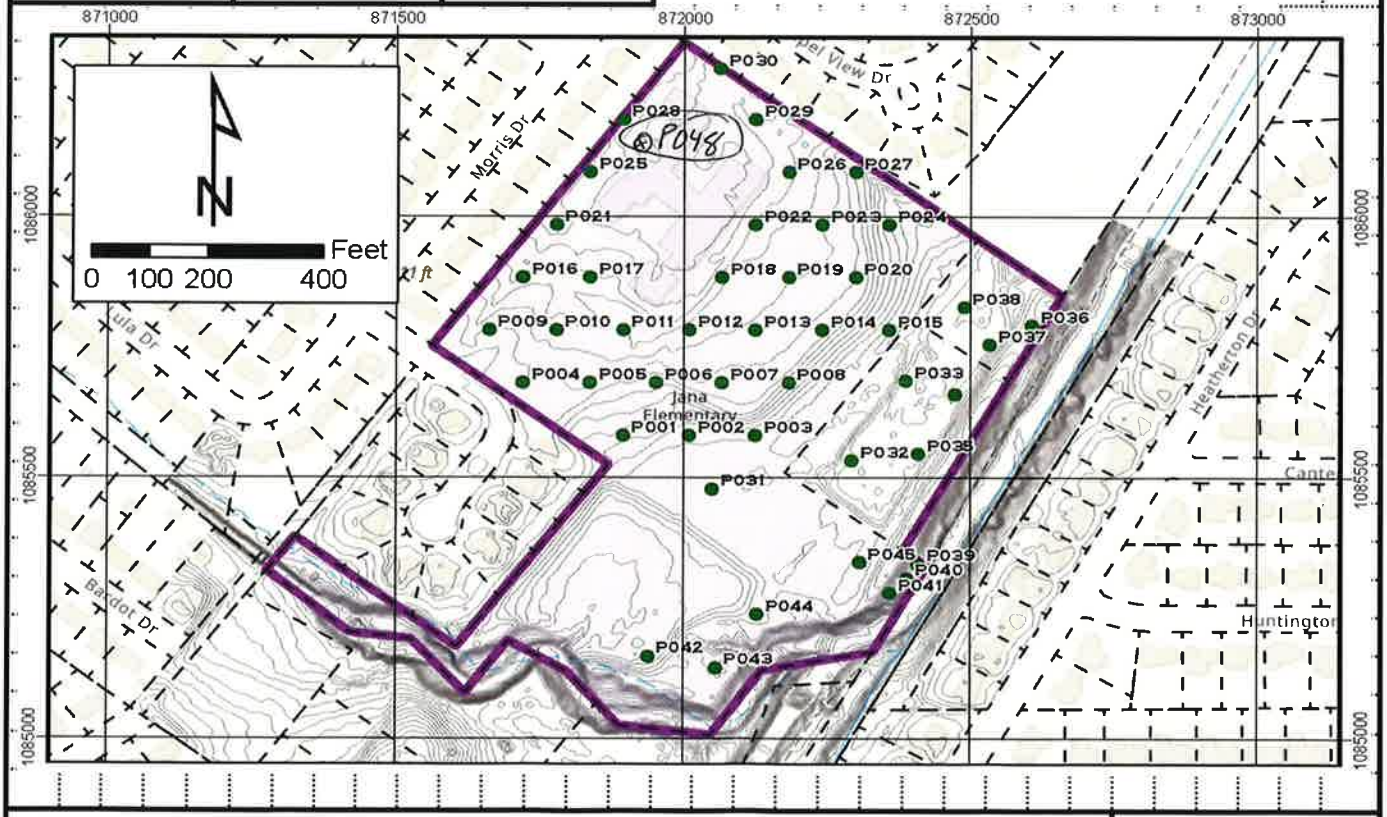
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 2	QA/QC - 0	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K Reed QAR — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable	cpm = Counts per minute	E = East
ft. = Feet	ppm = Parts per million	N = North
msl = Mean Sea Level	bgs = below ground surface	



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264 151

P048

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 151

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 2 of 2

USCS	Depth (ft. bgs)	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
	0	Mulch & organic soil	0 / 7000	4.0/4.0	SVP264151 1318	NA	Background 7050 CPM CPM - Counts per minute CPMs are gross numbers
	1	Pea Gravel	0 / 7200				
		Asphalt & Sub base gravel.	0 / 6800				
ml	2	Silt. Moderately firm, damp, not plastic, mostly grey-green w/ brown mottling. <1% FeOX nodules. (ml)	0 / 7200		SVP264152 1320		
			0 / 7900		1322 ARCHIVE		
	3	- mostly light brown w/ 10% grey-green blebs. (ml)	0 / 7400				
			0 / 7200				
	4		0 / 7200				
			0 / 7200	2.0/2.0			
	5		0 / 7200				
			0 / 7300				
	6		0 / 7400		ARCHIVE 1326		
		TD: 6' EOB: 1326					To be backfilled w/ hydrated bentonite chips & capped w/ gravel.
	7						USACE 11/3/2022 1335
	8						
	9						
	10						NOTES: SVP = SLAPS Vicinity Property; NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 151

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B0820 E0853 P049

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 289
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET: 1 of 2 SHEETS

3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P049
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, ~~Kevin Sutton~~ Cody Hearne	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1086188.328 E 871910.824
	9. SURFACE ELEVATION: 511.039 ft msl
	10. DATE STARTED: 11/4/2022 — 11. DATE COMPLETED: 11/4/2022
	15. DEPTH GROUNDWATER ENCOUNTERED: NP
12. OVERBURDEN THICKNESS: 0 ft. — 13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 6 feet bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	M169246 D174868	M156377 D164822
BKG: 0 ppm	BKG: 5985 CPM	BKG: 1177 CPM
CAL DATE: 01/19/23	CAL DATE: 2/22/23	CAL DATE: 8/1/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

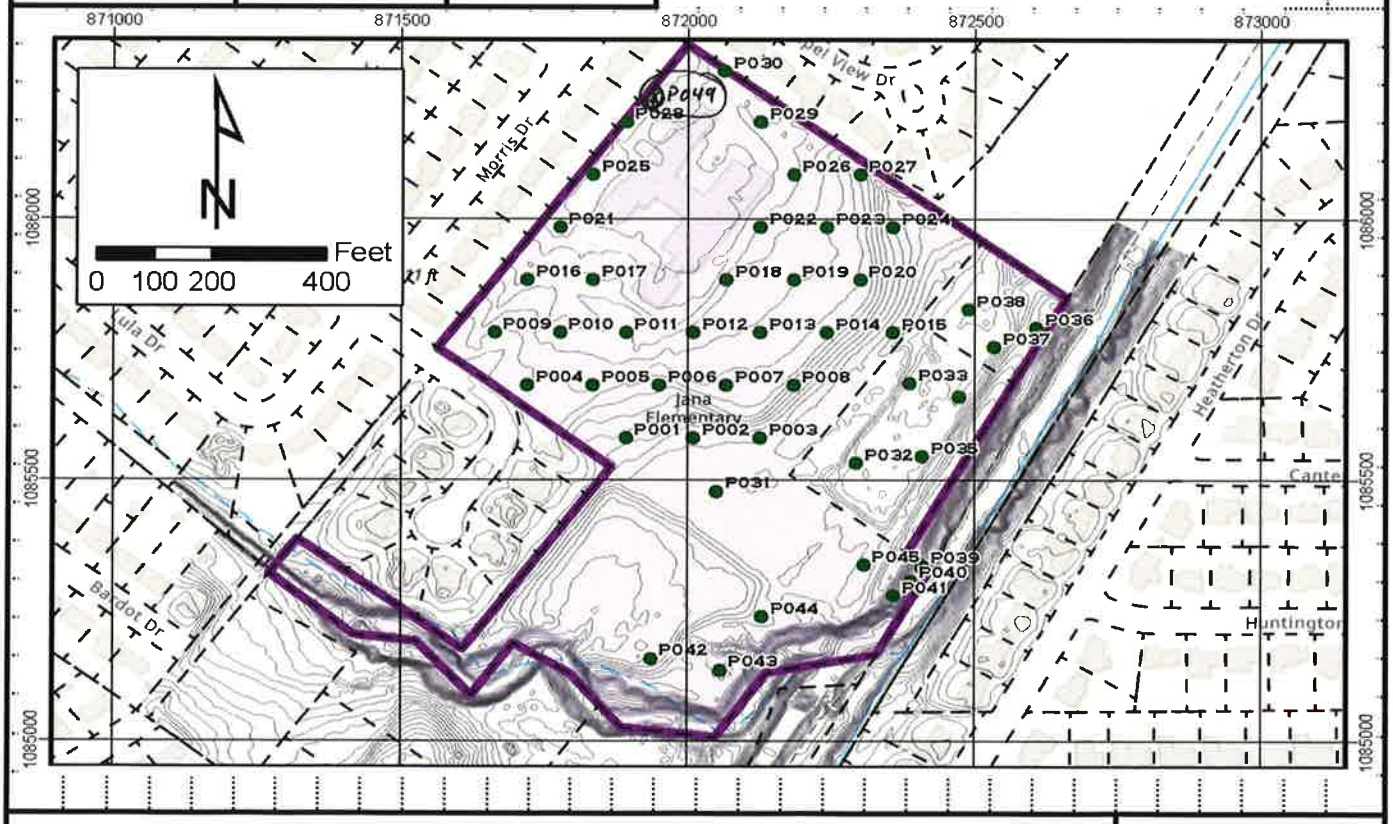
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 2	QA/QC - 1	Archive - 2	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K Reed QAR — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East
ft. = Feet; ppm = Parts per million; N = North
msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264 289

P049

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264289

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: Phil Ciuffini

Sheet 2 of 2 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
		Mulch & organic soil	0.1 / 5300	4.0/4.0	SVP264289 0831	NA	Background 5985 CPM CPM - Counts per minute CPMs are gross numbers
~~ml~~		Pea Gravel w/silt	0 / 6000				SVP264285 -1, -2 QAQC
ml		Silt. Very dump Light brown w/ <1% FeOx nodules, faint halo staining around nodules. Not plastic, moderately soft. (ml)	0 / 6300		SVP264290 ~~0833~~ 0835		
			0 / 6200				
			0 / 6200				
			0 / 6300				
			0 / 6500				
			0 / 6600		ARCHIVE 0837		
			0 / 6000	2.0/2.0			
			0 / 6400		ARCHIVE 0853		
		- FeOx nodules approx 3% (ml)	0 / 6300				
			0 / 6200				
		TD: 6'					To be backfilled w/ hydrated bentonik chips and capped w/ gravel.
		EOB:					
				USACE, CPT Maria Pascual Maria V. Pascual 04 NOV 2022 0904			

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

ft. bgs: 0 1 2 3 4 5 6 7 8 9 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264289

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B0903 E0931 P047

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 291
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P047	
5. NAME OF DRILLER(S): ~~Travis Hearne, Cody Schwartz~~, Kevin Sutton — Cody Hearne	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085482.957 E 871367.242	
	9. SURFACE ELEVATION: 502.099 ft msl	
	10. DATE STARTED: 11/4/2022	11. DATE COMPLETED: 11/4/2022
	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID	NaI	LUDLUM
592-601025	M169246 0174868	M156377 D164822
BKG: 0 ppm	BKG: 5985 CPM	BKG: 11177 CPM
CAL DATE: 01/19/23	CAL DATE: 2/22/23	CAL DATE: 8/1/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

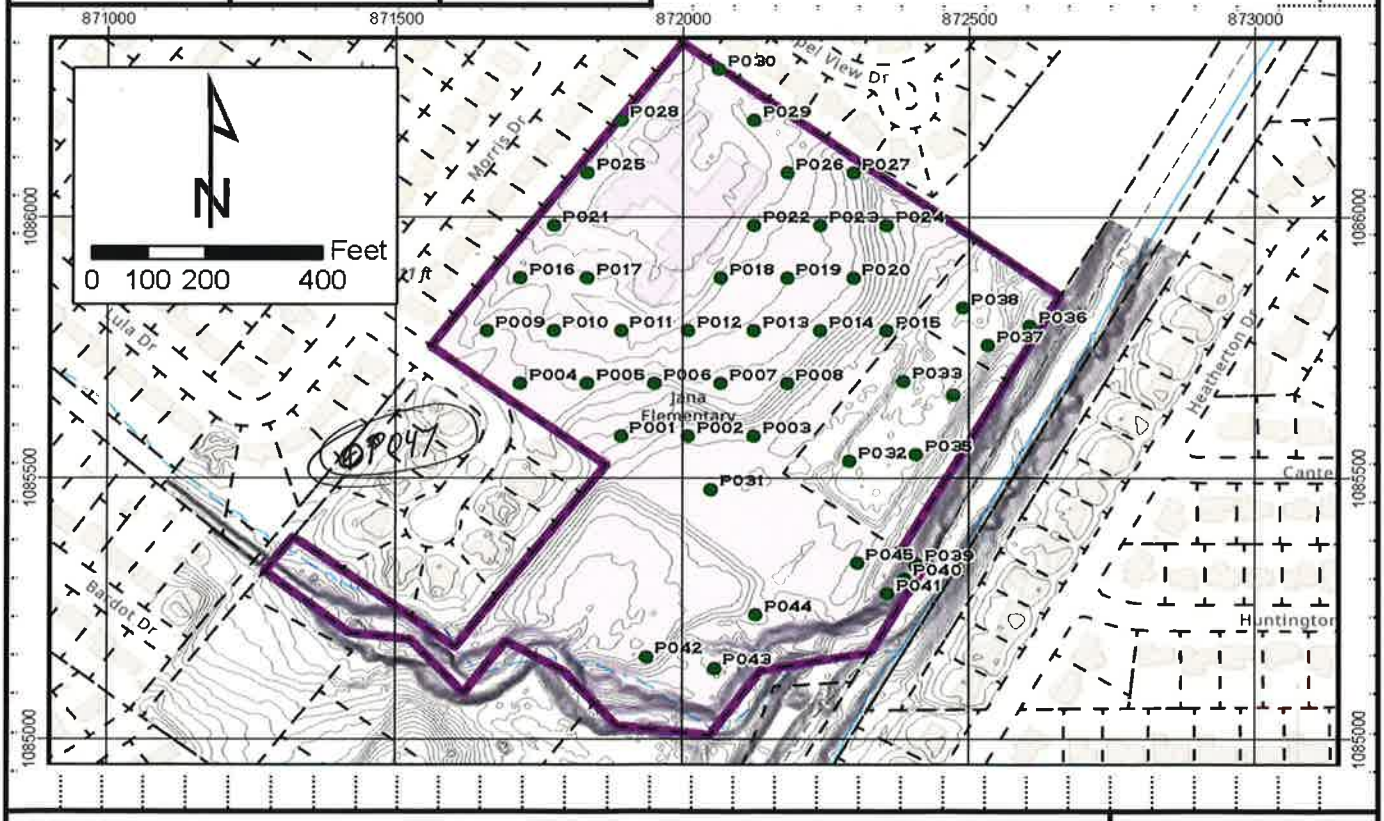
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed ORS — SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable	cpm = Counts per minute	E = East
ft. = Feet	ppm = Parts per million	N = North
msl = Mean Sea Level	bgs = below ground surface	



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264 291

P047

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264291

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: Phil Ciuffini

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Silt. Light brown moderately Soft, Not plastic, damp. Trace Roots from 0.0-0.4'. (ml)	0 6200	4.0/4.0	SVP264291 0903	NA	Background 5985 CPM CPM - Counts per minute CPMs are gross numbers
			0 6300				
			0 6300				
		- Lighter brown (closer to an FeOx color.). (ml)	0 6500		SVP264292 0905		
			0 6400				
			0 6500				
			0 6300				
			0 6500		SVP264293 0907		
			0 6200	4.0/4.0			
			0 6000				
			0 6200				
		- Less red in color, increase in FeOx nodules to approx 1%, tan mottling throughout. (ml)	0 6600		SVP264294 0911		
			0 6300		SVP264295		
			0 6400		~~SVP264295~~ NR 0914		
			0 6300				
			0 6400				
			0 6300	4.0/4.0			
		> FeOX Boundary Layer. (ml) Silt. tan w/ <1% FeOx nodules, moderately soft, not Plastic. Damp (ml)	0 6200		SVP264296		
			0 6400		~~SVP264296~~ NR 0921		
			0 6300				

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

ft. bgs: 0 1 2 3 4 5 6 7 8 9 10

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264291

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P047

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264291

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		As Described Previously. (ml)	0 / 6500	4.0 / 4.0		NA	Background 5985 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 6600		SVP264297		
		> FeOX stained bed.	0 / 6600		~~SVP264097~~ 0923 R		
			0 / 6600				
			0 / 5900	3.5 / 4.0			
			0 / 6100		SVP264298		
			0 / 6300		~~SVP264298~~ 0929		
			0 / 6100				
			0 / 6200		SVP264299		
			0 / 6200		~~SVP264299~~ 0931		
			0 / 6000				
			0 R	NR			
		TD: 16'					To be backfilled w/ high-solids bentonite slurry grout and capped w/ commercial top soil.
		EOB:				USACE CPT Maria Pascual	Maria V. Pascual 04 NOV 2022 0958

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264 291

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

B0947 E1027 P046

HTRW DRILLING LOG

DISTRICT: St. Louis		HOLE NUMBER: SVP264 300
1. COMPANY NAME: HGL	2. DRILLING SUBCONTRACTOR: HGL	SHEET 1 of 3 SHEETS
3. PROJECT: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO	4. LOCATION: P046	
5. NAME OF DRILLER(S): Travis Hearne, Cody Schwartz, Kevin Sutton TH Cody Hearne	6. MANUFACTURER'S DESIGNATION OF DRILL: GeoProbe 7822DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: GeoProbe 7822DT; GH63 Percussion Hammer; MC-7 3.5" OD DPT Sampler	8. HOLE LOCATION: N 1085397.814 E 871300.986	
	9. SURFACE ELEVATION: 499.621 ft msl	
10. DATE STARTED: 11/4/2022	11. DATE COMPLETED: 11/4/2022	
15. DEPTH GROUNDWATER ENCOUNTERED: NA		
12. OVERBURDEN THICKNESS: 0 ft.	13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER & ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 16 feet bgs		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

PID: 592-601025; BKG: 0 ppm; CAL DATE: 01/19/23

NaI: M169246 D174868; BKG: 5985 CPM; CAL DATE: 2/22/23

LUDLUM: M156377 D164822; BKG: 177 CPM; CAL DATE: 8/1/23

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	RAD - 9	QA/QC - 0	Archive - 0	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	See Remarks	NA	NA	

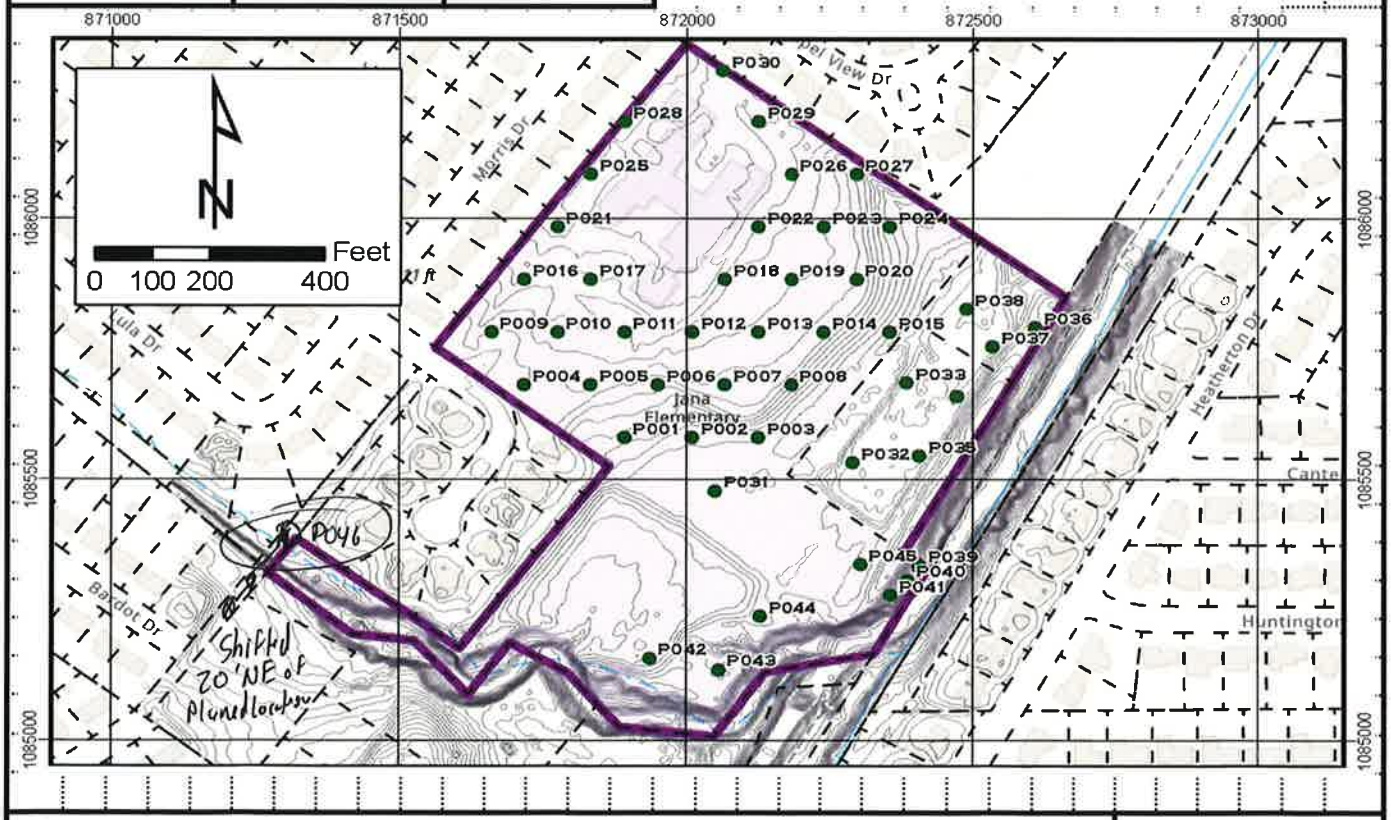
LOCATION SKETCH / COMMENTS / WITNESSED BY: K. Reed QA SCALE: NOT TO SCALE

Percentage (%) Terms					
Trace	<5%	Some	30 - 45%	Mostly	50 - 100%
Few	5 - 10%	Little	15 - 25%		

NA = Not Applicable; cpm = Counts per minute; E = East

ft. = Feet; ppm = Parts per million; N = North

msl = Mean Sea Level; bgs = below ground surface



PROJECT		HOLE NUMBER
Coldwater Creek Group 24 - Jana Elementary	FUSRAP / NORCO	SVP264 300

P046

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264 300

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP/ NORCO

Inspector: Phil Ciuffini

Sheet 3 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		As previously described (ml)	0 / 6000	4.0/4.0		NA	Background 5985 CPM CPM - Counts per minute CPMs are gross numbers
			0 / 6200				
			0 / 6300		SVP264306 1016		
			0 / 6200				
		- FeOx nodules reduced to <1% of groundmass (ml)	0 / 6200	3.5/4.0			
			0 / 6300		SVP264307 1025		
			0 / 6200				
			0 / 6200				
			0 / 6400		SVP264308 1027		
			0 / 6300				
			0 / 5900				
			~~0~~ nr	NR			
		TD: 16' EOB: 1027					To be backfilled w/ high-solids bentonite slurry grout and capped w/ commercial top soil.

USACE CPT Pascual, Maria
Maria V Pascual
1037
04NOV2022

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary FUSRAP / NORCO HOLE NO. SVP264 300

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

P046

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SVP264300

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP/NORCO

Inspector: Phil Ciuffini

Sheet 2 of 3 Sheets

USCS	Depth	DESCRIPTION OF MATERIALS	PID / NaI	Recovery	Analytical Sample No.	Blow Counts	Remarks
ml		Silt. Light brown, clump, not plastic, moderately soft. Trace roots from 0.0 - 0.6'. Weakly visible bedding foliation. (ml)	0 / 5800	4.0/4.0	SVP264300 0956	NA	Background 5985 CPM. CPM - Counts per minute. CPMs are gross numbers. Boring offset 20' NE along bike path to avoid utilities.
			0 / 6200				
			0 / 6400		SVP264301 0958		
			0 / 6200				
			0 / 6300				
			0 / 6300				
			0 / 6300				
			0 / 6400		SVP264302 1000		
			0 / 6100	4.0/4.0			
			0 / 6300				
		- FeOx nodules <1% w/moderate halo staining up to 0.5" (ml)	0 / 6200				
			0 / 6300		SVP264303 1004		
			0 / 6400				
		- 15% dark brown silt mottling. (ml)	0 / 6400				
			0 / 6400		SVP264304 1006		
			0 / 6300				
			0 / 6100	4.0/4.0			
		- increased FeOx nodules up to 5% of groundmass, staining contributes to overall darker color. (ml)	0 / 6300				
			0 / 6300		SVP264305 1014		
			0 / 6200				

ft. bgs: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

NOTES:
SVP = SLAPS Vicinity Property
NR = No Recovery

Project: Coldwater Creek Group 24 - Jana Elementary — FUSRAP / NORCO — HOLE NO. SVP264300

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

APPENDIX H

EVALUATION OF FINAL STATUS SURVEY SOIL SAMPLE DATA

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Table H-1. Class 2 SU-1 Systematic Surface Soil Sample Data Summary

Number of Systematic Samples: 7	Number of Biased Samples: 6	Area: 9,953 m^2

Statistic	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
		(pCi/g)										
Mean	Systematic	0.02	0.07	1.00	0.80	1.22	1.65	1.16	0.10	1.09	0.28	0.02
Median	Systematic	0.02	-0.08	1.00	0.83	1.13	1.71	1.10	0.10	1.04	0.28	0.01
Standard Deviation	Systematic	0.05	0.33	0.09	0.11	0.26	0.32	0.29	0.10	0.11	0.08	0.02
Maximum	Systematic	0.09	0.71	1.13	0.99	1.58	2.04	1.64	0.21	1.25	0.36	0.04
Maximum	All	0.13	0.71	1.13	0.99	1.58	2.07	1.64	0.21	3.29	0.37	0.05
Range	All	0.13	0.71	0.51	0.90	1.42	1.69	1.54	0.21	2.85	0.19	0.05

Sample/ Station Name	GWS-Based Area (m^2)	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP263853	--	Systematic	0.06	0.71	0.98	0.83	1.58	1.78	1.41	0.10	1.25	0.35	0.03
SVP263862	--	Systematic	-0.07	-0.13	1.07	0.83	1.05	1.57	1.19	0.21	1.00	0.35	0.03
SVP264027	--	Systematic	0.05	-0.08	1.00	0.77	1.26	1.96	1.64	-0.04	1.04	0.22	0.01
SVP264036	--	Systematic	0.01	0.27	1.02	0.83	0.93	1.31	0.83	0.19	1.04	0.18	0.00
SVP264045	--	Systematic	0.02	-0.16	0.94	0.63	1.58	2.04	1.06	0.04	1.14	0.36	0.04
SVP264054	--	Systematic	0.01	-0.22	0.86	0.71	1.13	1.17	0.86	0.20	0.97	0.28	0.00
SVP264062	--	Systematic	0.09	0.07	1.13	0.99	1.04	1.71	1.10	-0.01	1.21	0.21	0.00
SVP264145[a]	--	Biased	-0.10	-0.25	0.75	0.42	0.28	0.38	0.22	0.17	3.29	0.24	0.04
SVP264147	--	Biased	0.09	-0.50	0.92	0.33	0.75	1.13	0.83	0.18	0.74	0.28	0.00
SVP264149	--	Biased	0.13	-0.61	0.82	0.13	0.48	0.95	0.29	0.00	0.44	0.24	0.00
SVP264151	--	Biased	-0.03	-0.08	0.62	0.09	0.16	0.70	0.10	0.06	0.50	0.18	0.00
SVP264289	--	Biased	-0.21	-0.56	0.62	0.32	0.57	0.82	0.44	0.16	0.53	0.19	0.00
HTZ250128	1	Biased	0.09	-0.21	1.00	0.80	1.18	2.07	0.97	0.06	1.08	0.37	0.05

[a] The radionuclides analyzed by gamma spectroscopy for this biased sample were given the "R" (Rejected) qualifer due to insufficent sample volume. Analytical data for this sample are provided for informational purposes, but were not included in the risk and dose assessment included in Appendix J.

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

-- indicates GWS-based areas are not applicable to other biased or systematic soil sampling.

Table H-2. SU-1 Subsurface Soil Sample Data Summary

Number of Subsurface Samples:	60

Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
	(pCi/g)										
Mean	0.04	-0.04	1.05	0.84	1.18	1.60	1.04	0.02	1.08	0.20	0.00
Median	0.02	-0.06	1.03	0.85	1.19	1.57	1.05	0.02	1.09	0.19	0.00
Standard Deviation	0.09	0.24	0.12	0.11	0.21	0.29	0.23	0.08	0.18	0.02	0.01
Maximum	0.51	0.81	1.29	0.99	1.56	2.51	1.56	0.20	1.44	0.26	0.05
Range	0.51	0.81	0.54	0.80	1.01	1.51	1.38	0.20	0.85	0.12	0.05

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP263853	SVP263854	1.5-2.0	-0.06	-0.25	0.87	0.82	1.28	1.55	1.18	-0.01	1.33	0.19	0.00
	SVP263855	3.0-3.5	0.01	0.12	1.09	0.94	1.54	2.01	1.17	0.08	1.43	0.24	0.02
	SVP263856	5.5-6.0	0.04	0.10	1.02	0.86	1.05	1.32	0.84	0.05	1.20	0.18	0.00
	SVP263857	7.5-8.0	-0.02	-0.16	0.93	0.78	1.01	1.34	0.98	-0.07	0.84	0.17	0.00
	SVP263858	9.5-10.0	0.02	-0.10	1.16	0.85	1.06	1.52	1.08	-0.01	1.18	0.20	0.00
	SVP263859	11.0-11.5	0.02	-0.01	0.95	0.92	1.17	1.60	1.37	-0.09	1.10	0.19	0.00
	SVP263860	13.5-14.0	0.01	0.30	0.97	0.82	1.26	1.21	0.81	0.01	1.05	0.17	0.00
	SVP263861	15.0-15.5	0.02	-0.38	0.93	0.72	1.03	1.64	0.86	0.01	0.99	0.19	0.00
SVP263862	SVP263863	1.5-2.0	0.07	-0.14	1.25	0.95	1.23	2.01	0.85	0.10	1.25	0.24	0.02
	SVP263864	3.2-3.7	-0.06	-0.17	1.19	0.90	1.16	1.90	1.48	0.03	1.20	0.23	0.01
	SVP263865	5.5-6.0	0.02	-0.15	1.14	0.94	1.56	1.96	1.24	0.06	0.89	0.22	0.01
	SVP263866	7.5-8.0	0.09	0.57	1.14	0.92	1.20	1.66	1.11	0.03	1.00	0.21	0.00
	SVP263867	9.0-9.5	0.06	-0.25	0.99	0.76	1.02	1.52	1.05	0.01	0.96	0.19	0.00
	SVP263868	11.5-12.0	0.05	0.39	1.15	0.91	1.33	1.76	0.86	0.16	1.18	0.22	0.00
	SVP263869	13.5-14.0	0.15	0.12	1.03	0.79	1.01	1.57	1.17	-0.01	1.06	0.19	0.00
	SVP263870	15.0-15.5	0.00	-0.02	1.01	0.92	1.51	2.06	0.95	0.06	1.10	0.23	0.02
SVP264027	SVP264028	1.5-2.0	0.09	0.25	1.19	0.83	1.35	1.35	1.19	0.11	1.13	0.19	0.00
	SVP264029	2.5-3.0	0.11	-0.26	1.23	0.89	1.44	1.45	1.44	-0.10	1.24	0.20	0.01
	SVP264030	8.5-9.0	0.11	0.02	0.76	0.65	1.09	1.12	0.79	-0.06	0.78	0.14	0.00
	SVP264031	10.5-11.0	0.01	-0.18	0.94	0.81	1.18	1.55	1.29	-0.06	1.15	0.19	0.00
	SVP264032	4.5-5.0	0.04	-0.38	1.05	0.89	1.11	1.91	1.13	0.12	1.10	0.22	0.01
	SVP264033	7.0-7.5	0.02	0.16	0.90	0.77	1.20	1.33	0.72	-0.05	0.92	0.17	0.00
	SVP264034	13.5-14.0	0.04	0.04	0.82	0.71	0.68	1.17	0.80	0.01	0.77	0.15	0.00
	SVP264035	15.0-15.5	-0.01	-0.28	0.93	0.76	0.91	1.56	0.77	0.06	0.91	0.18	0.00
SVP264036	SVP264037	1.5-2.0	-0.03	-0.22	1.01	0.92	1.21	1.73	0.94	-0.05	1.28	0.21	0.00
	SVP264038	2.0-2.5	0.09	0.08	0.97	0.82	1.31	1.74	1.02	0.07	1.16	0.20	0.00
	SVP264039	4.5-5.0	-0.08	0.17	0.96	0.89	1.21	1.45	1.19	0.01	1.03	0.18	0.00
	SVP264040	7.0-7.5	0.00	0.00	0.88	0.66	1.02	1.50	0.79	-0.01	0.84	0.18	0.00
	SVP264041	9.0-9.5	0.18	-0.29	0.86	0.74	1.12	1.61	1.38	0.03	0.95	0.18	0.00
	SVP264042	10.3-10.8	-0.04	-0.30	1.04	0.86	1.43	1.41	1.00	0.05	1.14	0.19	0.00
	SVP264043	13.0-13.5	0.07	-0.07	0.90	0.80	1.14	1.66	0.99	-0.06	1.07	0.19	0.00
	SVP264044	14.5-15.0	-0.04	-0.03	1.09	0.83	0.79	1.34	1.50	0.04	1.10	0.18	0.00

Table H-2. SU-1 Subsurface Soil Sample Data Summary (Continued)

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP264045	SVP264046	1.0-1.5	-0.04	0.05	1.24	0.93	1.51	1.89	1.32	-0.02	1.44	0.24	0.01
	SVP264047	3.5-4.0	-0.07	0.13	1.23	0.98	1.07	1.65	1.05	-0.01	1.39	0.22	0.01
	SVP264048	4.5-5.0	0.02	-0.03	1.11	0.87	1.09	1.88	1.21	0.12	0.91	0.22	0.00
	SVP264049	7.0-7.5	0.08	-0.34	1.13	0.87	1.25	1.69	1.09	0.13	1.27	0.21	0.00
	SVP264050	9.0-9.5	-0.08	-0.02	0.97	0.80	0.59	1.27	0.87	0.09	1.08	0.17	0.00
	SVP264051	10.0-10.5	-0.03	-0.19	1.14	0.85	1.11	2.51	1.22	0.05	1.05	0.26	0.05
	SVP264052	13.5-14.0	0.00	0.30	0.96	0.77	1.01	2.22	1.13	0.12	0.92	0.23	0.03
	SVP264053	15.5-16.0	0.09	-0.15	1.02	0.92	1.02	1.00	0.93	-0.04	1.31	0.16	0.00
SVP264054	SVP264055	1.5-2.0	0.12	-0.31	1.08	0.94	1.32	1.82	1.24	-0.13	1.25	0.22	0.00
	SVP264056	2.0-2.5	0.00	0.06	1.06	0.85	1.20	1.53	1.02	-0.06	1.05	0.19	0.00
	SVP264057	5.5-6.0	-0.05	0.81	1.01	0.90	1.24	1.92	1.09	0.03	1.02	0.22	0.01
	SVP264058	9.0-9.5	-0.02	-0.18	1.05	0.84	1.24	1.42	0.88	-0.09	0.84	0.18	0.00
	SVP264059	10.0-10.5	0.02	-0.12	0.98	0.83	1.36	1.49	1.08	-0.05	0.90	0.18	0.00
	SVP264060	13.5-14.0	-0.09	-0.08	1.03	0.77	1.04	1.39	1.11	0.11	1.01	0.18	0.00
	SVP264061	15.0-15.5	0.12	-0.05	1.03	0.81	1.13	1.06	1.04	-0.09	0.78	0.15	0.00
SVP264062	SVP264063	1.5-2.0	0.51	0.33	1.17	0.99	1.09	1.45	1.08	0.01	1.15	0.20	0.00
	SVP264064	3.0-3.5	0.13	0.12	1.17	0.99	1.20	1.80	1.00	0.07	1.32	0.22	0.00
	SVP264065	5.0-5.5	0.00	-0.26	1.12	0.91	1.41	1.68	1.06	0.03	1.02	0.21	0.00
	SVP264066	6.5-7.0	0.06	0.20	1.06	0.84	1.19	1.46	0.99	-0.19	1.10	0.19	0.00
	SVP264067	9.5-10.0	0.02	-0.28	1.06	0.89	1.26	1.54	1.01	0.11	1.26	0.20	0.00
	SVP264068	10.5-11.0	0.01	-0.21	1.02	0.81	1.55	1.95	1.24	0.00	1.03	0.22	0.01
	SVP264069	13.5-14.0	0.05	-0.35	1.03	0.81	1.08	1.37	0.87	0.08	1.00	0.18	0.00
	SVP264070	14.0-14.5	-0.02	-0.04	0.95	0.76	1.05	1.65	0.70	0.03	0.98	0.19	0.00
SVP264145	SVP264146	0.5-1.0	0.13	0.13	0.94	0.19	0.55	1.52	0.18	0.07	0.59	0.18	0.00
SVP264147	SVP264148	1.5-2.0	0.03	-0.19	1.21	0.83	1.55	1.07	0.72	-0.05	1.22	0.18	0.00
SVP264149	SVP264150	1.0-1.5	0.05	0.17	1.29	0.87	1.31	1.67	0.93	0.20	1.24	0.22	0.01
SVP264151	SVP264152	1.5-2.0	0.16	-0.37	1.27	0.92	1.16	1.85	1.56	0.10	1.23	0.23	0.01
SVP264289	SVP264290	1.0-1.5	0.01	-0.20	1.20	0.87	1.34	1.81	0.82	-0.08	1.26	0.23	0.00

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

Table H-3. Class 2 SU-2 Systematic Surface Soil Sample Data Summary

Number of Systematic Samples: 9	Number of Biased Samples: 1	Area: 9,510 m^2

Statistic	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
		(pCi/g)										
Mean	Systematic	-0.25	-0.09	1.18	0.89	1.24	1.70	1.02	-0.01	1.10	0.38	0.07
Median	Systematic	-0.01	-0.01	1.16	0.86	1.14	1.76	1.02	-0.02	1.09	0.37	0.06
Standard Deviation	Systematic	0.63	0.46	0.13	0.10	0.30	0.28	0.23	0.10	0.08	0.04	0.04
Maximum	Systematic	0.19	0.52	1.34	1.05	1.70	2.02	1.54	0.22	1.25	0.43	0.12
Maximum	All	0.19	0.52	1.34	1.05	1.70	2.02	1.54	0.22	1.25	0.43	0.12
Range	All	0.19	0.52	0.33	0.31	0.87	0.87	0.75	0.22	0.24	0.10	0.10

Sample/ Station Name	GWS-Based Area (m^2)	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP190263	--	Systematic	-1.55	-0.60	1.33	0.98	1.70	1.90	0.79	0.22	1.12	0.42	0.11
SVP190267	--	Systematic	-1.13	0.20	1.34	0.84	1.57	1.97	0.86	-0.02	1.25	0.43	0.12
SVP263871	--	Systematic	0.18	0.52	1.08	0.86	1.12	1.50	0.85	-0.02	1.06	0.34	0.03
SVP263880	--	Systematic	-0.01	-0.20	1.01	0.85	0.96	1.53	1.16	0.00	1.01	0.33	0.01
SVP263889	--	Systematic	-0.07	-0.79	1.02	0.76	1.04	1.76	0.87	-0.01	1.10	0.35	0.03
SVP263904	--	Systematic	0.10	0.08	1.16	0.97	1.49	1.65	1.03	-0.09	1.18	0.37	0.06
SVP264071	--	Systematic	0.19	0.46	1.25	0.96	1.35	2.02	1.54	-0.07	1.04	0.42	0.10
SVP264089	--	Systematic	-0.07	-0.01	1.31	1.05	1.14	1.86	1.02	0.00	1.09	0.42	0.10
SVP264104	--	Systematic	0.08	-0.49	1.16	0.74	0.83	1.15	1.05	-0.11	1.03	0.33	0.04
HTZ250129	1	Biased	0.15	-0.38	1.04	0.84	1.41	1.80	1.23	0.04	1.06	0.36	0.04

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

-- indicates GWS-based areas are not applicable to other biased or systematic soil sampling.

Table H-4. SU-2 Subsurface Soil Sample Data Summary

Number of Subsurface Samples: 86

Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
	(pCi/g)										
Mean	-0.06	-0.06	1.11	0.88	1.20	1.57	1.07	0.05	1.06	0.20	0.01
Median	0.01	-0.05	1.08	0.89	1.17	1.54	1.08	0.05	1.06	0.20	0.00
Standard Deviation	0.37	0.29	0.17	0.08	0.22	0.33	0.20	0.09	0.16	0.03	0.01
Maximum	0.20	0.65	1.56	1.05	1.84	2.37	1.58	0.22	1.43	0.25	0.04
Range	0.20	0.65	0.72	0.33	1.06	1.42	1.06	0.22	0.66	0.11	0.04

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP190263	SVP190264	1.5-2.0	-2.10	-0.55	1.34	0.89	1.38	1.73	0.95	0.14	1.10	0.23	0.01
	SVP211120	3.0-3.5	-2.23	-0.90	1.53	0.94	1.63	1.67	1.26	0.15	1.28	0.24	0.03
SVP190267	SVP190268	1.5-2.0	-0.37	0.44	1.33	0.81	1.71	1.68	0.65	0.11	1.16	0.22	0.01
	SVP205289	3.5-4.0	-0.90	-0.55	1.51	0.90	1.47	1.47	1.43	0.20	1.30	0.22	0.02
	SVP205290	4.5-5.0	-1.22	-0.33	1.56	0.90	1.40	1.35	1.47	-0.14	1.40	0.22	0.03
	SVP232388	6.0-6.5	-0.03	-0.29	0.90	0.88	1.39	1.68	1.02	0.07	1.05	0.19	0.00
	SVP232389	8.0-8.5	0.10	0.07	0.87	0.80	1.14	1.86	1.10	0.05	1.02	0.20	0.00
	SVP232390	8.5-9.0	-0.06	0.13	0.98	0.90	1.04	1.73	1.23	-0.08	0.91	0.20	0.00
SVP263871	SVP263872	1.0-1.5	-0.04	-0.37	1.03	0.96	1.25	1.64	1.42	0.09	1.06	0.20	0.00
	SVP263873	3.5-4.0	0.02	-0.03	1.18	0.93	1.21	2.16	0.78	0.22	1.23	0.25	0.02
	SVP263874	5.5-6.0	0.08	0.11	1.23	1.03	1.22	1.91	1.33	0.07	1.20	0.23	0.01
	SVP263875	7.5-8.0	-0.01	0.07	1.09	0.90	1.03	1.32	1.52	0.20	1.00	0.18	0.00
	SVP263876	9.5-10.0	-0.01	0.13	0.94	0.83	1.07	1.37	1.09	0.05	0.95	0.17	0.00
	SVP263877	10.5-11.0	-0.06	-0.06	0.92	0.83	0.87	1.34	0.89	0.13	0.96	0.17	0.00
	SVP263878	13.5-14.0	-0.01	-0.26	0.84	0.77	0.82	1.05	0.86	-0.02	0.82	0.14	0.00
	SVP263879	14.8-15.3	0.04	-0.21	1.22	0.73	1.12	1.30	1.05	0.12	0.85	0.19	0.00
SVP263880	SVP263881	1.0-1.5	0.00	-0.42	1.02	0.90	1.39	1.71	1.33	0.01	1.20	0.21	0.00
	SVP263882	3.5-4.0	0.08	0.21	1.05	0.82	1.20	2.20	1.25	-0.06	1.09	0.24	0.02
	SVP263883	5.5-6.0	0.00	0.06	1.03	0.86	1.15	2.09	1.33	-0.05	1.14	0.23	0.02
	SVP263884	7.5-8.0	0.04	-0.36	1.05	0.89	0.80	2.26	1.13	-0.04	1.13	0.24	0.03
	SVP263885	9.5-10.0	0.00	-0.12	1.01	0.90	1.31	1.64	1.09	0.01	1.13	0.20	0.00
	SVP263886	11.5-12.0	0.00	-0.05	0.96	0.76	1.35	1.47	1.18	0.14	1.10	0.18	0.00
	SVP263887	12.5-13.0	-0.13	0.22	0.99	0.86	1.20	2.37	0.82	-0.04	1.01	0.24	0.04
	SVP263888	14.5-15.0	-0.05	0.58	0.85	0.73	0.83	1.25	1.22	-0.02	0.83	0.16	0.00

Table H-4. SU-2 Subsurface Soil Sample Data Summary (Continued)

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP263889	SVP263890	0.5-1.0	0.09	-0.11	1.19	0.99	1.27	2.08	1.13	0.05	1.08	0.24	0.02
	SVP263891	3.5-4.0	0.01	0.17	1.11	0.91	1.21	1.61	1.10	0.07	1.03	0.20	0.00
	SVP263892	4.5-5.0	0.07	0.28	1.18	0.81	1.18	1.41	0.73	-0.09	1.23	0.20	0.00
	SVP263893	6.5-7.0	0.04	-0.20	0.99	0.76	1.10	1.03	1.10	-0.11	0.97	0.15	0.00
	SVP263894	9.5-10.0	0.06	-0.16	0.98	0.84	1.31	2.15	1.26	0.16	1.27	0.23	0.02
	SVP263895	10.5-11.0	0.03	-0.56	1.01	0.86	1.24	1.70	1.21	0.05	0.99	0.20	0.00
	SVP263896	13.5-14.0	0.01	0.31	0.99	0.73	1.10	1.58	0.95	-0.09	0.92	0.19	0.00
	SVP263897	15.0-15.5	-0.04	-0.11	1.06	0.82	0.84	1.09	0.52	-0.11	0.99	0.16	0.00
	SVP263898	17.5-18.0	-0.01	-0.34	1.09	0.84	1.11	1.92	1.03	-0.05	1.09	0.22	0.01
	SVP263899	18.0-18.5	0.17	-0.09	1.20	0.93	1.11	1.56	1.01	-0.06	1.13	0.21	0.00
	SVP263900	21.0-21.5	0.05	-0.18	1.05	0.82	1.10	1.60	0.90	0.07	0.89	0.19	0.00
	SVP263901	22.5-23.0	0.05	-0.14	1.10	0.84	1.11	1.76	1.37	0.03	1.09	0.21	0.00
	SVP263902	25.5-26.0	-0.01	-0.11	1.07	0.98	1.32	1.14	0.95	0.12	1.33	0.17	0.00
	SVP263903	27.0-27.5	0.01	0.13	1.01	0.96	1.31	1.38	0.96	0.01	1.17	0.18	0.00
SVP263904	SVP263905	1.5-2.0	0.15	-0.07	1.25	0.89	1.24	1.35	1.01	0.09	1.41	0.20	0.01
	SVP263906	2.5-3.0	0.15	-0.21	1.19	0.93	1.31	1.52	1.11	0.18	1.23	0.21	0.00
	SVP263907	4.5-5.0	-0.04	-0.38	1.32	0.98	1.14	2.05	1.18	0.18	1.23	0.25	0.03
	SVP263908	7.5-8.0	0.02	0.30	1.46	0.89	1.33	1.52	1.12	-0.09	0.93	0.22	0.02
	SVP263909	9.0-9.5	0.09	-0.15	1.20	0.92	1.00	1.39	1.12	0.00	1.04	0.19	0.00
	SVP263910	10.5-11.0	-0.03	0.16	1.09	0.89	0.93	1.05	0.91	0.06	1.10	0.16	0.00
	SVP263911	13.0-13.5	0.05	0.15	1.08	0.86	0.78	1.12	1.23	0.04	0.87	0.16	0.00
	SVP263912	14.5-15.0	0.01	-0.23	0.98	0.85	0.91	1.12	0.93	0.18	0.93	0.16	0.00
	SVP263913	17.5-18.0	-0.08	-0.39	1.35	0.92	1.20	0.95	1.30	0.08	0.90	0.17	0.01
	SVP263914	19.0-19.5	0.10	-0.13	1.05	0.93	1.36	1.42	1.03	0.04	1.21	0.19	0.00
	SVP263915	21.5-22.0	0.08	-0.44	1.08	0.96	1.47	1.24	1.16	0.07	1.11	0.18	0.00
	SVP263916	23.0-23.5	0.10	0.00	1.01	0.88	1.68	1.40	0.99	0.10	1.27	0.19	0.00
	SVP263917	25.0-25.5	0.00	-0.19	0.99	1.05	1.31	1.39	1.16	0.10	1.27	0.18	0.00
	SVP263918	26.0-26.5	-0.13	0.19	1.00	1.02	1.70	1.89	1.22	0.12	1.18	0.22	0.00
SVP264071	SVP264072	1.5-2.0	0.08	0.28	1.35	0.97	1.12	1.77	0.91	0.02	1.20	0.23	0.01
	SVP264073	2.5-3.0	-0.05	0.11	1.31	0.95	1.06	1.57	0.79	0.11	1.15	0.22	0.01
	SVP264074	5.5-6.0	-0.03	0.05	1.26	1.00	1.43	1.93	1.09	0.09	1.23	0.24	0.01
	SVP264075	6.0-6.5	-0.01	-0.24	1.27	1.00	1.11	2.11	1.10	0.14	1.14	0.25	0.03
	SVP264076	8.5-9.0	0.11	0.29	1.25	0.90	1.84	1.92	1.20	-0.03	1.15	0.23	0.01
	SVP264077	11.5-12.0	-0.07	0.12	1.22	0.94	1.60	1.46	1.03	0.20	1.43	0.21	0.01
	SVP264078	12.5-13.0	0.06	0.07	1.01	0.88	1.44	1.71	0.95	0.10	0.98	0.20	0.00
	SVP264079	15.0-15.5	-0.08	-0.16	1.04	0.77	1.31	1.91	1.21	0.03	1.05	0.22	0.01

Table H-4. SU-2 Subsurface Soil Sample Data Summary (Continued)

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP264089	SVP264090	1.5-2.0	-0.03	0.01	1.44	1.04	1.40	1.74	1.22	0.10	1.32	0.24	0.02
	SVP264091	2.5-3.0	0.01	0.02	1.47	1.00	1.34	1.86	1.29	-0.15	1.22	0.25	0.02
	SVP264092	5.0-5.5	-0.07	-0.06	1.14	0.80	0.93	1.37	0.98	0.07	0.97	0.19	0.00
	SVP264093	7.5-8.0	0.06	0.09	1.26	0.91	1.05	1.11	1.02	0.02	1.05	0.18	0.01
	SVP264094	8.0-8.5	0.12	-0.11	1.22	0.81	0.95	1.53	0.83	-0.05	1.02	0.20	0.00
	SVP264095	11.0-11.5	0.05	0.65	1.17	0.85	1.19	1.69	0.82	0.22	0.89	0.21	0.00
	SVP264096	13.0-13.5	0.07	-0.11	1.14	0.75	1.14	1.97	0.89	0.18	0.89	0.23	0.01
	SVP264097	14.5-15.0	0.06	0.32	1.01	0.72	1.05	1.54	0.80	0.13	0.77	0.19	0.00
	SVP264098	17.5-18.0	0.04	-0.09	1.17	0.85	1.07	1.28	0.75	-0.11	0.78	0.18	0.00
	SVP264099	18.5-19.0	-0.01	0.03	1.10	0.83	1.16	1.41	1.03	0.04	0.86	0.18	0.00
	SVP264100	20.5-21.0	-0.05	-0.28	1.03	0.76	1.00	1.06	0.94	0.01	0.82	0.16	0.00
	SVP264101	23.0-23.5	-0.08	-0.10	1.11	0.87	0.99	1.13	0.86	0.00	1.08	0.17	0.00
	SVP264102	25.3-25.8	0.02	-0.34	1.01	0.87	1.10	1.33	0.97	-0.01	0.95	0.17	0.00
	SVP264103	26.5-27.0	0.02	-0.03	0.96	0.88	0.98	1.42	1.58	-0.02	0.91	0.18	0.00
SVP264104	SVP264105	1.5-2.0	-0.08	0.02	1.31	1.00	1.12	1.87	1.06	0.15	1.30	0.24	0.01
	SVP264106	3.5-4.0	0.00	-0.98	1.18	0.96	1.27	1.92	1.16	0.03	0.92	0.22	0.01
	SVP264107	5.5-6.0	0.03	-0.38	1.04	0.74	1.01	1.51	0.85	0.00	0.84	0.19	0.00
	SVP264108	6.0-6.5	0.04	0.30	1.11	0.87	1.15	1.66	1.29	-0.05	0.87	0.20	0.00
	SVP264109	9.5-10.0	-0.06	-0.61	0.96	0.81	0.94	1.40	1.11	0.11	0.84	0.17	0.00
	SVP264110	11.0-11.5	0.20	0.17	1.01	0.90	1.35	1.77	0.89	0.06	0.91	0.20	0.00
	SVP264111	12.5-13.0	-0.12	0.06	0.86	0.77	0.96	0.99	1.04	0.02	0.79	0.14	0.00
	SVP264112	15.0-15.5	0.05	0.01	0.93	0.82	1.14	1.83	0.97	-0.02	0.86	0.20	0.00
	SVP264113	17.0-17.5	0.10	-0.03	0.91	0.93	1.15	1.27	1.48	-0.02	1.04	0.17	0.00
	SVP264114	19.0-19.5	0.07	0.00	0.87	1.00	1.35	1.21	0.96	0.12	1.04	0.16	0.00
	SVP264115	20.5-21.0	-0.01	0.06	0.89	1.00	1.51	1.40	1.19	0.05	1.14	0.18	0.00
	SVP264116	23.0-23.5	0.05	0.36	0.93	0.95	1.39	1.36	0.97	0.12	1.14	0.18	0.00

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

Table H-5. Class 2 SU-3 Systematic Surface Soil Sample Data Summary

Number of Systematic Samples: 7	Number of Biased Samples: 2	Area: 9,841

Statistic	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
		(pCi/g)										
Mean	Systematic	0.04	-0.16	0.99	0.73	1.06	1.68	0.93	0.00	0.98	0.27	0.02
Median	Systematic	-0.02	-0.07	0.97	0.83	1.00	1.56	1.02	0.00	0.96	0.29	0.01
Standard Deviation	Systematic	0.12	0.35	0.13	0.31	0.47	0.61	0.43	0.07	0.27	0.10	0.03
Maximum	Systematic	0.22	0.32	1.22	1.02	1.53	2.61	1.44	0.12	1.45	0.40	0.08
Maximum	All	0.22	0.32	1.22	1.02	1.53	2.61	1.44	0.12	1.45	0.40	0.08
Range	All	0.22	0.32	0.42	0.95	1.33	1.84	1.38	0.12	0.91	0.28	0.08

Sample/ Station Name	GWS-Based Area (m^2)	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP263644	--	Systematic	-0.02	-0.74	0.99	0.83	1.00	1.56	0.86	-0.01	1.07	0.33	0.01
SVP263817	--	Systematic	-0.10	-0.15	0.91	0.75	0.99	1.20	1.09	-0.06	0.93	0.29	0.00
SVP263826	--	Systematic	0.22	-0.06	0.94	0.74	1.41	1.82	0.87	0.05	0.92	0.34	0.02
SVP263835	--	Systematic	0.15	-0.50	0.97	0.85	1.53	2.61	1.44	0.02	0.96	0.40	0.08
SVP264000	--	Systematic	-0.05	0.32	0.80	0.07	0.20	0.77	0.06	0.12	0.55	0.12	0.00
SVP264009	--	Systematic	0.10	0.06	1.22	1.02	1.47	2.21	1.02	-0.08	1.45	0.26	0.03
SVP264018	--	Systematic	-0.02	-0.07	1.09	0.87	0.80	1.56	1.16	0.00	0.96	0.20	0.00
HTZ250127	1	Biased	0.04	-0.26	0.92	0.65	0.89	2.14	0.53	0.04	0.95	0.36	0.05
SVP263984	--	Biased	-0.06	-0.17	1.10	0.72	1.39	1.72	0.80	-0.04	1.07	0.36	0.05

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

-- indicates GWS-based areas are not applicable to other biased or systematic soil sampling.

Table H-6. SU-3 Subsurface Soil Sample Data Summary

Number of Subsurface Samples: 57

Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
	(pCi/g)										
Mean	0.02	0.00	1.06	0.85	1.19	1.66	1.06	0.05	1.06	0.20	0.00
Median	0.03	0.07	1.04	0.84	1.21	1.63	1.05	0.05	1.03	0.20	0.00
Standard Deviation	0.06	0.26	0.13	0.09	0.19	0.27	0.23	0.08	0.17	0.02	0.01
Maximum	0.14	0.65	1.40	1.03	1.57	2.56	1.55	0.22	1.42	0.29	0.07
Range	0.14	0.65	0.55	0.35	0.72	1.41	0.99	0.22	0.83	0.14	0.07

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP263644	SVP263645	1.0-1.5	-0.07	-0.75	1.09	0.87	1.49	1.69	1.46	0.03	1.36	0.21	0.00
	SVP263646	3.3-3.8	-0.06	-0.12	1.10	1.03	1.53	1.90	1.08	0.20	1.20	0.22	0.00
	SVP263647	4.5-5.0	0.05	-0.51	1.07	1.00	1.26	1.40	1.10	0.02	1.17	0.19	0.00
	SVP263648	7.2-7.7	-0.06	-0.03	1.09	0.93	1.35	1.61	1.35	0.10	1.13	0.20	0.00
	SVP263649	9.5-10.0	-0.08	0.07	0.93	0.78	1.42	1.46	0.56	0.22	1.02	0.18	0.00
	SVP263650	11.0-11.5	0.13	-0.27	0.95	0.79	1.04	1.31	1.21	0.02	0.94	0.17	0.00
	SVP263651	13.5-14.0	0.07	-0.15	0.98	0.74	0.88	1.21	1.29	-0.04	0.85	0.16	0.00
	SVP263652	14.5-15.0	-0.06	0.09	0.85	0.75	1.05	1.63	0.87	0.03	1.00	0.19	0.00
SVP263817	SVP263818	1.5-2.0	0.09	-0.57	1.03	1.02	1.41	1.79	1.27	-0.08	1.35	0.22	0.00
	SVP263819	3.0-3.5	0.00	0.09	0.98	0.80	1.28	1.98	1.12	0.10	1.03	0.22	0.01
	SVP263820	5.5-6.0	-0.04	-0.26	1.06	0.90	1.27	1.69	1.01	-0.06	1.32	0.21	0.00
	SVP263821	6.5-7.0	0.13	0.27	1.02	0.84	0.87	1.34	1.26	0.15	0.89	0.18	0.00
	SVP263822	9.0-9.5	-0.05	0.08	0.90	0.68	1.22	1.49	0.77	-0.02	0.87	0.18	0.00
	SVP263823	10.5-11.0	0.05	-0.12	1.10	0.83	1.28	1.96	1.09	0.05	1.14	0.23	0.01
	SVP263824	13.0-13.5	0.05	0.44	0.90	0.79	0.98	1.31	0.86	0.07	1.03	0.17	0.00
	SVP263825	14.7-15.2	-0.03	0.18	1.08	0.84	0.96	1.63	1.48	-0.06	1.06	0.20	0.00
SVP263826	SVP263827	1.5-2.0	0.01	-0.12	1.12	0.98	1.37	1.30	1.28	0.20	1.26	0.19	0.00
	SVP263828	3.5-4.0	0.03	-0.16	1.32	0.91	1.03	1.98	1.45	-0.02	1.20	0.24	0.02
	SVP263829	5.5-6.0	-0.12	0.14	1.20	0.92	1.32	1.65	1.18	0.05	1.06	0.21	0.00
	SVP263830	7.5-8.0	-0.08	0.08	1.16	0.88	1.30	1.64	1.15	0.10	1.42	0.22	0.00
	SVP263831	9.0-9.5	0.04	0.10	0.99	0.83	1.42	1.69	1.05	-0.11	1.02	0.20	0.00
	SVP263832	11.0-11.5	0.01	-0.16	1.02	0.81	1.04	1.55	0.89	0.11	1.10	0.19	0.00
	SVP263833	13.5-14.0	0.05	0.12	0.98	0.70	1.07	2.07	0.95	0.03	0.83	0.22	0.02
	SVP263834	14.5-15.0	0.10	-0.03	0.90	0.76	0.96	2.17	0.68	-0.02	0.94	0.22	0.02
SVP263835	SVP263836	1.0-1.5	0.05	-0.11	1.14	0.96	1.19	1.58	0.88	0.09	1.40	0.21	0.00
	SVP263837	3.2-3.7	0.07	-0.06	1.40	1.02	1.21	2.56	1.01	0.15	1.18	0.29	0.07
	SVP263838	5.5-6.0	0.08	-0.28	1.12	0.88	1.17	1.86	0.96	0.07	0.98	0.22	0.00
	SVP263839	6.0-6.5	0.10	0.31	1.21	0.86	1.24	1.77	1.39	0.10	1.09	0.22	0.00
	SVP263840	9.5-10.0	0.04	0.26	1.04	0.83	1.13	1.27	0.87	0.09	0.99	0.17	0.00
	SVP263841	11.0-11.5	0.00	0.30	1.01	0.84	0.91	1.37	1.09	-0.01	0.96	0.18	0.00
	SVP263842	12.5-13.0	0.01	0.20	0.89	0.75	0.91	1.67	1.10	-0.06	0.97	0.19	0.00
	SVP263843	14.5-15.0	0.14	0.19	0.91	0.79	1.09	1.78	0.82	0.06	1.02	0.20	0.00

Table H-6. SU-3 Subsurface Soil Sample Data Summary (Continued)

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP263984	SVP263985	1.0-1.5	0.01	-0.17	1.24	0.93	1.57	1.63	1.08	0.12	1.25	0.22	0.01
SVP264000	SVP264001	1.0-1.5	-0.07	-0.48	1.17	0.77	0.85	1.31	0.81	0.13	1.29	0.19	0.00
	SVP264002	2.0-2.5	0.12	0.39	1.25	1.02	1.21	1.72	1.55	0.08	1.14	0.22	0.01
	SVP264003	5.0-5.5	0.01	0.26	1.36	0.98	1.35	1.92	1.24	0.06	1.20	0.24	0.02
	SVP264004	7.0-7.5	-0.02	0.11	1.09	0.87	1.46	1.61	1.13	0.14	1.26	0.21	0.00
	SVP264005	8.5-9.0	0.08	-0.12	0.98	0.76	0.97	1.36	0.84	-0.05	0.94	0.17	0.00
	SVP264006	10.5-11.0	0.09	0.30	1.12	0.86	1.30	1.61	0.97	0.09	1.03	0.20	0.00
	SVP264007	12.5-13.0	0.09	-0.05	1.12	0.94	1.22	1.54	0.68	-0.01	0.98	0.20	0.00
	SVP264008	14.0-14.5	0.00	-0.10	1.00	0.70	0.93	1.46	1.06	0.13	1.06	0.19	0.00
SVP264009	SVP264010	1.5-2.0	0.04	0.01	1.20	1.03	1.35	1.80	1.11	-0.15	1.22	0.22	0.00
	SVP264011	2.5-3.0	0.06	0.07	1.18	0.93	1.41	2.22	1.22	0.03	1.14	0.25	0.03
	SVP264012	5.5-6.0	-0.02	0.10	1.03	0.85	0.96	1.88	0.88	0.08	1.11	0.22	0.00
	SVP264013	6.5-7.0	-0.08	0.07	0.96	0.74	1.17	1.47	0.75	0.11	0.94	0.18	0.00
	SVP264014	9.0-9.5	0.05	0.07	0.99	0.83	1.07	1.83	1.00	0.14	1.00	0.21	0.00
	SVP264015	10.5-11.0	0.04	-0.09	0.94	0.75	1.32	1.89	0.96	0.05	1.00	0.21	0.00
	SVP264016	12.0-12.5	0.00	-0.08	1.08	0.88	1.12	1.59	0.66	-0.06	1.08	0.20	0.00
	SVP264017	14.0-14.5	0.05	-0.08	0.98	0.76	0.89	1.64	1.09	0.14	0.90	0.19	0.00
SVP264018	SVP264019	1.5-2.0	0.00	0.09	1.17	0.91	1.31	2.04	1.47	0.11	1.10	0.24	0.02
	SVP264020	2.0-2.5	0.08	0.38	1.32	0.86	1.01	1.86	1.04	-0.04	1.23	0.24	0.01
	SVP264021	5.5-6.0	-0.07	-0.30	0.99	0.82	1.22	1.60	0.99	0.00	0.74	0.19	0.00
	SVP264022	6.5-7.0	0.02	0.15	1.11	0.86	1.12	1.54	1.33	0.03	0.98	0.20	0.00
	SVP264023	9.0-9.5	0.00	-0.42	0.97	0.78	1.14	1.60	1.03	0.09	0.96	0.19	0.00
	SVP264024	11.5-12.0	0.05	0.65	0.99	0.81	1.38	1.62	1.04	0.00	0.92	0.19	0.00
	SVP264025	12.5-13.0	0.03	0.21	0.98	0.83	1.35	1.57	0.92	0.04	0.85	0.19	0.00
	SVP264026	15.0-15.5	0.04	-0.09	0.87	0.70	1.29	1.15	0.81	0.05	0.59	0.15	0.00

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

Table H-7. Class 2 SU-4 Systematic Surface Soil Sample Data Summary

Number of Systematic Samples: 10	Number of Biased Samples: 1	Area: 9,794 m^2

Statistic	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
		(pCi/g)										
Mean	Systematic	-0.24	-0.03	1.09	0.82	1.39	1.76	1.11	0.04	1.03	0.36	0.05
Median	Systematic	-0.03	-0.02	1.06	0.84	1.41	1.82	1.02	0.05	1.05	0.37	0.05
Standard Deviation	Systematic	0.48	0.40	0.12	0.06	0.17	0.26	0.28	0.13	0.12	0.03	0.03
Maximum	Systematic	0.22	0.86	1.33	0.88	1.62	2.05	1.59	0.22	1.21	0.40	0.08
Maximum	All	0.22	0.86	1.33	0.88	1.63	2.05	1.59	0.22	1.21	0.41	0.09
Range	All	0.22	0.86	0.36	0.19	0.56	0.71	0.83	0.22	0.33	0.10	0.09

Sample/ Station Name	GWS-Based Area (m^2)	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP190223	--	Systematic	-1.10	-0.40	1.14	0.76	1.37	2.02	0.85	-0.14	0.88	0.39	0.08
SVP190227	--	Systematic	-0.85	0.86	1.23	0.87	1.42	1.87	1.00	0.09	0.88	0.40	0.08
SVP190247	--	Systematic	-0.75	-0.41	1.33	0.84	1.62	1.56	0.96	0.00	0.99	0.40	0.08
SVP263662	--	Systematic	-0.05	0.02	0.97	0.70	1.41	1.34	0.95	0.08	1.05	0.31	0.00
SVP263671	--	Systematic	-0.15	-0.57	1.08	0.82	1.32	1.78	1.23	0.03	1.04	0.36	0.05
SVP263693	--	Systematic	0.22	0.10	1.00	0.87	1.40	1.35	1.15	0.06	1.17	0.32	0.01
SVP263706	--	Systematic	0.07	-0.07	1.06	0.88	1.51	1.86	0.76	0.22	1.21	0.37	0.05
SVP263715	--	Systematic	0.11	0.08	1.05	0.86	1.16	2.00	1.57	0.20	1.07	0.37	0.06
SVP263844	--	Systematic	-0.02	0.23	1.00	0.84	1.07	1.73	1.05	0.01	0.91	0.34	0.03
SVP264080	--	Systematic	0.15	-0.17	1.00	0.80	1.57	2.05	1.59	-0.18	1.13	0.37	0.05
SVP201660	--	Biased	-1.65	-0.21	1.33	0.80	1.63	1.70	1.09	0.00	1.05	0.41	0.09

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

-- indicates GWS-based areas are not applicable to other biased or systematic soil sampling.

Table H-8. SU-4 Subsurface Soil Sample Data Summary

Number of Subsurface Samples: 75

Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
	(pCi/g)										
Mean	-0.11	-0.04	1.04	0.84	1.21	1.62	1.06	0.05	1.05	0.20	0.01
Median	-0.01	-0.05	1.01	0.85	1.21	1.58	1.04	0.05	1.04	0.19	0.00
Standard Deviation	0.33	0.30	0.14	0.08	0.23	0.36	0.23	0.11	0.14	0.03	0.01
Maximum	0.15	0.67	1.35	1.04	1.70	2.39	1.66	0.45	1.44	0.26	0.04
Range	0.15	0.67	0.57	0.37	1.15	1.50	1.23	0.45	0.70	0.12	0.04

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP190223	SVP190224	0.5-1.0	-0.87	0.67	1.17	0.74	1.44	2.06	0.77	-0.03	1.13	0.24	0.02
	SVP190225	2.0-2.5	-1.07	0.44	1.30	0.83	1.30	1.72	1.08	0.45	1.09	0.22	0.01
	SVP190226	5.5-6.0	-1.27	-0.21	1.33	0.92	1.39	2.09	1.29	-0.23	1.29	0.25	0.03
	SVP211117	4.0-4.5	-0.98	0.34	1.25	0.89	1.39	2.25	1.32	0.28	1.06	0.25	0.03
SVP190227	SVP190228	1.0-1.5	-0.79	-0.03	1.18	0.80	1.40	2.26	0.67	0.03	1.05	0.25	0.03
	SVP211115	3.0-3.5	-1.09	0.43	1.32	0.93	1.08	2.05	0.89	0.22	1.00	0.24	0.03
	SVP211116	4.5-5.0	-1.00	-0.84	1.29	0.95	1.50	1.71	1.10	0.05	1.10	0.22	0.01
SVP190247	SVP190248	1.0-1.5	-0.90	0.49	1.24	0.70	1.02	1.37	0.83	0.05	1.02	0.19	0.01
SVP201660	SVP201661	0.5-1.0	-0.80	-0.48	1.35	0.87	1.22	1.18	1.09	0.15	1.08	0.19	0.01
SVP263662	SVP263663	1.0-1.5	-0.01	-0.34	1.02	0.90	1.62	2.03	1.21	0.00	1.18	0.23	0.01
	SVP263664	3.0-3.5	0.01	0.35	1.01	1.01	1.40	2.13	1.47	0.00	1.15	0.23	0.02
	SVP263665	5.5-6.0	0.05	0.50	0.99	0.90	1.62	2.21	1.01	-0.06	1.17	0.24	0.03
	SVP263666	7.0-7.5	0.10	-0.25	1.04	0.84	1.06	1.59	1.17	0.05	1.16	0.20	0.00
	SVP263667	8.8-9.3	0.00	-0.21	0.93	0.73	0.88	1.29	0.67	0.12	0.89	0.17	0.00
	SVP263668	11.0-11.5	0.06	0.05	0.98	0.84	1.22	1.46	1.04	0.12	0.94	0.18	0.00
	SVP263669	12.5-13.0	0.07	0.12	0.91	0.83	1.26	1.21	0.91	-0.14	1.05	0.16	0.00
	SVP263670	15.5-16.0	0.08	-0.01	0.99	0.78	0.74	1.07	0.89	0.17	1.14	0.16	0.00
SVP263671	SVP263672	1.0-1.5	-0.15	-0.20	1.08	0.88	1.15	2.00	0.94	0.27	1.17	0.23	0.01
	SVP263673	3.0-3.5	-0.02	-0.12	0.97	0.94	1.07	1.54	0.92	0.06	1.33	0.19	0.00
	SVP263674	4.5-5.0	-0.02	0.07	0.96	0.87	1.18	1.40	0.91	0.07	1.20	0.18	0.00
	SVP263675	7.5-8.0	-0.03	-0.39	1.06	0.92	1.21	1.48	1.18	0.10	1.08	0.19	0.00
	SVP263676	8.5-9.0	-0.01	0.08	0.91	0.77	1.23	2.01	1.33	-0.01	0.98	0.21	0.01
	SVP263677	11.5-12.0	0.13	0.00	0.91	0.80	1.17	1.18	0.92	-0.08	0.74	0.15	0.00
	SVP263678	13.5-14.0	0.02	-0.41	0.89	0.79	1.01	1.67	1.32	0.00	0.94	0.19	0.00
	SVP263679	15.0-15.5	-0.07	-0.05	0.91	0.74	1.07	1.42	0.70	-0.02	0.97	0.18	0.00

Table H-8. SU-4 Subsurface Soil Sample Data Summary (Continued)

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP263693	SVP263694	1.0-1.5	0.01	0.50	1.12	0.93	1.24	2.32	1.66	0.14	1.44	0.26	0.04
	SVP263695	3.0-3.5	-0.09	0.24	1.06	0.94	1.42	2.24	1.21	-0.02	1.25	0.25	0.03
	SVP263696	5.0-5.5	-0.08	0.67	0.99	0.85	1.25	1.58	1.05	-0.02	1.17	0.19	0.00
	SVP263697	6.0-6.5	0.05	-0.18	0.93	0.81	1.02	1.26	1.02	0.00	0.97	0.17	0.00
	SVP263698	9.5-10.0	-0.01	-0.15	0.85	0.79	0.93	1.40	0.90	0.03	1.11	0.17	0.00
	SVP263699	10.8-11.3	-0.10	-0.43	0.96	0.81	0.97	1.00	0.43	0.08	1.11	0.15	0.00
	SVP263700	13.0-13.5	0.09	-0.22	0.85	0.76	1.04	1.59	1.04	-0.16	0.89	0.18	0.00
	SVP263701	14.0-14.5	-0.01	0.00	0.90	0.73	0.86	1.51	0.83	-0.01	0.91	0.18	0.00
	SVP263702	17.1-17.6	0.00	0.05	0.95	0.82	1.70	1.89	0.89	-0.16	0.99	0.21	0.00
	SVP263703	18.0-18.5	-0.07	-0.08	0.98	0.79	0.87	1.58	1.08	0.06	0.97	0.19	0.00
	SVP263704	20.5-21.0	-0.05	-0.49	1.19	0.77	0.55	1.45	0.94	-0.02	0.91	0.19	0.00
	SVP263705	22.5-23.0	-0.05	0.39	1.00	0.77	1.16	1.33	1.11	0.06	0.90	0.17	0.00
SVP263706	SVP263707	1.0-1.5	-0.06	-0.33	1.03	0.97	1.49	1.94	0.93	0.14	1.28	0.22	0.01
	SVP263708	3.0-3.5	0.07	-0.17	1.21	1.04	1.52	1.94	1.38	0.12	1.32	0.24	0.01
	SVP263709	5.5-6.0	-0.06	0.02	1.06	0.92	1.12	1.75	1.05	-0.01	0.95	0.21	0.00
	SVP263710	6.5-7.0	-0.05	0.02	1.10	0.92	1.48	1.85	0.99	0.11	0.97	0.22	0.00
	SVP263711	9.0-9.5	0.07	0.07	1.02	0.89	1.36	2.39	1.33	0.17	0.99	0.25	0.04
	SVP263712	10.0-10.5	0.08	0.09	0.97	0.88	1.16	1.69	1.08	0.03	1.10	0.20	0.00
	SVP263713	13.0-13.5	0.04	-0.21	1.09	0.84	1.06	1.24	0.98	0.15	0.89	0.17	0.00
	SVP263714	15.0-15.5	-0.04	-0.21	0.93	0.79	0.82	1.17	0.74	0.09	0.94	0.16	0.00
SVP263715	SVP263716	1.5-2.0	-0.06	0.12	1.00	0.69	1.46	1.96	1.27	0.20	1.08	0.22	0.01
	SVP263717	2.5-3.0	-0.07	-0.37	1.09	0.90	1.51	2.14	1.25	0.05	1.09	0.24	0.02
	SVP263718	4.5-5.0	0.09	-0.31	1.26	0.97	1.20	1.53	1.41	-0.11	1.27	0.21	0.01
	SVP263719	6.0-6.5	-0.01	-0.05	1.13	0.88	1.21	1.78	1.24	0.06	1.09	0.22	0.00
	SVP263720	9.5-10.0	-0.07	-0.02	0.96	0.75	0.76	1.13	0.85	0.07	0.99	0.16	0.00
	SVP263721	11.0-11.5	0.01	-0.04	0.97	0.79	0.99	1.13	0.78	0.01	1.04	0.16	0.00
	SVP263722	13.5-14.0	-0.01	-0.47	0.85	0.73	1.30	1.23	1.01	-0.04	0.91	0.16	0.00
	SVP263723	15.0-15.5	0.07	-0.47	0.81	0.71	0.99	1.51	0.81	0.06	0.84	0.17	0.00
	SVP263724	16.5-17.0	-0.04	0.15	0.88	0.78	0.89	1.55	1.16	0.06	1.03	0.18	0.00
	SVP263725	18.5-19.0	-0.01	0.06	0.78	0.71	1.22	1.49	0.97	-0.02	0.85	0.17	0.00
	SVP263726	21.5-22.0	0.10	0.15	0.80	0.77	1.27	1.77	0.90	0.06	0.83	0.19	0.00
	SVP263727	23.0-23.5	0.02	0.22	0.82	0.86	1.35	1.41	1.08	0.01	1.14	0.17	0.00
	SVP263728	25.5-26.0	0.00	-0.34	0.89	0.88	1.27	1.22	1.45	0.04	0.96	0.16	0.00
	SVP263729	2.0-27.5	-0.07	0.31	0.91	0.95	1.52	1.83	1.08	0.14	1.19	0.21	0.00

Table H-8. SU-4 Subsurface Soil Sample Data Summary (Continued)

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP263844	SVP263845	1.5-2.0	-0.01	0.08	1.10	0.95	1.12	1.67	1.49	0.24	1.26	0.21	0.00
	SVP263846	3.5-4.0	0.05	0.11	1.05	0.88	1.48	2.01	1.40	0.01	1.08	0.23	0.01
	SVP263847	5.5-6.0	-0.04	0.57	1.14	0.88	1.24	1.83	1.13	0.17	0.90	0.22	0.00
	SVP263848	7.0-7.5	-0.01	-0.24	1.01	0.91	1.11	1.59	0.99	-0.14	0.99	0.19	0.00
	SVP263849	9.0-9.5	0.05	-0.34	1.11	0.94	1.42	1.88	1.29	0.02	1.16	0.22	0.00
	SVP263850	11.0-11.5	0.08	-0.21	0.96	0.81	1.56	1.48	1.20	-0.02	0.86	0.18	0.00
	SVP263851	13.5-14.0	0.00	-0.14	0.93	0.78	1.14	1.25	0.81	-0.08	0.97	0.16	0.00
	SVP263852	15.5-16.0	0.15	-0.05	0.93	0.79	1.20	0.89	0.93	0.14	0.93	0.14	0.00
SVP264080	SVP264081	1.5-2.0	0.15	-0.41	1.17	0.90	1.27	2.05	1.21	-0.12	1.12	0.24	0.02
	SVP264082	3.0-3.5	0.09	0.13	1.19	0.88	1.51	1.58	1.20	-0.02	1.00	0.20	0.00
	SVP264083	5.0-5.5	-0.10	-0.31	1.22	0.87	0.91	1.37	1.03	-0.05	1.04	0.19	0.00
	SVP264084	6.5-7.0	0.02	-0.14	1.20	0.89	1.13	1.51	1.05	0.12	0.92	0.20	0.00
	SVP264085	8.5-9.0	0.03	-0.14	1.24	0.94	1.16	1.47	1.58	0.11	1.10	0.20	0.01
	SVP264086	11.0-11.5	0.03	-0.09	1.07	0.86	1.44	1.36	1.02	0.01	0.94	0.18	0.00
	SVP264087	13.5-14.0	0.13	-0.43	1.03	0.73	1.35	1.14	0.98	-0.01	0.96	0.16	0.00
	SVP264088	14.0-14.5	-0.04	0.15	0.99	0.67	0.95	1.25	0.66	0.09	0.93	0.17	0.00

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

Table H-9. Class 2 SU-5 Systematic Surface Soil Sample Data Summary

Number of Systematic Samples: 8	Number of Biased Samples: 1	Area: 9,563 m^2

Statistic	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
		(pCi/g)										
Mean	Systematic	-1.15	-0.02	1.20	0.85	1.10	1.55	1.00	0.12	0.87	0.37	0.06
Median	Systematic	-1.30	0.27	1.23	0.84	1.20	1.51	1.06	0.15	1.02	0.36	0.06
Standard Deviation	Systematic	0.84	0.73	0.16	0.05	0.20	0.21	0.20	0.17	0.47	0.03	0.03
Maximum	Systematic	0.15	0.69	1.49	0.95	1.31	1.93	1.15	0.33	1.16	0.43	0.11
Maximum	All	0.22	0.69	1.49	0.95	1.31	1.93	1.15	0.33	1.16	0.43	0.11
Range	All	0.22	0.69	0.71	0.32	0.52	0.72	0.60	0.33	1.16	0.17	0.11

Sample/ Station Name	GWS-Based Area (m^2)	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP190163	--	Systematic	-1.26	0.35	1.30	0.84	0.79	1.38	1.14	0.33	-0.28	0.36	0.07
SVP190167	--	Systematic	-1.68	0.16	1.22	0.80	1.18	1.41	1.05	0.12	0.86	0.36	0.05
SVP190177	--	Systematic	-1.34	0.18	1.49	0.95	1.21	1.51	1.15	-0.19	1.16	0.43	0.11
SVP190179	--	Systematic	-1.98	-0.86	1.26	0.90	0.89	1.71	1.15	0.28	1.02	0.39	0.08
SVP190181	--	Systematic	-2.05	0.38	1.23	0.86	1.23	1.27	0.95	0.15	1.02	0.36	0.06
SVP190221	--	Systematic	-1.05	0.69	1.12	0.81	1.24	1.69	0.55	0.15	1.12	0.37	0.05
SVP263653	--	Systematic	0.15	-1.44	1.06	0.83	1.31	1.93	0.94	-0.08	1.09	0.37	0.05
SVP263808	--	Systematic	0.04	0.38	0.95	0.80	0.93	1.51	1.06	0.16	1.00	0.32	0.00
SVP263680	--	Biased	0.22	-0.24	0.78	0.63	1.16	1.21	0.94	0.14	0.82	0.26	0.00

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

-- indicates GWS-based areas are not applicable to other biased or systematic soil sampling.

Table H-10. SU-5 Subsurface Soil Sample Data Summary

Number of Subsurface Samples:	47

Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
	(pCi/g)										
Mean	-0.60	-0.10	1.16	0.86	1.20	1.72	1.08	0.08	1.04	0.21	0.01
Median	-0.04	-0.09	1.08	0.88	1.20	1.70	1.07	0.08	1.02	0.21	0.01
Standard Deviation	0.80	0.41	0.27	0.10	0.24	0.36	0.21	0.11	0.20	0.03	0.02
Maximum	0.17	0.58	1.85	1.02	1.85	2.53	1.56	0.38	1.70	0.28	0.05
Range	0.17	0.58	1.03	0.37	1.11	1.59	0.98	0.38	1.10	0.12	0.05

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP190163	SVP190164	1.5-2.0	-1.26	-1.29	1.52	0.96	1.12	1.37	1.56	-0.05	0.71	0.21	0.02
	SVP190165	3.5-4.0	-1.32	-0.96	1.29	0.86	1.29	1.55	0.91	-0.08	0.87	0.21	0.01
	SVP190166	4.0-4.5	-2.15	-0.44	1.29	0.97	1.45	1.39	1.22	0.32	1.70	0.21	0.02
SVP190167	SVP190168	1.0-1.5	-1.36	-0.76	1.34	0.96	1.60	1.96	1.52	0.14	1.21	0.24	0.02
	SVP211098	2.5-3.0	-1.44	-0.13	1.54	0.95	1.34	1.46	1.03	0.19	0.95	0.22	0.03
	SVP211099	4.5-5.0	-2.35	0.21	1.74	1.00	1.31	2.06	1.05	-0.04	1.18	0.28	0.05
SVP190177	SVP190178	1.0-1.5	-1.22	-0.94	1.40	0.93	0.92	1.81	1.21	0.09	1.03	0.23	0.02
	SVP211092	2.5-3.0	-1.81	-0.21	1.41	0.93	1.10	1.16	0.86	0.14	1.02	0.19	0.02
SVP190179	SVP190180	0.5-1.0	-2.01	-0.32	1.38	1.02	1.30	1.31	1.06	0.38	1.12	0.20	0.02
	SVP211093	3.0-3.5	-1.80	-0.54	1.64	0.97	1.13	1.90	0.76	0.25	1.25	0.26	0.04
	SVP211094	4.0-4.5	-1.53	0.32	1.19	0.92	1.39	1.70	1.22	0.12	1.21	0.22	0.00
	SVP211100	5.0-5.5	-2.01	0.44	1.42	0.91	1.35	1.38	1.41	0.14	0.96	0.21	0.02
SVP190181	SVP190182	1.0-1.5	-1.04	-0.45	1.50	0.89	1.04	1.95	0.98	0.32	1.32	0.26	0.03
	SVP211101	3.5-4.0	-1.28	-0.14	1.51	0.99	1.10	1.74	1.28	0.08	0.96	0.24	0.02
	SVP211102	4.5-5.0	-1.27	0.18	1.53	0.95	0.78	1.50	0.75	0.22	0.60	0.21	0.03
	SVP211103	5.0-5.5	-1.32	0.52	1.85	0.94	1.12	0.94	0.98	-0.03	1.18	0.21	0.05
SVP190221	SVP190222	0.5-1.0	-1.14	-0.36	1.14	0.83	1.78	2.47	1.19	0.16	0.82	0.26	0.04
	SVP211118	3.5-4.0	-0.99	-0.55	1.26	0.91	1.41	1.27	0.82	-0.04	1.00	0.19	0.01
	SVP211119	4.5-5.0	-1.48	0.26	1.36	1.01	1.20	2.18	0.58	-0.02	1.50	0.27	0.04
SVP263653	SVP263654	0.5-1.0	-0.04	-0.18	1.02	0.91	1.22	1.97	1.39	0.12	1.21	0.22	0.01
	SVP263655	3.5-4.0	0.08	-0.09	1.10	0.93	1.15	2.25	1.36	0.16	1.06	0.24	0.03
	SVP263656	4.0-4.5	-0.02	0.09	1.18	0.93	1.20	1.64	1.22	0.17	1.13	0.21	0.00
	SVP263657	6.0-6.5	0.07	0.17	1.01	0.80	1.20	1.72	1.07	-0.08	0.90	0.20	0.00
	SVP263658	9.5-10.0	-0.04	0.58	1.00	0.84	0.83	1.83	1.40	0.02	1.17	0.21	0.00
	SVP263659	10.0-10.5	0.00	-0.04	0.98	0.82	1.13	1.10	1.08	0.17	1.09	0.16	0.00
	SVP263660	13.5-14.0	0.06	0.05	0.86	0.71	1.14	1.49	0.92	0.14	0.76	0.17	0.00
	SVP263661	14.0-14.5	0.00	0.01	1.01	0.79	1.33	1.67	0.98	0.06	0.95	0.20	0.00

Table H-10. SU-5 Subsurface Soil Sample Data Summary (Continued)

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP263680	SVP263681	1.0-1.5	0.10	0.40	0.93	0.65	1.23	1.85	1.08	0.07	0.81	0.20	0.00
	SVP263682	2.5-3.0	-0.01	-0.38	0.87	0.70	1.85	2.53	1.08	0.04	1.07	0.25	0.05
	SVP263683	5.5-6.0	0.10	0.00	0.82	0.91	0.74	1.74	1.15	0.19	1.13	0.19	0.00
	SVP263684	6.0-6.5	-0.02	0.35	0.86	0.88	1.31	2.00	1.23	0.11	1.08	0.21	0.01
	SVP263685	9.5-10.0	-0.07	0.31	1.08	0.83	1.11	1.81	1.07	-0.02	1.12	0.22	0.00
	SVP263686	11.0-11.5	0.12	-0.10	1.10	0.90	1.05	1.61	1.07	0.03	0.97	0.20	0.00
	SVP263687	12.5-13.0	-0.01	0.01	0.88	0.81	1.30	1.70	1.03	0.12	0.96	0.19	0.00
	SVP263688	14.8-15.3	-0.12	-0.30	0.88	0.76	1.21	1.87	1.16	0.04	0.91	0.20	0.00
	SVP263689	16.7-17.2	0.13	-0.15	0.87	0.82	1.16	1.49	1.08	-0.04	0.83	0.17	0.00
	SVP263690	18.1-18.6	0.07	-0.36	0.82	0.74	0.95	1.31	0.74	0.14	0.75	0.16	0.00
	SVP263691	21.0-21.5	0.17	0.13	0.94	0.81	0.99	1.54	0.87	-0.12	1.14	0.19	0.00
	SVP263692	21.5-22.0	-0.04	-0.29	1.00	0.78	1.52	2.09	0.99	-0.03	0.97	0.23	0.02
SVP263808	SVP263809	1.5-2.0	-0.07	-0.33	1.07	0.81	1.43	2.31	1.09	0.10	1.17	0.25	0.03
	SVP263810	3.5-4.0	-0.01	-0.34	1.07	0.86	0.82	1.55	0.92	0.03	1.25	0.20	0.00
	SVP263811	5.5-6.0	-0.03	0.54	1.15	0.93	1.48	2.02	1.02	0.00	0.82	0.23	0.01
	SVP263812	7.5-8.0	-0.05	0.44	1.07	0.86	1.15	2.27	1.27	0.04	1.21	0.25	0.03
	SVP263813	9.0-9.5	-0.02	-0.31	0.93	0.68	0.86	1.64	1.16	-0.09	0.92	0.19	0.00
	SVP263814	10.0-10.5	0.02	0.32	0.86	0.69	1.12	1.89	0.84	0.04	0.85	0.20	0.00
	SVP263815	13.5-14.0	-0.03	-0.07	0.99	0.76	1.45	1.45	1.33	0.15	1.01	0.18	0.00
	SVP263816	15.0-15.5	0.00	-0.04	1.00	0.76	0.78	1.39	0.84	-0.05	0.96	0.18	0.00

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

Table H-11. Class 2 SU-6 Systematic Surface Soil Sample Data Summary

Number of Systematic Samples: 8	Number of Biased Samples: 7	Area: 9,846 m^2

Statistic	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
		(pCi/g)										
Mean	Systematic	-0.91	0.01	1.25	0.78	1.18	1.80	1.02	0.12	1.02	0.40	0.09
Median	Systematic	-1.03	0.05	1.25	0.76	1.21	1.86	1.03	0.13	1.04	0.40	0.09
Standard Deviation	Systematic	0.38	0.36	0.05	0.07	0.18	0.37	0.13	0.13	0.10	0.02	0.02
Maximum	Systematic	-0.35	0.61	1.31	0.91	1.40	2.22	1.17	0.29	1.21	0.43	0.12
Maximum	All	0.03	0.61	1.67	0.91	1.40	2.67	1.17	0.29	1.25	0.46	0.14
Range	All	0.03	0.61	0.63	0.40	0.75	1.56	0.81	0.29	0.48	0.13	0.12

Sample/ Station Name	GWS-Based Area (m^2)	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP190125	--	Systematic	-0.45	0.61	1.19	0.75	1.32	1.82	1.01	0.12	1.06	0.39	0.07
SVP190129	--	Systematic	-1.17	0.05	1.31	0.91	0.98	1.11	1.17	0.05	1.21	0.37	0.07
SVP190149	--	Systematic	-0.35	0.05	1.25	0.77	1.19	1.72	1.14	0.24	0.88	0.39	0.08
SVP190153	--	Systematic	-1.19	-0.49	1.23	0.79	1.32	1.44	1.13	-0.06	1.06	0.37	0.06
SVP190169	--	Systematic	-0.99	-0.32	1.29	0.85	1.40	2.18	0.88	0.29	1.03	0.43	0.12
SVP190171	--	Systematic	-1.41	0.21	1.18	0.75	1.23	2.22	0.99	0.14	0.90	0.41	0.10
SVP190183	--	Systematic	-0.66	0.23	1.28	0.71	0.89	1.90	1.04	0.22	1.04	0.41	0.10
SVP190187	--	Systematic	-1.06	-0.29	1.25	0.67	1.11	1.99	0.79	-0.05	1.00	0.41	0.10
SVP190353	--	Biased	-0.46	-0.26	1.44	0.87	1.05	1.66	0.97	-0.03	1.15	0.43	0.11
SVP190365	--	Biased	-0.58	-0.16	1.67	0.51	0.65	1.11	0.36	0.09	0.88	0.43	0.14
SVP207127	--	Biased	-0.91	-0.23	1.25	0.77	1.18	2.67	0.97	0.16	1.09	0.46	0.14
SVP207129	--	Biased	-0.57	0.13	1.26	0.81	1.24	2.12	0.88	0.03	1.25	0.43	0.11
SVP207131	--	Biased	-0.64	-0.54	1.21	0.77	1.33	1.99	0.93	0.00	1.04	0.40	0.09
SVP263743	--	Biased	0.03	-0.09	1.04	0.71	1.30	1.56	1.07	-0.07	0.77	0.33	0.02
SVP263756	--	Biased	-0.12	0.42	1.07	0.75	1.13	2.10	1.07	0.09	0.88	0.38	0.07

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

-- indicates GWS-based areas are not applicable to other biased or systematic soil sampling.

Table H-12. SU-6 Subsurface Soil Sample Data Summary

Number of Subsurface Samples: 60

Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
	(pCi/g)										
Mean	-0.61	-0.06	1.31	0.88	1.20	1.74	1.02	0.08	1.04	0.22	0.02
Median	-0.54	-0.05	1.26	0.86	1.18	1.70	0.99	0.08	1.06	0.22	0.01
Standard Deviation	0.63	0.42	0.25	0.10	0.30	0.46	0.24	0.15	0.17	0.04	0.03
Maximum	0.18	0.86	2.05	1.12	2.25	3.19	1.63	0.66	1.38	0.34	0.13
Range	0.18	0.86	1.08	0.44	1.57	2.24	1.20	0.66	0.78	0.18	0.13

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP190125	SVP190126	1.5-2.0	-0.87	-0.09	1.20	0.77	1.10	1.77	1.11	0.02	0.91	0.22	0.00
	SVP190127	3.5-4.0	-0.47	-0.04	1.19	0.82	0.78	1.30	0.89	0.13	0.85	0.18	0.00
	SVP190128	5.5-6.0	-1.47	-0.07	1.17	0.80	0.95	1.71	0.99	0.09	1.07	0.21	0.00
SVP190129	SVP190130	1.0-1.5	-0.93	0.38	1.33	0.90	0.96	1.67	1.15	0.12	1.05	0.22	0.01
	SVP190131	2.0-2.5	-0.90	-0.21	1.44	0.99	0.68	1.62	0.87	0.21	1.17	0.23	0.02
	SVP190132	5.5-6.0	-0.87	-0.47	1.35	0.92	0.89	1.53	0.68	-0.05	1.06	0.21	0.01
SVP190149	SVP190150	1.5-2.0	-0.99	0.02	1.23	0.84	1.10	1.25	1.07	-0.20	1.23	0.19	0.01
	SVP190151	2.5-3.0	-1.44	-0.18	1.34	0.92	0.80	1.41	1.16	-0.15	1.28	0.21	0.01
	SVP190152	4.0-4.5	-1.16	-0.18	1.40	0.98	1.34	1.44	1.03	0.14	1.28	0.21	0.02
SVP190153	SVP190154	1.5-2.0	0.07	0.35	1.34	0.86	1.25	1.54	0.65	0.13	1.15	0.22	0.01
	SVP190155	2.0-2.5	-0.64	-0.07	1.21	0.80	2.25	1.80	1.45	0.08	1.01	0.22	0.00
	SVP190156	5.0-5.5	-0.51	-0.23	1.62	1.06	1.43	1.65	1.50	-0.20	1.07	0.24	0.03
SVP190169	SVP190170	0.5-1.0	-0.95	0.03	1.28	0.84	0.92	1.93	0.82	0.05	0.85	0.23	0.02
	SVP211104	2.0-2.5	-1.34	-0.82	1.56	0.91	1.40	1.84	0.72	0.15	1.14	0.25	0.03
	SVP211105	4.0-4.5	-1.24	-0.43	2.04	1.04	1.71	2.82	1.11	-0.02	0.79	0.34	0.13
	SVP211106	4.5-5.0	-1.25	-0.21	2.05	1.04	1.07	2.64	0.81	-0.02	1.12	0.34	0.11
SVP190171	SVP190172	1.0-1.5	-1.76	-0.87	1.29	0.72	0.84	1.60	1.22	0.20	1.06	0.21	0.01
	SVP211107	3.5-4.0	-1.12	0.26	1.20	0.84	1.32	1.86	1.24	0.05	1.15	0.23	0.01
	SVP211108	4.0-4.5	-1.11	0.28	1.24	0.74	0.85	0.95	0.62	0.19	0.70	0.16	0.01
	SVP211109	6.5-7.0	-1.28	-0.54	1.52	0.88	1.00	1.04	1.02	0.01	0.82	0.19	0.02
	SVP211110	8.0-8.5	-1.17	-0.69	1.20	1.02	1.24	1.65	1.29	-0.23	0.92	0.21	0.00
SVP190183	SVP190184	1.0-1.5	-1.04	-0.67	1.35	0.81	1.64	1.91	0.66	0.23	0.82	0.23	0.02
	SVP190185	3.5-4.0	-0.96	-1.16	1.42	0.90	0.71	1.98	0.78	-0.14	1.07	0.25	0.03
	SVP190186	5.5-6.0	-1.90	0.56	1.51	1.00	0.98	3.19	1.34	0.05	1.38	0.34	0.12
	SVP211111	6.0-6.5	-1.60	0.71	1.97	1.12	1.04	1.73	0.98	-0.29	0.95	0.27	0.05
	SVP211112	7.0-7.5	-1.08	0.10	1.61	1.03	0.94	2.10	1.19	0.41	0.96	0.27	0.05
SVP190187	SVP190188	1.5-2.0	-1.40	0.44	1.21	0.82	1.08	1.48	0.84	0.66	1.02	0.20	0.00
	SVP211113	2.0-2.5	-1.93	-0.36	1.23	0.83	1.59	1.26	0.82	0.10	0.91	0.18	0.01
	SVP211114	4.5-5.0	-1.43	-1.25	1.29	0.83	1.47	1.62	0.94	0.29	0.83	0.21	0.01
SVP190353	SVP190354	1.0-1.5	-0.50	0.10	1.74	0.96	1.24	1.53	0.74	0.03	1.34	0.24	0.04
SVP190365	SVP190366	0.5-1.0	-0.92	0.32	1.81	0.69	1.15	1.09	0.93	0.01	0.93	0.21	0.04
SVP207127	SVP207128	1.0-1.5	-0.50	-0.01	1.27	0.82	1.12	1.76	0.43	0.17	1.05	0.22	0.01
	SVP211141	2.0-2.5	-0.66	0.19	1.26	0.74	1.24	1.91	1.10	0.08	1.19	0.24	0.01

Table H-12. SU-6 Subsurface Soil Sample Data Summary (Continued)

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP207129	SVP207130	1.5-2.0	-0.41	0.34	1.36	0.93	1.52	1.85	1.12	0.12	1.27	0.24	0.02
	SVP211142	2.0-2.5	-0.81	0.56	1.79	1.03	1.33	1.54	1.26	0.05	0.86	0.24	0.04
SVP207131	SVP207132	1.5-2.0	-0.57	-0.41	1.25	0.84	2.22	2.33	0.79	0.22	1.22	0.26	0.04
SVP263743	SVP263744	1.5-2.0	-0.07	0.19	1.00	0.80	1.04	1.18	0.80	0.11	1.03	0.17	0.00
	SVP263745	3.0-3.5	0.10	-0.12	1.08	0.86	0.98	1.25	0.92	0.19	1.19	0.18	0.00
	SVP263746	5.0-5.5	0.10	-0.49	1.10	0.87	1.27	1.97	1.24	0.24	1.07	0.23	0.01
	SVP263747	6.5-7.0	0.10	0.40	1.40	1.01	1.22	1.62	1.12	0.21	1.15	0.22	0.02
	SVP263748	9.0-9.5	-0.03	0.23	1.31	0.93	1.30	1.68	1.33	-0.08	1.15	0.22	0.01
	SVP263749	11.0-11.5	0.03	-0.28	1.26	1.01	1.33	1.89	1.06	0.20	1.16	0.23	0.01
	SVP263750	12.5-13.0	0.05	0.21	1.15	0.91	1.48	2.14	1.63	0.03	0.92	0.24	0.02
	SVP263751	15.0-15.5	0.03	-0.02	1.17	0.86	1.62	1.95	1.01	0.11	1.16	0.23	0.01
	SVP263752	17.0-17.5	-0.03	0.27	1.29	0.85	0.97	1.18	0.94	-0.11	1.20	0.19	0.01
	SVP263753	18.5-19.0	0.03	-0.37	1.30	0.88	1.06	1.46	0.91	0.08	1.30	0.21	0.01
	SVP263754	21.5-22.0	0.02	0.40	1.24	0.81	1.18	1.29	0.91	0.11	1.08	0.19	0.01
	SVP263755	23.5-24.0	-0.09	0.86	1.00	0.68	1.23	1.38	0.96	0.10	0.73	0.17	0.00
SVP263756	SVP263757	1.5-2.0	-0.05	0.17	1.02	0.80	1.23	1.89	1.32	0.03	1.11	0.22	0.00
	SVP263758	3.0-3.5	-0.08	0.00	1.10	0.81	1.24	1.73	1.51	0.09	0.60	0.20	0.00
	SVP263759	4.5-5.0	0.02	0.43	1.06	0.91	1.56	1.80	0.99	0.03	1.14	0.21	0.00
	SVP263760	7.5-8.0	0.09	0.13	1.13	1.01	1.08	1.73	1.14	-0.04	0.86	0.21	0.00
	SVP263761	9.0-9.5	-0.08	-0.05	1.14	0.88	1.15	2.10	0.98	0.04	1.21	0.24	0.02
	SVP263762	11.5-12.0	0.18	-0.01	1.16	0.99	1.04	3.05	0.82	0.18	1.03	0.30	0.08
	SVP263763	13.0-13.5	0.06	-0.15	1.38	0.92	1.37	2.32	1.12	0.15	1.12	0.27	0.05
	SVP263764	15.5-16.0	0.12	-0.15	0.99	0.77	1.38	2.39	0.84	0.07	0.80	0.24	0.04
	SVP263765	17.0-17.5	0.18	-0.12	0.97	0.83	0.95	1.58	0.98	0.05	1.03	0.19	0.00
	SVP263766	19.0-19.5	0.01	-0.08	1.05	0.84	1.03	1.14	1.05	0.05	0.92	0.16	0.00
	SVP263767	21.0-21.5	0.00	-0.20	1.08	0.81	1.18	1.41	0.90	-0.03	0.97	0.19	0.00
	SVP263768	22.5-23.0	0.09	-0.35	1.02	0.73	1.19	2.19	1.30	0.07	0.95	0.23	0.02

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

Table H-13. Class 2 SU-7 Systematic Surface Soil Sample Data Summary

Number of Systematic Samples: 8	Number of Biased Samples: 3	Area: 8,194 m^2

Statistic	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
		(pCi/g)										
Mean	Systematic	-0.87	0.06	1.25	0.80	1.31	1.66	0.91	0.09	1.15	0.39	0.08
Median	Systematic	-1.00	0.09	1.30	0.80	1.21	1.54	0.89	0.06	1.22	0.41	0.09
Standard Deviation	Systematic	0.65	0.47	0.12	0.06	0.26	0.42	0.17	0.13	0.19	0.04	0.03
Maximum	Systematic	0.07	0.63	1.38	0.88	1.91	2.31	1.16	0.30	1.45	0.45	0.13
Maximum	All	0.07	0.63	1.53	0.95	1.91	2.31	1.36	0.30	1.45	0.49	0.18
Range	All	0.07	0.63	0.58	0.76	1.61	1.62	1.01	0.30	0.95	0.21	0.15

Sample/ Station Name	GWS-Based Area (m^2)	Type	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP190139	--	Systematic	-1.06	-0.75	1.38	0.73	1.15	1.48	0.96	0.30	1.22	0.41	0.09
SVP190143	--	Systematic	-1.00	0.63	1.29	0.87	1.91	2.31	0.79	0.28	1.21	0.45	0.13
SVP190145	--	Systematic	-1.00	-0.23	1.36	0.84	1.20	1.49	0.74	-0.05	1.45	0.41	0.09
SVP190147	--	Systematic	-1.20	0.57	1.30	0.77	1.34	1.88	1.07	0.08	0.94	0.41	0.10
SVP190159	--	Systematic	-0.84	-0.24	1.31	0.72	1.22	0.98	0.68	0.07	0.89	0.35	0.07
SVP190161	--	Systematic	-1.93	0.35	1.11	0.88	1.20	1.59	0.83	-0.01	1.24	0.36	0.04
SVP264291	--	Systematic	0.07	-0.03	1.21	0.83	1.11	2.12	1.16	0.05	1.28	0.42	0.10
SVP264300	--	Systematic	-0.02	0.21	1.06	0.78	1.33	1.45	1.04	-0.04	0.98	0.34	0.02
SVP190309	--	Biased	-0.83	0.09	1.53	0.95	1.20	2.24	0.72	-0.08	1.39	0.49	0.18
SVP190337	--	Biased	-0.40	0.15	1.11	0.18	0.30	0.69	0.35	0.10	0.50	0.28	0.03
SVP263730	--	Biased	-0.07	0.06	0.95	0.75	1.11	1.85	1.36	0.02	0.84	0.34	0.03

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

-- indicates GWS-based areas are not applicable to other biased or systematic soil sampling.

Table H-14. SU-7 Subsurface Soil Sample Data Summary

Number of Subsurface Samples: 44

Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
	(pCi/g)										
Mean	-0.40	0.04	1.22	0.83	1.19	1.72	1.06	0.04	1.04	0.22	0.02
Median	-0.06	0.01	1.24	0.86	1.19	1.64	1.10	0.04	1.09	0.22	0.01
Standard Deviation	0.62	0.38	0.17	0.15	0.32	0.45	0.24	0.10	0.21	0.03	0.02
Maximum	0.15	1.44	1.55	1.12	1.90	2.77	1.46	0.42	1.45	0.30	0.08
Range	0.15	1.44	0.66	0.85	1.55	1.90	1.22	0.42	1.04	0.14	0.08

Station Name	Sample Name	Depth (ft)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP190139	SVP190140	0.5-1.0	-1.02	0.39	1.55	0.71	1.52	2.66	0.71	-0.06	0.95	0.30	0.08
	SVP190141	2.0-2.5	-0.84	-0.45	1.39	0.50	1.30	2.77	1.07	0.06	0.80	0.29	0.08
SVP190143	SVP190144	0.5-1.0	-1.41	0.03	1.34	0.85	1.85	1.59	1.41	-0.05	1.18	0.22	0.01
SVP190145	SVP190146	1.0-1.5	-1.04	0.32	1.36	0.90	1.24	1.70	0.85	0.02	1.45	0.23	0.02
SVP190147	SVP190148	1.0-1.5	-1.25	-0.26	1.35	0.86	0.93	1.16	0.80	-0.20	0.89	0.19	0.01
	SVP211095	3.0-3.5	-1.31	-0.17	1.44	0.93	1.57	1.92	1.08	-0.02	1.08	0.25	0.03
	SVP211096	4.0-4.5	-1.19	1.44	1.52	0.88	1.13	1.59	1.22	0.23	0.65	0.22	0.02
	SVP211097	5.0-5.5	-1.20	0.86	1.53	0.86	1.15	1.35	1.17	-0.02	1.08	0.21	0.03
SVP190159	SVP190160	1.0-1.5	-1.23	-0.28	1.37	0.77	1.11	1.38	1.28	0.07	0.95	0.20	0.01
	SVP206986	2.5-3.0	-0.70	-0.03	1.45	0.77	0.97	1.17	0.69	-0.05	1.04	0.20	0.02
SVP190161	SVP190162	1.0-1.5	-1.81	0.15	1.23	0.73	1.00	1.57	0.90	0.02	0.82	0.20	0.01
	SVP211090	3.0-3.5	-1.41	0.69	1.25	0.83	1.64	1.75	1.12	0.21	0.95	0.22	0.01
	SVP211091	5.0-5.5	-2.06	-0.26	1.33	0.98	0.75	1.62	1.14	0.09	1.24	0.22	0.01
SVP190309	SVP190310	1.5-2.0	-0.75	-0.09	1.29	0.77	0.79	1.35	1.29	-0.02	0.92	0.19	0.01
SVP190337	SVP190338	1.0-1.5	-0.66	-0.54	1.24	0.27	0.42	1.05	0.39	-0.09	0.41	0.16	0.01
	SVP206998	1.5-2.0	-0.26	0.03	1.34	0.30	0.35	0.87	0.24	0.07	0.55	0.16	0.01
SVP263730	SVP263731	1.0-1.5	0.04	0.27	1.10	0.89	1.18	1.68	1.20	0.06	1.14	0.21	0.00
	SVP263732	3.5-4.0	0.13	-0.04	1.04	0.93	1.19	1.14	1.07	0.01	1.21	0.17	0.00
	SVP263733	5.5-6.0	-0.02	0.04	1.11	0.87	0.96	1.66	1.29	-0.03	1.20	0.21	0.00
	SVP263734	7.0-7.5	-0.07	0.03	1.06	0.85	1.49	1.48	1.07	0.00	1.22	0.19	0.00
	SVP263735	8.5-9.0	0.13	0.14	1.07	0.88	1.32	1.31	0.97	0.09	0.81	0.17	0.00
	SVP263736	11.0-11.5	0.15	0.77	1.08	0.85	1.33	1.93	1.16	0.03	1.14	0.22	0.01
	SVP263737	13.0-13.5	-0.07	-0.05	1.06	0.82	1.11	2.14	1.15	-0.07	0.91	0.23	0.02
	SVP263738	15.0-15.5	0.09	-0.20	1.24	0.82	1.00	1.84	0.95	0.04	1.12	0.23	0.01
	SVP263739	17.0-17.5	-0.04	0.05	0.96	0.84	0.93	1.61	0.85	0.07	1.25	0.20	0.00
	SVP263740	19.0-19.5	-0.07	0.00	1.08	0.87	0.98	1.48	1.38	-0.04	0.95	0.19	0.00
	SVP263741	21.3-21.8	0.00	-0.04	1.02	0.79	0.97	1.29	1.13	0.09	1.09	0.18	0.00
	SVP263742	22.5-23.0	-0.11	0.28	1.09	0.88	1.14	1.83	1.17	0.11	1.07	0.22	0.00

Table H-14. SU-7 Subsurface Soil Sample Data Summary (Continued)

Station Name	Sample Name	Depth (ft bgs)	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	SOR_G	SOR_N
			(pCi/g)										
SVP264291	SVP264292	1.5-2.0	-0.07	0.06	1.43	1.12	1.47	2.08	1.46	0.42	1.33	0.26	0.04
	SVP264293	3.5-4.0	0.04	-0.18	1.39	0.97	1.49	1.85	1.06	0.03	1.13	0.24	0.02
	SVP264294	5.5-6.0	0.03	-0.67	1.38	1.03	1.27	1.83	1.18	-0.07	1.15	0.24	0.02
	SVP264295	6.5-7.0	0.10	-0.56	1.30	0.92	1.29	2.05	1.01	0.01	1.16	0.25	0.02
	SVP264296	9.0-9.5	0.03	-0.11	1.26	0.89	0.75	1.50	0.98	0.08	1.10	0.21	0.01
	SVP264297	11.0-11.5	-0.01	-0.26	0.92	0.79	1.24	1.26	0.89	0.05	0.87	0.16	0.00
	SVP264298	13.0-13.5	0.06	0.24	0.89	0.77	1.26	2.38	0.92	-0.01	0.95	0.24	0.04
	SVP264299	14.5-15.0	0.06	-0.08	0.90	0.76	0.89	1.45	0.93	0.12	0.96	0.18	0.00
SVP264300	SVP264301	1.0-1.5	0.07	-0.02	1.24	0.88	1.34	1.79	1.22	-0.10	1.25	0.23	0.01
	SVP264302	3.5-4.0	0.04	-0.17	1.12	0.83	1.33	1.60	1.32	0.09	1.12	0.20	0.00
	SVP264303	5.5-6.0	0.02	0.13	1.15	0.97	1.59	2.29	1.23	0.09	1.19	0.25	0.03
	SVP264304	7.0-7.5	-0.02	0.18	1.06	0.89	0.93	2.66	1.26	-0.10	1.41	0.28	0.06
	SVP264305	9.0-9.5	-0.09	0.31	1.13	0.90	1.90	2.37	1.19	0.18	0.94	0.25	0.04
	SVP264306	11.0-11.5	0.14	0.21	1.16	0.85	1.17	2.37	0.89	0.09	1.16	0.26	0.04
	SVP264307	12.5-13.0	0.05	0.01	1.18	0.95	1.63	2.20	1.13	0.15	0.94	0.24	0.03
	SVP264308	14.0-14.5	0.01	-0.29	1.14	0.76	1.28	1.32	1.01	0.12	1.13	0.19	0.00

Notes:

Negative results are less than the laboratory system's background level.

Bold value indicates a soil sample with an SOR_N exceeding 1.0. Non-bold value indicates a soil sample with an SOR_N not exceeding 1.0.

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APPENDIX I

COMPARISON OF SUBJECT AREA SOIL SAMPLE RESULTS TO REFERENCE AREA BACKGROUND SOIL SAMPLE RESULTS

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Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.2 5/3/2023 7:33:42 AM
From File	Jana soil PDIR-FSSE data for ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Ac-227
Sample 2 Data: Ac-227B

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	555	74
Number of Distinct Observations	484	46
Minimum	-2.35	-0.16
Maximum	0.507	0.82
Mean	-0.234	0.209
Median	-0.00753	0.135
SD	0.532	0.233
SE of Mean	0.0226	0.027

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	161427
Standardized WMW U-Stat	-9.125
Mean (U)	20535
SD(U) - Adj ties	1468
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.2 5/3/2023 7:34:42 AM
From File	Jana soil PDIR-FSSE data for ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Pa-231
Sample 2 Data: Pa-231B

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	555	74
Number of Distinct Observations	468	61
Minimum	-2.19	-0.49
Maximum	1.46	2.17
Mean	-0.0462	0.195
Median	-0.0356	0.185
SD	0.401	0.418
SE of Mean	0.017	0.0486

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	168070
Standardized WMW U-Stat	-4.601
Mean (U)	20535
SD(U) - Adj ties	1468
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.2 5/3/2023 7:35:52 AM
From File	Jana soil PDIR-FSSE data for ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median = Sample 2 Mean/Median (Two Sided Alternative)
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median

Sample 1 Data: Ra-226
Sample 2 Data: Ra-226B

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	555	74
Number of Distinct Observations	171	49
Minimum	0.393	0.56
Maximum	2.05	1.55
Mean	1.126	1.051
Median	1.09	1.085
SD	0.204	0.273
SE of Mean	0.00864	0.0317

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 = Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	177281
WMW U-Stat	22991
Standardized WMW U-Stat	1.673
Mean (U)	20535
SD(U) - Adj ties	1468
Lower Approximate U-Stat Critical Value (0.025)	-1.96
Upper Approximate U-Stat Critical Value (0.975)	1.96
P-Value (Adjusted for Ties)	0.0944

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 = Sample 2

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.2 5/3/2023 7:38:33 AM
From File	Jana soil PDIR-FSSE data for ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Ra-228
Sample 2 Data: Ra-228B

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	555	74
Number of Distinct Observations	293	40
Minimum	0.0721	0.72
Maximum	1.61	1.24
Mean	0.851	0.977
Median	0.852	0.965
SD	0.159	0.129
SE of Mean	0.00675	0.015

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	164444
Standardized WMW U-Stat	-7.07
Mean (U)	20535
SD(U) - Adj ties	1468
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	1

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.2 5/3/2023 7:39:17 AM
From File	Jana soil PDIR-FSSE data for ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Th-228
Sample 2 Data: Th-228B

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	555	74
Number of Distinct Observations	183	57
Minimum	0.0865	0.63
Maximum	2.25	2.15
Mean	1.169	1.176
Median	1.17	1.09
SD	0.273	0.345
SE of Mean	0.0116	0.0402

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	176404
Standardized WMW U-Stat	1.075
Mean (U)	20535
SD(U) - Adj ties	1468
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.141

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.2 5/3/2023 7:39:39 AM
From File	Jana soil PDIR-FSSE data for ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Th-230
Sample 2 Data: Th-230B

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	555	74
Number of Distinct Observations	176	64
Minimum	0.382	0.94
Maximum	3.19	2.89
Mean	1.615	1.659
Median	1.6	1.505
SD	0.4	0.487
SE of Mean	0.017	0.0566

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	175323
Standardized WMW U-Stat	0.339
Mean (U)	20535
SD(U) - Adj ties	1468
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.367

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.2 5/3/2023 8:12:28 AM
From File	Jana soil PDIR-FSSE data for ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Th-232
Sample 2 Data: Th-232B

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	555	74
Number of Distinct Observations	249	54
Minimum	0.0565	0.53
Maximum	1.66	1.96
Mean	1.027	1.112
Median	1.03	1.09
SD	0.247	0.346
SE of Mean	0.0105	0.0402

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	172271
Standardized WMW U-Stat	-1.74
Mean (U)	20535
SD(U) - Adj ties	1468
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.959

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.2 5/3/2023 8:12:51 AM
From File	Jana soil PDIR-FSSE data for ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: U-235
Sample 2 Data: U-235B

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	555	74
Number of Distinct Observations	459	22
Minimum	-0.308	-0.06
Maximum	0.66	0.25
Mean	0.0525	0.0618
Median	0.0503	0.06
SD	0.111	0.0666
SE of Mean	0.00473	0.00775

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	173498
Standardized WMW U-Stat	-0.904
Mean (U)	20535
SD(U) - Adj ties	1468
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.817

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.2 5/3/2023 8:13:10 AM
From File	Jana soil PDIR-FSSE data for ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: U-238
Sample 2 Data: U-238B

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	555	74
Number of Distinct Observations	214	55
Minimum	-2.29	0.65
Maximum	3.29	2.04
Mean	1.034	1.179
Median	1.05	1.135
SD	0.312	0.325
SE of Mean	0.0133	0.0378

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	170414
Standardized WMW U-Stat	-3.005
Mean (U)	20535
SD(U) - Adj ties	1468
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.999

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

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APPENDIX J

RISK AND DOSE ASSESSMENT

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RISK AND DOSE ASSESSMENT

As discussed in Section 4.1.2 of this report, the conclusions of the WMW Comparison Tests for the COCs are that the soil sample results from CWC-365 and CWC-386 are equal to or less than the reference area background data. Thus, these risk and dose estimates are essentially estimates for variation in natural background radioactivity.

RADIOLOGICAL RISK AND DOSE ASSESSMENT MODEL

RESidual RADioactivity (RESRAD)-ONSITE is a computer model developed by the Argonne National Laboratory (ANL) for the U.S. Department of Energy (DOE). RESRAD-ONSITE calculates site-specific risk and dose to various future hypothetical on-site receptors at sites with radioactive materials. The use of the RESRAD family of codes for modeling risk and dose has become an acceptable regulatory standard. Examples follow.

- The USEPA used RESRAD in its *Reassessment of Radium and Thorium Soil Concentrations and Annual Dose Rates* (USEPA 1996), which demonstrates the protectiveness of Uranium Mill Tailings Radiation Control Act soil criteria, and in its rulemaking for cleanup of sites with radioactivity.
- The USEPA was also a signatory to the ROD (USACE 2005a), which used RESRAD. The USEPA is a participant in many other CERCLA actions involving RESRAD.
- Seven U.S. Cabinet-level agencies (including the USEPA, DOE, U.S. Nuclear Regulatory Commission [NRC], and DoD), functioning as the Interagency Steering Committee on Radiation Standards, formally accepted RESRAD-BIOTA.

RESRAD-ONSITE Version 7.2 was used to calculate potential risk and dose based on receptor scenarios. RESRAD Version 5.82 was used for the risk and dose assessments supporting the ROD (USACE 2005a). A comparative evaluation of the two versions demonstrates that the differences in risk/dose slope/conversion factors[1] have insignificant impact on the risk estimates for the COCs. Additionally, the USEPA published updated age-specific external exposure dose conversion factors in *Federal Guidance Report No. 15: External Exposure to Radionuclides in Air, Water and Soil* (FGR-15) (USEPA 2019). A comparative evaluation of these new FGR-15 factors demonstrates that the differences are not significant enough to impact the dose assessment results relative to meeting the ROD RGs.

RESRAD-ONSITE RECEPTOR SCENARIOS

The RME receptor scenario applicable to CWC-365 and CWC-386 for UUUE is the suburban resident receptor scenario based on footnote “e” of Table 2-5 of the ROD (USACE 2005a). The ROD also states, “the standard suburban residential scenario is considered representative of UUUE” (USACE 2005a). In addition, the hypothetical residential gardener and the recreational user receptor scenarios are included for informational purposes. The approach and assumptions used to develop the risk and dose estimates are designed to prevent underestimation of the actual risk and dose to the receptor. This means the actual risk and dose received by an individual will be lower than the estimates in this assessment.

[1] The term ‘slope factor’ is used relative to the risk of cancer, and the term ‘conversion factor’ is used relative to radiation dose.

The receptor scenarios are summarized as follows.

- Student Receptor: This scenario is a student who spends 11.5 hours per day at the school for 170 days per year for 6 years. The parameter value of 11.5 hours per day is based on a child receiving before- and after-school care. The parameter value of 170 days is based on the school academic calendar for 2022 through 2023, and the parameter value of 6 years is based on kindergarten through fifth grade.
- Staff Receptor: This scenario is a school staff member who spends 8.5 hours per day at the school for 250 days per year for 25 years. The parameter value of 8.5 hours per day includes being onsite for regular working hours plus a half-hour lunch. The parameter values of 250 days and 25 years are based on worker duration in OSWER Directive 9200.1-120, *Human Health Evaluation Manual, Supplemental Guidance, Update of Standard Default Exposure Factors* (USEPA 2014).
- Suburban Resident: This scenario is a composite of two residential periods of 0 to 6 years old and 24 years as an adult (USACE 2003, USEPA 1991). The time at the residence is 350 days per year (USEPA 2014). The amounts of time spent indoors at the residence are 16.7 and 15.8 hours per day for ages 0 to 6 and adults, respectively, based on Table 16-1 of the *Exposure Factors Handbook: 2011 Edition* (2011 EFH) (USEPA 2011). The amounts of time spent outdoors at the residence are 3.26 and 2.4 hours per day for ages 0 to 6 and adults, respectively, based on Table 16-20 of the 2011 EFH.
- Hypothetical Residential Gardener: The hypothetical residential gardener receptor is modeled as a potential receptor in case the suburban resident receptor includes home gardening to grow fruits, vegetables, and grains for eating. As a health-conservative measure, all the consumed plants are assumed to be grown in soil containing each radionuclide at the 95 percent upper confidence limit (UCL_{95}) values, with no reduction from compost or other soil improvements often used in gardening.
- Recreational User: The recreational user is assumed to be an older child (6 through 14 years) who occasionally visits the subject property area. The recreational user is assumed to be onsite 2 hours per day, 26 days per year (once per week for 6 months), for 9 years (DOE 1993, USACE 2003).

The exposure pathways applicable to the radiological risk and dose assessment for the receptor scenarios are external gamma, soil ingestion, and inhalation of dust for all scenarios, with plant ingestion added for the hypothetical residential gardener scenario. Because groundwater is not a potential source of drinking water for the North St. Louis County Sites, the drinking water pathway is not considered a potential pathway for the properties (USACE 2005a). The final status conditions must be effective for 1,000 years per 40 *CFR* Part 192.02(a) to take into account the risks posed by long-lived radionuclides and the growth of decay products. This considers the period of time over which achievement of the cleanup standard must be reasonably assured. The non-default RESRAD-ONSITE input parameters for the receptor scenarios are presented in Table J-1. To conserve space in Table J-1, the suburban resident, hypothetical residential gardener, and recreational user scenarios have shortened titles of resident, gardener, and recreational, respectively.

Table J-1. RESRAD Non-Default Input Parameters

Parameter	Description	Values					Basis for Selected Values
		Student	Staff	Resident	Gardener	Recreational	
Area of Contaminated Zone	The area of soil assumed to have radioactivity at the exposure point concentrations (EPCs).	66,701 m^2					Land area of CWC-365 and CWC-386, including area under structures. A residential-size area of 2,000 m^2 would result in slightly lower risk and dose estimates.
Thickness of the Contaminated Zone	This is the thickness of the soil assumed to radioactivity at the EPCs.	0.3 m					From Table D-2 of Appendix D of the FS (USACE 2003) as the typical site-wide thickness of the soil lens containing radioactivity at the EPCs. No cover of pavement or clean soil is assumed as a health-conservative measure. The thickness of the contaminated zone is assumed to be 0.3 m as a health-conservative measure. A thickness of 0.15 m could be justified based on post-remediated and never-remediated conditions. In addition, the concept of a 0.15-m thick layer in the 40 *CFR* 192.12 ARAR could be applied to the thickness of soil represented by the EPCs. RESRAD-ONSITE evaluations that varied only the contamination zone thickness resulted in lower risk estimates using a 0.5-ft thickness.
Contaminated Zone Erosion Rate	The soil is assumed to erode at this rate.	0.00006 m/year					Selected in Table D-2 of Appendix D of the FS (USACE 2003) based on the following statement from the *Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil* (ANL 1993): "An erosion rate of 6×10-5 m/yr, leading to erosion of 0.06 m of soil in 1,000 yr, can be used for a site with a 2% slope if it can be reasonably shown that the farm/garden scenario is unreasonable; for example, if the site is, and will likely continue to be, unsuitable for agricultural use."
Evaluation Times	Various times for which calculated results are reported.	0, 1, 3, 6, 30, 100, 300, 1,000 years	0, 1, 3, 10, 25, 100, 300, 1,000 years	0, 1, 3, 10, 30, 100, 300, 1,000 years		0, 1, 3, 9, 30, 100, 300, 1,000 years	The times include the start and end of the exposure durations plus intermediate years with a focus on early years because those tend to have the higher risk and dose. The evaluation times continue to 1,000 years per 40 *CFR* Part 192.02(a).
Exposure Duration	The number of years a person could be onsite.	6 years	25 years	30 years		9 years	Student and Staff: Based on the scenario description. Resident, Gardener: Although the USEPA has published a new exposure duration of 26 years for the residential receptor (USEPA 2014), an exposure duration of 30 years was selected as a health-conservative measure and to ensure the final condition of the site is consistent with the objectives of the ROD selected remedy (i.e., risk to the residential receptor meets the ROD criteria for UUUE, which were based on 30 years of cumulative risk) (USACE 2005a). Recreational: Based on the scenario description.
Outdoor Time Fraction	The fraction of time spent onsite outdoors during the year.	0.0611	0.0903	0.103		0.00594	Student: Based on Table 16-20 of the 2011 EFH (USEPA 2011), outdoor time at school is 88 minutes/day. 88 minutes/day / 1,440 minutes/day = 0.061. Staff: Based on Table 16-20 of the 2011 EFH, outdoor time at school is 130 minutes/day. 130 minutes/day / 1,440 minutes/day = 0.0903. Resident, Gardener: An average, weighted by Exposure Durations, of the child and adult hours per day is calculated first: (3.26 hours/day * 6 years + 2.4 hours/day * 24 years) / 30 years = 2.57 hours/day. The indoor fraction is then calculated: (2.57 hours/day * 350 days/year) / 8,760 hours/year = 0.103. Recreational: Based on FS Table D-2 and the scenario description. (2 hours/day x 26 days/year) / (24 hours/day x 365 days/year) = 0.00594.
Indoor Time Fraction	The fraction of time spent onsite indoors during the year.	0.194	0.180	0.639		0	Student: From the previous row, the outdoor time for students is 88 minutes/day (rounded to 1.5 hours/day). $\frac{(11.5\ hours/day - 1.5\ hours/day)*170\ days}{8{,}760\ hours/year} = 0.194$ Staff: From the previous row, the outdoor time for staff is 130 minutes/day (rounded to 2.2 hours/day). $\frac{(8.5\ hours/day - 2.2\ hours/day)*250\ days}{8{,}760\ hours/year} = 0.180$ Resident, Gardener: An average, weighted by Exposure Durations, of the child and adult hours per day is calculated first: (16.7 hours/day * 6 years + 15.8 hours/day * 24 years) / 30 years = 16 hours/day. The indoor fraction is then calculated: (16 hours/day * 350 days/year) / 8,760 hours/year = 0.639. Recreational: All time onsite is spent outdoors.

Table J-1. RESRAD Non-Default Input Parameters (Continued)

Parameter	Description	Values					Basis for Selected Values
		Student	Staff	Resident	Gardener	Recreational	
Inhalation Rate	The average breathing rate while onsite.	4,380 m^3/year	5,840 m^3/year	5,402 m^3/year		4,891 m^3/year	Based on Table 6-1 of the 2011 EFH (USEPA 2011), inhalation rates follow. Student: 12 m^3/day. 12 m^3/day * 365 days = 4,380 m^3/year. Staff: 16 m^3/day. 16 m^3/day * 365 days = 5,840 m^3/year. Suburban Resident: For a child ages 0 to 6, the assumed rate is 10.1 m^3/day. Weighted breathing rates are (10.1 m^3/day x 6 years + 16 m^3/day x 24 years) / 30 years = 14.8 m^3/day. The breathing rate from ages 0 to 6 ranges from 3.5 to 10.1 m^3/day, so using the highest rate is health-conservative. 14.8 m^3/day x 365 day/year = 5,402 m^3/year. Recreational: The rate is 12 m^3/day for a child ages 6 to 11 and 15.2 m^3/day for a child ages 11 to 14. Weighted breathing rates are (12 m^3/day x 5 years + 15.2 m^3/day x 4 years) / 9 years = 13.4 m^3/day. For a year, 13.4 m^3/day x 365 days/year = 4,891 m^3/year.
Indoor Dust Filtration Factor	Ratio of indoor airborne particulates to outdoor airborne particulates.	0.4				1	Student, Staff, Resident, Gardener: The RESRAD-ONSITE default value of 0.4 is selected. Recreational: The selected value of 1 is based on this scenario occurring only outdoors.
External Gamma Shielding Factor	Fraction of gamma radiation from outdoors that remains after shielding provided by the building.	0.4					Based on Section 2.4.1 of *the Soil Screening Guidance for Radionuclides: Technical Background Document* (USEPA 2000).
Soil Ingestion	The yearly amount of soil or dust entering the body through the mouth.	73.0 g/year	36.5 g/year	43.8 g/year		60.8 g/year	Based on Table 5-1 of the *Update for Chapter 5 of the Exposure Factors Handbook: Soil and Dust Ingestion* (2017 EFH) (USEPA 2017), combined soil and dust ingestion rates follow. Student: 200 mg/day. 200 mg/day x (1 g/1,000 mg) x 365 days/year = 73.0 g/year. Staff: 100 mg/day. 100 mg/day x (1 g/1,000 mg) x 365 days/year = 36.5 g/year. Resident, Gardener: ([200 mg/day x 6 years] + [100 mg/day x 24 years]) x (1 g/1,000 mg) x (365 days/year) / 30 years = 43.8 g/year. Recreational: ([200 mg/day x 6 years] + [100 mg/day x 3 years]) x (1 g/1,000 mg) x (365 days/year) / 9 years = 60.8 g/year. Table 5-1 of the 2017 EFH identifies soil and dust ingestion rates of 100 and 200 mg/day for the ages of 0 to 12, and 100 mg/day for ages of 12 through adulthood. These are upper percentile rates; central tendency rates are 40 to 90 for ages 0 to 12 and 30 for ages of 12 through adulthood. Using the higher values is health-conservative. In addition, the residential ingestion rate of 43.8 g per year is slightly health-conservative compared to the value used on the USEPA radiological preliminary remediation goals website (i.e., 1,120 g per 26 years, or 43.1 g per year) (USEPA 2020).
Fruit, Vegetable, and Grain Ingestion Rate	The yearly amount of these foods grown onsite and eaten by the gardener.	Not Applicable			42.7 kg/year	Not Applicable	The consumed mass of fruits, vegetables, and grains and mass of leafy vegetables are obtained from Equation 5 of *Soil Screening Guidance for Radionuclides: User's Guide* (USEPA 2000). These values are health conservative because the age-weighted average ingestion rate is 20.2 kg per year for combined fruits and vegetables used values in Tables 8-1 and 13-1 of the 2011 EFH (USEPA 2017).
Leafy Vegetable Ingestion Rate		Not Applicable			4.66 kg/year	Not Applicable	
Dose Conversion Factors, Risk Slope Factors	Library of multiplication factors that convert other input parameters into risk and dose estimates	Dose: DCFPAK3.02 (Age 5) Risk: DCFPAK3.02 Morbidity	Dose: DCFPAK3.02 (Adult) Risk: DCFPAK3.02 Morbidity	Dose: DCFPAK3.02 (Age 10) Risk: DCFPAK3.02 Morbidity		Dose: DCFPAK3.02 (Age 10) Risk: DCFPAK3.02 Morbidity	All: DCFPAK 3.02 Morbidity reflects the most recent collection of risk multiplication factors for cancer occurring but not necessarily leading to death. Student: DCFPAK 3.02 (Age 5) is for children at age 5. The factors for age 5 result in a higher risk and dose than the factors for age 10. Staff: DCFPAK 3.02 (Adult) is for adults. Resident, Gardener: DCFPAK 3.02 (Age 10) is for children at age 10. This age is selected to represent weighted factors for children at ages 0 to 6 and 24 years as an adult. Recreational: DCFPAK 3.02 (Age 10) is for children at age 10. This age is selected to represent the age range of 6 to 14.
Radionuclide Transformations	Library of radionuclide decay information.	ICRP 107					International Commission on Radiological Protection (ICRP) 107 (ICRP 2008). Most recent collection of radionuclide decay chain and energy data.
Cut-Off Half Life	Decay progeny with this half-life or less are automatically included in the calculation.	180 days					Selected so polonium-210, with its 138-day half-life, is assumed to be in secular equilibrium with lead-210.

DETERMINATION OF RADIONUCLIDE EXPOSURE POINT CONCENTRATIONS

Risk and dose for CWC-365 and CWC-386 are determined by developing a source term and applying that source term to the receptor scenarios using RESRAD-ONSITE. The source terms are based upon exposure point concentrations (EPCs) calculated from the FSSE data. EPCs for applicable COCs are independently calculated for both GWS-based and non-GWS-based soil sample stations. According to the *Risk Assessment Guidance for Superfund: Volume 1 – Human Health Evaluation Manual (Part A)* (RAGS Part A) (USEPA 1989), purposive sampling (e.g., GWS-based sampling) should not be used to provide defensible information for a risk assessment. As a health-conservative measure, instead of eliminating the potentially higher GWS-based sample results as recommended by USEPA guidance, the non-GWS sample results and GWS-based sample results are area-weighted to calculate the EPC for input to RESRAD-ONSITE. Area weighting of the two groups of soil sample results is conducted to ensure that GWS-based sampling does not cause the true average concentration term to be misrepresented.

For this analysis, GWS-based soil samples are those samples collected based on increased readings during the GWS that may be due to environmental contamination in the soil or due to greater amounts of naturally occurring radioactivity in the soil. During the GWS for CWC-365 and CWC-386, GWS-based soil samples were assigned areas based on the estimated area exhibiting increased readings. Non-GWS-based samples include the remaining surface and subsurface soil samples that are not grouped as GWS-based samples. The following discussion summarizes the process for calculating each COC's EPC.

- The non-GWS-based soil sample results for each radiological COC are entered into the USEPA-designed software ProUCL Version 5.2 to calculate the UCL_{95} of the arithmetic mean. The $EPC_{non\text{-}GWS}$ for each radiological COC is calculated by subtracting the average reference area background concentration from the smaller of its UCL_{95} result or its maximum detection concentration. Using the average background radionuclide concentrations in calculating the EPC values is health-conservative. Traditional statistical analysis calls for using the UCL_{95} values for both the subject area data and the reference area background data. Because average values are less than UCL_{95} values, the EPCs using average values are larger.
- Because accurate UCL_{95} statistics cannot be computed with a small dataset (only three values in this case), EPC_{GWS} values are estimated by subtracting the average background concentration from the maximum concentration for each radionuclide.
- The areas represented by the GWS-based soil sample results are summed. The total area represented by the non-GWS-based soil samples is calculated by subtracting the total GWS-based soil sample area from the total area of all the SUs. Next, these areas are used to calculate a weighted average of the EPC_{GWS} and $EPC_{non\text{-}GWS}$ values as the final EPC values.
- Because the soil sample analytical results did not include COCs Pb-210 and U-234, the EPCs for these radionuclides are estimated from established ratios to other radionuclides for which an EPC is calculated. From Table 2.15 of the BRA, the ratio of Pb-210 to Ra-226 is 2.4, and the ratio of U-234 to U-238 is 1.0 (DOE 1993, USACE 2003).

The EPCs calculated for CWC-365 and CWC-386 are provided in Table J-2. EPC calculations (including ProUCL output files) are included as Attachment J-1.

Table J-2. Radionuclide Exposure Point Concentrations using Average Background Values

	Area (m^2)	Statistic	Radionuclide Concentration (pCi/g)										
			Ac-227	**Pa-231**	**Pb-210[a]**	**Ra-226**	**Ra-228**	**Th-228**	**Th-230**	**Th-232**	**U-234[a]**	**U-235**	**U-238**
Non-GWS-Based Samples	66,698	Average Background[b]	0.21	0.20	-	1.05	0.98	1.18	1.66	1.11	-	0.06	1.18
		Maximum	0.51	1.44	-	2.05	1.12	2.25	3.19	1.66	-	0.66	1.70
		Distribution	X	N	-	X	X	N	N	N	-	N	N
		UCL_{95}	-0.15	-0.02	-	1.17	0.87	1.21	1.68	1.06	-	0.06	1.06
		$EPC_{non-GWS}$	0.00	0.00	-	0.12	0.00	0.03	0.02	0.00	-	0.00	0.00
GWS-Based Samples	3	Average Background[b]	0.21	0.20	-	1.05	0.98	1.18	1.66	1.11	-	0.06	1.18
		Maximum	0.15	-0.21	-	1.04	0.84	1.41	2.14	1.23	-	0.06	1.08
		EPC_{GWS}[c]	0.00	0.00	-	0.00	0.00	0.23	0.48	0.12	-	0.00	0.00
Total Area	66,701	EPC	**0.00**	**0.00**	**0.29**	**0.12**	**0.00**	**0.03**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**

[a] EPCs are determined based on the relationship presented in Table 2.15 of the BRA (DOE 1993): Pb-210 = 2.4 x Ra-226, U-234 = U-238.

[b] Average background soil concentrations are taken from Appendix D, Attachment 1, of the FS (USACE 2003) and are reproduced in Attachment J-1.

[c] GWS-based EPCs are estimated by subtracting the average background concentration from the maximum detected concentration for each radionuclide, because the GWS-based dataset is too small to accurately calculate UCL_{95} values or determine a statistical distribution.

Notes:

- indicates not applicable.

Distribution: N = Normal, X = Non-Parametric

RADIOLOGICAL RISK AND DOSE ASSESSMENT RESULTS

The radiological risk and dose in a 1,000-year period to the suburban resident, hypothetical residential gardener, and recreational user receptor scenarios from exposure to the radionuclides present at CWC-365 and CWC-386, without cover in place, is summarized in Table J-3 and shown on Figures J-1 and J-2. When compared to the CERCLA risk range and benchmark dose criteria, the results of this risk and dose assessment confirm that the investigated soil at CWC-365 and CWC-386 is protective of human health and the environment and meets the criteria for UUUE. RESRAD-ONSITE output files for all modeled scenarios are included as Attachment J-2.

Table J-3. Results of Risk and Dose Assessment

Receptor	Year of Highest Estimate	Highest Risk[a]	Highest Dose (mrem/year)
Student	0	9.4×10^{-7}	0.3
Staff		3.5×10^{-6}	0.2
Suburban Resident (UUUE)[b]		9.1×10^{-6}	0.7
Hypothetical Residential Gardener (Informational)		1.1×10^{-5}	1.2
Recreational User		5.4×10^{-8}	0.01

[a] Maximum risk assumes the worst-case scenario such that receptors would be in direct contact with soil, without regard to any clean cover. When estimating cancer risk, predictions indicated a lifetime risk level for an exposed individual and how many additional cancer cases might occur in a population of exposed people (i.e., 1×10^{-6} is equal to one additional case in a population of one million). These cancers may or may not occur, but should they occur, they would be in addition to cancers from other causes, such as smoking tobacco or obesity.

[b] Scenario established in the ROD for determining whether risk and dose meet the criteria for UUUE for the North St. Louis County Sites.

Radiological risk and dose estimates for the suburban resident from surfaces of structures on CWC-365 and CWC-386 were separately estimated to be 1.4×10^{-5} and 2.7 mrem per year, respectively (USACE 2023a). Because these risk and dose estimates associated with soil and structures could be additive, cumulative risk and dose estimates for the suburban resident scenario for both the structure surfaces and the soil would not exceed 2.3×10^{-5} and 3.4 mrem per year, respectively.

APPENDIX J

FIGURES

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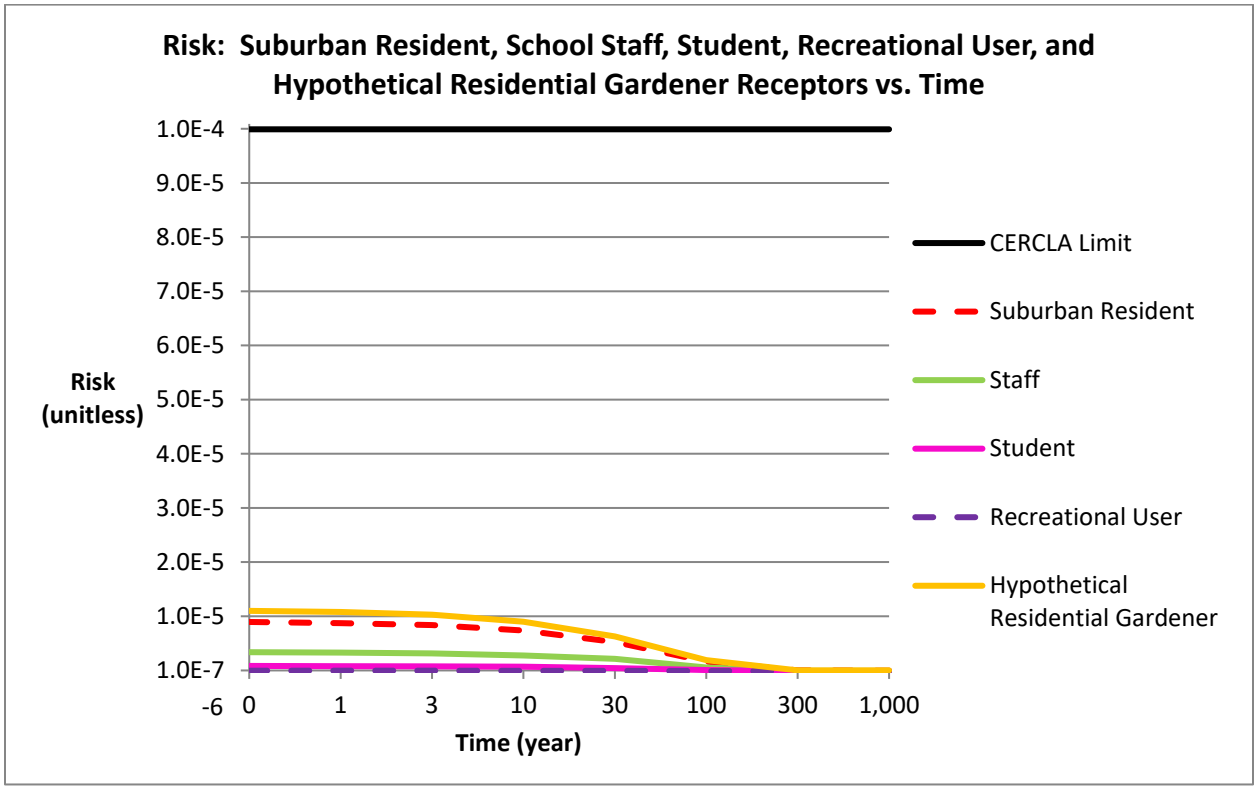

Figure J-1. Risk: Suburban Resident, School Staff, Student, Recreational User, and Hypothetical Residential Gardner Receptors vs. Time

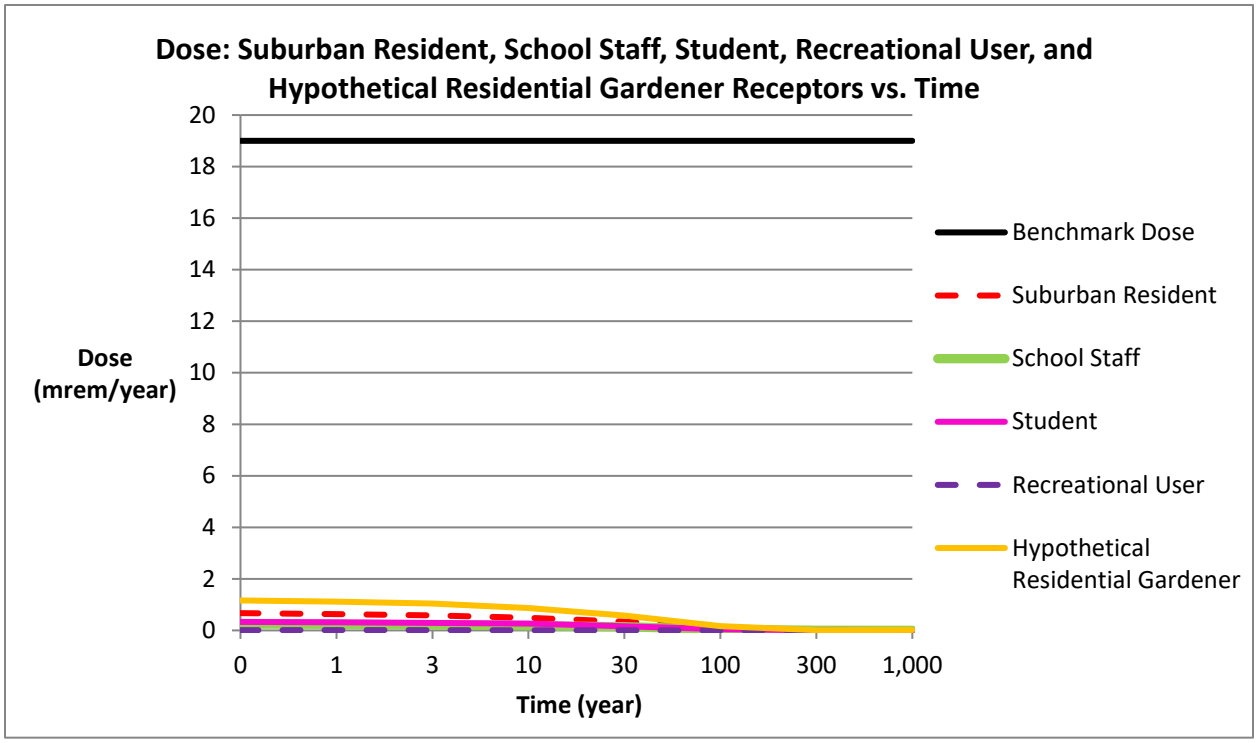

Figure J-2. Dose: Suburban Resident, School Staff, Student, Recreational User, and Hypothetical Residential Gardener Receptors vs. Time

ATTACHMENT J-1

EPC CALCULATIONS AND ProUCL OUTPUT FILES

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Determination of Exposure Point Concentration for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial)

SU	Area (m^2)	Statistic	Ac-227	Pa-231	Pb-210[a]	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-234[a]	U-235	U-238
			(pCi/g)										
Non-GWS-Based Samples	66,698	Background[b]	0.21	0.20	-	1.05	0.98	1.18	1.66	1.11	-	0.06	1.18
		Maximum	0.51	1.44	-	2.05	1.12	2.25	3.19	1.66	-	0.66	1.70
		Distribution[c]	X	N	-	X	X	N	N	N	-	N	N
		UCL_{95}	-0.15	-0.02	-	1.17	0.87	1.21	1.68	1.06	-	0.06	1.06
		EPC	0.00	0.00	-	0.12	0.00	0.03	0.02	0.00	-	0.00	0.00
GWS-Based Samples	3	Background[b]	0.21	0.20	-	1.05	0.98	1.18	1.66	1.11	-	0.06	1.18
		Maximum	0.15	-0.21	-	1.04	0.84	1.41	2.14	1.23	-	0.06	1.08
		EPC[d]	0.00	0.00	-	0.00	0.00	0.23	0.48	0.12	-	0.00	0.00
Combined Area	66,701	**EPC**	**0.00**	**0.00**	**0.29**	**0.12**	**0.00**	**0.03**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**

[a] EPC value is determined by the relationship established in Table D-2 of Appendix D of the FS (USACE 2003).

[b] Background soil concentrations are taken from Attachment 1 to Appendix D of the FS (USACE 2003) (reproduced in the following table).

[c] Distribution: N = Normal, X = Non-Parametric.

[d] GWS-based EPCs are estimated by subtracting the average background concentration from the maximum detected concentration for each radionuclide, because the GWS-based dataset is too small to accurately calculate UCL_{95} values or determine a statistical distribution.

Note: - indicates not applicable.

Soil Background Summary[a]

Analyte	Units	Frequency of Detect	Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Average Result	Standard Deviation	Distribution[b]	99th Percentile	Parametric UTL_{95}	Nonparametric UTL_{95}	Background Criteria[c]
Ac-227	pCi/g	17/74	-0.16	0.62	0.15	0.82	0.21	0.23	D	0.82	-	0.82	0.82
Cs-137	pCi/g	37/74	-0.02	0.02	0.05	0.57	0.16	0.18	X	0.57	-	0.57	0.57
Pa-231	pCi/g	2/17	-0.49	2.17	1.06	1.13	0.20	0.42	D	2.17	-	2.17	1.13
K-40	pCi/g	63/74	12.31	14.70	12.73	17.28	14.60	1.09	N	17.28	16.80	17.28	16.8
Ra-226	pCi/g	74/74	-	-	0.56	1.55	1.05	0.27	X	1.55	-	1.55	1.55
Ra-228	pCi/g	74/74	-	-	0.72	1.24	0.98	0.13	L	1.24	1.27	1.24	1.24
Th-228	pCi/g	74/74	-	-	0.63	2.15	1.18	0.35	L	2.15	2.04	2.15	2.04
Th-230	pCi/g	74/74	-	-	0.94	2.89	1.66	0.49	X	2.89	-	2.89	2.89
Th-232	pCi/g	74/74	-	-	0.53	1.96	1.11	0.35	N	1.96	1.83	1.96	1.83
U-234	pCi/g	49/50	0.40	0.40	0.45	3.53	1.13	0.47	L	3.53	2.22	3.53	2.22
U-235	pCi/g	2/74	-0.06	0.22	0.22	0.25	0.06	0.07	D	0.25	-	0.25	0.25
U-238	pCi/g	50/74	0.66	1.72	0.65	2.04	1.18	0.33	L	2.04	2.02	2.04	2.02

[a] This information is reproduced from Attachment 1 to Appendix D of the FS (USACE 2003).

[b] Distribution: L = Lognormal; N = Normal; X = Non-Parametric; D = Not Determined because fewer than 5 detects or less than 50 percent detects; D and X do not have parametric results.

[c] Background criteria was assigned as 0.0 for analytes never detected in background.

Notes:

- indicates not applicable.

UTL_{95} - 95 percent upper tolerance limit

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.2 12/9/2022 7:33:36 AM
From File	ProUCL input_Jana Parcels Non-GWS Soil Samples.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Ac-227

General Statistics

Total Number of Observations	503	Number of Distinct Observations	440
		Number of Missing Observations	0
Minimum	-2.35	Mean	-0.251
Maximum	0.507	Median	-0.0082
SD	0.547	Std. Error of Mean	0.0244
Coefficient of Variation	-2.18	Skewness	-1.786

Normal GOF Test

Shapiro Wilk Test Statistic	0.673	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.355	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.0461	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	-0.211	95% Adjusted-CLT UCL (Chen-1995)	-0.213
		95% Modified-t UCL (Johnson-1978)	-0.211

Gamma Statistics Not Available

Lognormal Statistics Not Available

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	-0.211	95% BCA Bootstrap UCL	-0.212
95% Standard Bootstrap UCL	-0.21	95% Bootstrap-t UCL	-0.212
95% Hall's Bootstrap UCL	-0.212	95% Percentile Bootstrap UCL	-0.212
90% Chebyshev(Mean, Sd) UCL	-0.178	95% Chebyshev(Mean, Sd) UCL	-0.145
97.5% Chebyshev(Mean, Sd) UCL	-0.0986	99% Chebyshev(Mean, Sd) UCL	-0.00822

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Suggested UCL to Use

95% Student's-t UCL -0.211

User Identified Distribution: X **User Selected UCL:** 95% Chebyshev(Mean, Sd) UCL -0.15

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Pa-231

General Statistics

Total Number of Observations	503	Number of Distinct Observations	430
		Number of Missing Observations	0
Minimum	-1.44	Mean	-0.0421
Maximum	1.44	Median	-0.0412
SD	0.342	Std. Error of Mean	0.0153
Coefficient of Variation	-8.132	Skewness	-0.19

Normal GOF Test

Shapiro Wilk Test Statistic	0.986	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0.559	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.0485	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0461	Data Not Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	-0.0169	95% Adjusted-CLT UCL (Chen-1995)	-0.0171
		95% Modified-t UCL (Johnson-1978)	-0.017

Gamma Statistics Not Available

Lognormal Statistics Not Available

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	-0.017	95% BCA Bootstrap UCL	-0.017
95% Standard Bootstrap UCL	-0.0167	95% Bootstrap-t UCL	-0.018
95% Hall's Bootstrap UCL	-0.0179	95% Percentile Bootstrap UCL	-0.0157
90% Chebyshev(Mean, Sd) UCL	0.0037	95% Chebyshev(Mean, Sd) UCL	0.0244
97.5% Chebyshev(Mean, Sd) UCL	0.0532	99% Chebyshev(Mean, Sd) UCL	0.11

Suggested UCL to Use

95% Student's-t UCL -0.0169

User Identified Distribution: N **User Selected UCL:** 95% Student's-t UCL -0.02

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Ra-226

General Statistics

Total Number of Observations	503	Number of Distinct Observations	164
		Number of Missing Observations	0
Minimum	0.618	Mean	1.128
Maximum	2.05	Median	1.09
SD	0.201	Std. Error of Mean	0.00896
Coefficient of Variation	0.178	Skewness	1.071

Normal GOF Test

Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.0876	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0461	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.142	95% Adjusted-CLT UCL (Chen-1995)	1.143
		95% Modified-t UCL (Johnson-1978)	1.143

Gamma GOF Test

A-D Test Statistic	2.655	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0673	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.0403	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	33.86	k star (bias corrected MLE)	33.66
Theta hat (MLE)	0.0333	Theta star (bias corrected MLE)	0.0335
nu hat (MLE)	34066	nu star (bias corrected)	33864
MLE Mean (bias corrected)	1.128	MLE Sd (bias corrected)	0.194
		Approximate Chi Square Value (0.05)	33438
Adjusted Level of Significance	0.0495	Adjusted Chi Square Value	33436

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.142	95% Adjusted Gamma UCL	1.142

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.0434	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0562	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.0365	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.481	Mean of logged Data	0.105
Maximum of Logged Data	0.718	SD of logged Data	0.17

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Assuming Lognormal Distribution

95% H-UCL	1.142	90% Chebyshev (MVUE) UCL	1.153
95% Chebyshev (MVUE) UCL	1.165	97.5% Chebyshev (MVUE) UCL	1.181
99% Chebyshev (MVUE) UCL	1.213		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.142	95% BCA Bootstrap UCL	1.143
95% Standard Bootstrap UCL	1.143	95% Bootstrap-t UCL	1.143
95% Hall's Bootstrap UCL	1.143	95% Percentile Bootstrap UCL	1.142
90% Chebyshev(Mean, Sd) UCL	1.155	95% Chebyshev(Mean, Sd) UCL	1.167
97.5% Chebyshev(Mean, Sd) UCL	1.184	99% Chebyshev(Mean, Sd) UCL	1.217

Suggested UCL to Use

95% Student's-t UCL 1.142

User Identified Distribution: X **User Selected UCL:** 95% Chebyshev(Mean, Sd) UCL 1.17

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Ra-228

General Statistics

Total Number of Observations	503	Number of Distinct Observations	266
		Number of Missing Observations	0
Minimum	0.0721	Mean	0.843
Maximum	1.12	Median	0.852
SD	0.125	Std. Error of Mean	0.00558
Coefficient of Variation	0.148	Skewness	-2.379

Normal GOF Test

Shapiro Wilk Test Statistic	0.829	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.0974	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0461	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.852	95% Adjusted-CLT UCL (Chen-1995)	0.851
		95% Modified-t UCL (Johnson-1978)	0.852

Gamma GOF Test

A-D Test Statistic	33.42	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.172	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.0403	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	25.72	k star (bias corrected MLE)	25.56
Theta hat (MLE)	0.0328	Theta star (bias corrected MLE)	0.033
nu hat (MLE)	25869	nu star (bias corrected)	25717
MLE Mean (bias corrected)	0.843	MLE Sd (bias corrected)	0.167
		Approximate Chi Square Value (0.05)	25345
Adjusted Level of Significance	0.0495	Adjusted Chi Square Value	25344

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.855	95% Adjusted Gamma UCL	0.855

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.527	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.212	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.0365	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.63	Mean of logged Data	-0.191
Maximum of Logged Data	0.113	SD of logged Data	0.241

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Assuming Lognormal Distribution

95% H-UCL	0.866	90% Chebyshev (MVUE) UCL	0.879
95% Chebyshev (MVUE) UCL	0.891	97.5% Chebyshev (MVUE) UCL	0.909
99% Chebyshev (MVUE) UCL	0.943		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.852	95% BCA Bootstrap UCL	0.851
95% Standard Bootstrap UCL	0.852	95% Bootstrap-t UCL	0.851
95% Hall's Bootstrap UCL	0.851	95% Percentile Bootstrap UCL	0.852
90% Chebyshev(Mean, Sd) UCL	0.86	95% Chebyshev(Mean, Sd) UCL	0.867
97.5% Chebyshev(Mean, Sd) UCL	0.878	99% Chebyshev(Mean, Sd) UCL	0.898

Suggested UCL to Use

95% Student's-t UCL 0.852

User Identified Distribution: X **User Selected UCL:** 95% Chebyshev(Mean, Sd) UCL 0.87

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Th-228

General Statistics

Total Number of Observations	503	Number of Distinct Observations	159
		Number of Missing Observations	0
Minimum	0.163	Mean	1.191
Maximum	2.25	Median	1.2
SD	0.258	Std. Error of Mean	0.0115
Coefficient of Variation	0.217	Skewness	-0.0777

Normal GOF Test

Shapiro Wilk Test Statistic	0.982	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0.173	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.0444	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0461	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.21	95% Adjusted-CLT UCL (Chen-1995)	1.21
		95% Modified-t UCL (Johnson-1978)	1.21

Gamma GOF Test

A-D Test Statistic	5.057	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0799	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.0403	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	17.94	k star (bias corrected MLE)	17.83
Theta hat (MLE)	0.0664	Theta star (bias corrected MLE)	0.0668
nu hat (MLE)	18046	nu star (bias corrected)	17940
MLE Mean (bias corrected)	1.191	MLE Sd (bias corrected)	0.282
		Approximate Chi Square Value (0.05)	17630
Adjusted Level of Significance	0.0495	Adjusted Chi Square Value	17629

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.212	95% Adjusted Gamma UCL	1.212

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.869	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.1	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.0365	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.814	Mean of logged Data	0.147
Maximum of Logged Data	0.811	SD of logged Data	0.257

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Assuming Lognormal Distribution

95% H-UCL	1.22	90% Chebyshev (MVUE) UCL	1.239
95% Chebyshev (MVUE) UCL	1.258	97.5% Chebyshev (MVUE) UCL	1.284
99% Chebyshev (MVUE) UCL	1.335		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.21	95% BCA Bootstrap UCL	1.208
95% Standard Bootstrap UCL	1.21	95% Bootstrap-t UCL	1.211
95% Hall's Bootstrap UCL	1.211	95% Percentile Bootstrap UCL	1.209
90% Chebyshev(Mean, Sd) UCL	1.226	95% Chebyshev(Mean, Sd) UCL	1.241
97.5% Chebyshev(Mean, Sd) UCL	1.263	99% Chebyshev(Mean, Sd) UCL	1.306

Suggested UCL to Use

95% Student's-t UCL 1.21

User Identified Distribution: N **User Selected UCL:** 95% Student's-t UCL 1.21

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Th-230

General Statistics

Total Number of Observations	503	Number of Distinct Observations	153
		Number of Missing Observations	0
Minimum	0.688	Mean	1.652
Maximum	3.19	Median	1.62
SD	0.372	Std. Error of Mean	0.0166
Coefficient of Variation	0.225	Skewness	0.487

Normal GOF Test

Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0.0343	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.043	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0461	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.679	95% Adjusted-CLT UCL (Chen-1995)	1.679
		95% Modified-t UCL (Johnson-1978)	1.679

Gamma GOF Test

A-D Test Statistic	0.265	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0241	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.0403	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	19.65	k star (bias corrected MLE)	19.53
Theta hat (MLE)	0.0841	Theta star (bias corrected MLE)	0.0846
nu hat (MLE)	19768	nu star (bias corrected)	19651
MLE Mean (bias corrected)	1.652	MLE Sd (bias corrected)	0.374
		Approximate Chi Square Value (0.05)	19326
Adjusted Level of Significance	0.0495	Adjusted Chi Square Value	19325

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.68	95% Adjusted Gamma UCL	1.68

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.984	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.413	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0359	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.0365	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.374	Mean of logged Data	0.476
Maximum of Logged Data	1.16	SD of logged Data	0.229

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Assuming Lognormal Distribution

95% H-UCL	1.682	90% Chebyshev (MVUE) UCL	1.704
95% Chebyshev (MVUE) UCL	1.727	97.5% Chebyshev (MVUE) UCL	1.76
99% Chebyshev (MVUE) UCL	1.823		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.679	95% BCA Bootstrap UCL	1.679
95% Standard Bootstrap UCL	1.679	95% Bootstrap-t UCL	1.679
95% Hall's Bootstrap UCL	1.679	95% Percentile Bootstrap UCL	1.679
90% Chebyshev(Mean, Sd) UCL	1.702	95% Chebyshev(Mean, Sd) UCL	1.724
97.5% Chebyshev(Mean, Sd) UCL	1.755	99% Chebyshev(Mean, Sd) UCL	1.817

Suggested UCL to Use

95% Student's-t UCL 1.679

User Identified Distribution: N **User Selected UCL:** 95% Student's-t UCL 1.68

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Th-232

General Statistics

Total Number of Observations	503	Number of Distinct Observations	229
		Number of Missing Observations	0
Minimum	0.0565	Mean	1.042
Maximum	1.66	Median	1.05
SD	0.239	Std. Error of Mean	0.0106
Coefficient of Variation	0.229	Skewness	-0.356

Normal GOF Test

Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	1.5672E-4	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.0403	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0461	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.06	95% Adjusted-CLT UCL (Chen-1995)	1.059
		95% Modified-t UCL (Johnson-1978)	1.059

Gamma GOF Test

A-D Test Statistic	7.5	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0764	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.0403	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	14.32	k star (bias corrected MLE)	14.24
Theta hat (MLE)	0.0728	Theta star (bias corrected MLE)	0.0732
nu hat (MLE)	14406	nu star (bias corrected)	14321
MLE Mean (bias corrected)	1.042	MLE Sd (bias corrected)	0.276
		Approximate Chi Square Value (0.05)	14044
Adjusted Level of Significance	0.0495	Adjusted Chi Square Value	14043

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.063	95% Adjusted Gamma UCL	1.063

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.785	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.11	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.0365	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.874	Mean of logged Data	0.00579
Maximum of Logged Data	0.507	SD of logged Data	0.303

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

Assuming Lognormal Distribution

95% H-UCL	1.078	90% Chebyshev (MVUE) UCL	1.097
95% Chebyshev (MVUE) UCL	1.117	97.5% Chebyshev (MVUE) UCL	1.144
99% Chebyshev (MVUE) UCL	1.198		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.059	95% BCA Bootstrap UCL	1.059
95% Standard Bootstrap UCL	1.06	95% Bootstrap-t UCL	1.06
95% Hall's Bootstrap UCL	1.06	95% Percentile Bootstrap UCL	1.059
90% Chebyshev(Mean, Sd) UCL	1.074	95% Chebyshev(Mean, Sd) UCL	1.088
97.5% Chebyshev(Mean, Sd) UCL	1.108	99% Chebyshev(Mean, Sd) UCL	1.148

Suggested UCL to Use

95% Student's-t UCL 1.06

User Identified Distribution: N **User Selected UCL:** 95% Student's-t UCL 1.06

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial)
Non-GWS-Based Soil Samples

U-235

General Statistics

Total Number of Observations	503	Number of Distinct Observations	421
		Number of Missing Observations	0
Minimum	-0.287	Mean	0.0518
Maximum	0.66	Median	0.0479
SD	0.108	Std. Error of Mean	0.0048
Coefficient of Variation	2.079	Skewness	0.559

Normal GOF Test

Shapiro Wilk Test Statistic	0.983	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0.245	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.0394	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0461	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.0597	95% Adjusted-CLT UCL (Chen-1995)	0.0598
		95% Modified-t UCL (Johnson-1978)	0.0597

Gamma Statistics Not Available

Lognormal Statistics Not Available

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0597	95% BCA Bootstrap UCL	0.0599
95% Standard Bootstrap UCL	0.0598	95% Bootstrap-t UCL	0.06
95% Hall's Bootstrap UCL	0.06	95% Percentile Bootstrap UCL	0.0599
90% Chebyshev(Mean, Sd) UCL	0.0662	95% Chebyshev(Mean, Sd) UCL	0.0727
97.5% Chebyshev(Mean, Sd) UCL	0.0818	99% Chebyshev(Mean, Sd) UCL	0.0995

Suggested UCL to Use

95% Student's-t UCL 0.0597

User Identified Distribution: N **User Selected UCL:** 95% Student's-t UCL 0.06

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Results of Pro-UCL Run for Jana Elementary School Soil: CWC-365 and CWC-386 (Partial) Non-GWS-Based Soil Samples

U-238

General Statistics

Total Number of Observations	503	Number of Distinct Observations	193
		Number of Missing Observations	0
Minimum	-0.275	Mean	1.046
Maximum	1.7	Median	1.05
SD	0.185	Std. Error of Mean	0.00825
Coefficient of Variation	0.177	Skewness	-0.887

Normal GOF Test

Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	1.5194E-4	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.0449	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.0461	Data appear Normal at 1% Significance Level	

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.06	95% Adjusted-CLT UCL (Chen-1995)	1.06
		95% Modified-t UCL (Johnson-1978)	1.06

Gamma Statistics Not Available

Lognormal Statistics Not Available

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.06	95% BCA Bootstrap UCL	1.058
95% Standard Bootstrap UCL	1.06	95% Bootstrap-t UCL	1.059
95% Hall's Bootstrap UCL	1.06	95% Percentile Bootstrap UCL	1.059
90% Chebyshev(Mean, Sd) UCL	1.071	95% Chebyshev(Mean, Sd) UCL	1.082
97.5% Chebyshev(Mean, Sd) UCL	1.098	99% Chebyshev(Mean, Sd) UCL	1.128

Suggested UCL to Use

95% Student's-t UCL 1.06

User Identified Distribution: N **User Selected UCL:** 95% Student's-t UCL 1.06

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Determination of Exposure Point Concentration for Jana Elementary School Soil:
CWC-365 and CWC-386 (Partial)
Non-GWS-Based Soil Samples

Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
	(pCi/g)								
Background	0.21	0.20	1.05	0.98	1.18	1.66	1.11	0.06	1.18
Maximum	0.51	1.44	2.05	1.12	2.25	3.19	1.66	0.66	1.70
Distribution	X	N	X	X	N	N	N	N	N
UCL_{95}[a]	-0.15	-0.02	1.17	0.87	1.21	1.68	1.06	0.06	1.06
EPC	0.00	0.00	0.12	0.00	0.03	0.02	0.00	0.00	0.00

[a] From the non-GWS-based ProUCL output results for each radionuclide.

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP190125	SVP190125	-0.45	0.61	1.19	0.75	1.32	1.82	1.01	0.12	1.06
SVP190125	SVP190126	-0.9	-0.09	1.20	0.77	1.10	1.77	1.11	0.02	0.91
SVP190125	SVP190127	-0.47	-0.04	1.19	0.82	0.78	1.30	0.89	0.13	0.85
SVP190125	SVP190128	-1.5	-0.07	1.17	0.80	0.95	1.71	0.99	0.09	1.07
SVP190129	SVP190129	-1.17	0.05	1.31	0.91	0.98	1.11	1.17	0.05	1.21
SVP190129	SVP190130	-0.93	0.38	1.33	0.90	0.96	1.67	1.15	0.12	1.05
SVP190129	SVP190131	-0.90	-0.21	1.44	0.99	0.68	1.62	0.87	0.21	1.17
SVP190129	SVP190132	-0.87	-0.47	1.35	0.92	0.89	1.53	0.68	-0.05	1.06
SVP190139	SVP190139	-1.06	-0.7	1.38	0.73	1.15	1.48	0.96	0.30	1.22
SVP190139	SVP190140	-1.02	0.4	1.55	0.71	1.52	2.66	0.71	-0.06	0.95
SVP190139	SVP190141	-0.84	-0.5	1.39	0.50	1.30	2.77	1.07	0.06	0.80
SVP190143	SVP190143	-1.0	0.63	1.29	0.87	1.91	2.31	0.79	0.28	1.21
SVP190143	SVP190144	-1.41	0.03	1.34	0.85	1.85	1.59	1.41	-0.05	1.18
SVP190145	SVP190145	-1.00	-0.2	1.36	0.84	1.20	1.49	0.74	-0.05	1.45
SVP190145	SVP190146	-1.0	0.32	1.36	0.90	1.24	1.70	0.85	0.02	1.45
SVP190147	SVP190147	-1.20	0.57	1.30	0.77	1.34	1.88	1.07	0.08	0.94
SVP190147	SVP190148	-1.25	-0.3	1.35	0.86	0.93	1.16	0.80	-0.20	0.89
SVP190147	SVP211095	-1.31	-0.17	1.44	0.93	1.57	1.92	1.08	-0.02	1.08
SVP190147	SVP211096	-1.19	1.44	1.52	0.88	1.13	1.59	1.22	0.23	0.65
SVP190147	SVP211097	-1.20	0.86	1.53	0.86	1.15	1.35	1.17	-0.02	1.08
SVP190149	SVP190149	-0.35	0.05	1.25	0.77	1.19	1.72	1.14	0.24	0.88
SVP190149	SVP190150	-0.99	0.02	1.23	0.84	1.10	1.25	1.07	-0.20	1.23
SVP190149	SVP190151	-1.44	-0.18	1.34	0.92	0.80	1.41	1.16	-0.15	1.28
SVP190149	SVP190152	-1.16	-0.18	1.40	0.98	1.34	1.44	1.03	0.14	1.28
SVP190153	SVP190153	-1.19	-0.49	1.23	0.79	1.32	1.44	1.13	-0.06	1.06
SVP190153	SVP190154	0.07	0.35	1.34	0.86	1.25	1.54	0.65	0.13	1.15
SVP190153	SVP190155	-0.64	-0.07	1.21	0.80	2.25	1.80	1.45	0.08	1.01
SVP190153	SVP190156	-0.51	-0.23	1.62	1.06	1.43	1.65	1.50	-0.20	1.07
SVP190159	SVP190159	-0.84	-0.24	1.31	0.72	1.22	0.98	0.68	0.07	0.89
SVP190159	SVP190160	-1.23	-0.28	1.37	0.77	1.11	1.38	1.28	0.07	0.95
SVP190159	SVP206986	-0.70	-0.03	1.45	0.77	0.97	1.17	0.69	-0.05	1.04
SVP190161	SVP190161	-1.93	0.35	1.11	0.88	1.20	1.59	0.83	-0.01	1.24
SVP190161	SVP190162	-1.81	0.15	1.23	0.73	1.00	1.57	0.90	0.02	0.82
SVP190161	SVP211090	-1.41	0.69	1.25	0.83	1.64	1.75	1.12	0.21	0.95
SVP190161	SVP211091	-2.06	-0.26	1.33	0.98	0.75	1.62	1.14	0.09	1.24
SVP190163	SVP190163	-1.26	0.35	1.30	0.84	0.79	1.38	1.14	0.33	-0.28

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP190163	SVP190164	-1.26	-1.29	1.52	0.96	1.12	1.37	1.56	-0.05	0.71
SVP190163	SVP190165	-1.32	-0.96	1.29	0.86	1.29	1.55	0.91	-0.08	0.87
SVP190163	SVP190166	-2.15	-0.44	1.29	0.97	1.45	1.39	1.22	0.32	1.70
SVP190167	SVP190167	-1.68	0.16	1.22	0.80	1.18	1.41	1.05	0.12	0.86
SVP190167	SVP190168	-1.36	-0.76	1.34	0.96	1.60	1.96	1.52	0.14	1.21
SVP190167	SVP211098	-1.44	-0.13	1.54	0.95	1.34	1.46	1.03	0.19	0.95
SVP190167	SVP211099	-2.35	0.21	1.74	1.00	1.31	2.06	1.05	-0.04	1.18
SVP190169	SVP190169	-0.99	-0.32	1.29	0.85	1.40	2.18	0.88	0.29	1.03
SVP190169	SVP190170	-0.95	0.03	1.28	0.84	0.92	1.93	0.82	0.05	0.85
SVP190169	SVP211104	-1.34	-0.82	1.56	0.91	1.40	1.84	0.72	0.15	1.14
SVP190169	SVP211105	-1.24	-0.43	2.04	1.04	1.71	2.82	1.11	-0.02	0.79
SVP190169	SVP211106	-1.25	-0.21	2.05	1.04	1.07	2.64	0.81	-0.02	1.12
SVP190171	SVP190171	-1.41	0.21	1.18	0.75	1.23	2.22	0.99	0.14	0.90
SVP190171	SVP190172	-1.76	-0.87	1.29	0.72	0.84	1.60	1.22	0.20	1.06
SVP190171	SVP211107	-1.12	0.26	1.20	0.84	1.32	1.86	1.24	0.05	1.15
SVP190171	SVP211108	-1.11	0.28	1.24	0.74	0.85	0.95	0.62	0.19	0.70
SVP190171	SVP211109	-1.28	-0.54	1.52	0.88	1.00	1.04	1.02	0.01	0.82
SVP190171	SVP211110	-1.17	-0.69	1.20	1.02	1.24	1.65	1.29	-0.23	0.92
SVP190177	SVP190177	-1.34	0.18	1.49	0.95	1.21	1.51	1.15	-0.19	1.16
SVP190177	SVP190178	-1.22	-0.94	1.40	0.93	0.92	1.81	1.21	0.09	1.03
SVP190177	SVP211092	-1.81	-0.21	1.41	0.93	1.10	1.16	0.86	0.14	1.02
SVP190179	SVP190179	-1.98	-0.86	1.26	0.90	0.89	1.71	1.15	0.28	1.02
SVP190179	SVP190180	-2.01	-0.32	1.38	1.02	1.30	1.31	1.06	0.38	1.12
SVP190179	SVP211093	-1.80	-0.54	1.64	0.97	1.13	1.90	0.76	0.25	1.25
SVP190179	SVP211094	-1.53	0.32	1.19	0.92	1.39	1.70	1.22	0.12	1.21
SVP190179	SVP211100	-2.01	0.44	1.42	0.91	1.35	1.38	1.41	0.14	0.96
SVP190181	SVP190181	-2.05	0.38	1.23	0.86	1.23	1.27	0.95	0.15	1.02
SVP190181	SVP190182	-1.04	-0.45	1.50	0.89	1.04	1.95	0.98	0.32	1.32
SVP190181	SVP211101	-1.28	-0.14	1.51	0.99	1.10	1.74	1.28	0.08	0.96
SVP190181	SVP211102	-1.27	0.18	1.53	0.95	0.78	1.50	0.75	0.22	0.60
SVP190181	SVP211103	-1.32	0.52	1.85	0.94	1.12	0.94	0.98	-0.03	1.18
SVP190183	SVP190183	-0.66	0.23	1.28	0.71	0.89	1.90	1.04	0.22	1.04
SVP190183	SVP190184	-1.04	-0.67	1.35	0.81	1.64	1.91	0.66	0.23	0.82
SVP190183	SVP190185	-0.96	-1.16	1.42	0.90	0.71	1.98	0.78	-0.14	1.07
SVP190183	SVP190186	-1.90	0.56	1.51	1.00	0.98	3.19	1.34	0.05	1.38
SVP190183	SVP211111	-1.60	0.71	1.97	1.12	1.04	1.73	0.98	-0.29	0.95
SVP190183	SVP211112	-1.08	0.10	1.61	1.03	0.94	2.10	1.19	0.41	0.96
SVP190187	SVP190187	-1.06	-0.29	1.25	0.67	1.11	1.99	0.79	-0.05	1.00
SVP190187	SVP190188	-1.40	0.44	1.21	0.82	1.08	1.48	0.84	0.66	1.02
SVP190187	SVP211113	-1.93	-0.36	1.23	0.83	1.59	1.26	0.82	0.10	0.91
SVP190187	SVP211114	-1.43	-1.25	1.29	0.83	1.47	1.62	0.94	0.29	0.83
SVP190221	SVP190221	-1.05	0.69	1.12	0.81	1.24	1.69	0.55	0.15	1.12
SVP190221	SVP190222	-1.14	-0.36	1.14	0.83	1.78	2.47	1.19	0.16	0.82
SVP190221	SVP211118	-0.99	-0.55	1.26	0.91	1.41	1.27	0.82	-0.04	1.00
SVP190221	SVP211119	-1.48	0.26	1.36	1.01	1.20	2.18	0.58	-0.02	1.50
SVP190223	SVP190223	-1.10	-0.40	1.14	0.76	1.37	2.02	0.85	-0.14	0.88
SVP190223	SVP190224	-0.87	0.67	1.17	0.74	1.44	2.06	0.77	-0.03	1.13
SVP190223	SVP190225	-1.07	0.44	1.30	0.83	1.30	1.72	1.08	0.45	1.09
SVP190223	SVP190226	-1.27	-0.21	1.33	0.92	1.39	2.09	1.29	-0.23	1.29
SVP190223	SVP211117	-0.98	0.34	1.25	0.89	1.39	2.25	1.32	0.28	1.06
SVP190227	SVP190227	-0.85	0.86	1.23	0.87	1.42	1.87	1.00	0.09	0.88

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP190227	SVP190228	-0.79	-0.03	1.18	0.80	1.40	2.26	0.67	0.03	1.05
SVP190227	SVP211115	-1.09	0.43	1.32	0.93	1.08	2.05	0.89	0.22	1.00
SVP190227	SVP211116	-1.00	-0.84	1.29	0.95	1.50	1.71	1.10	0.05	1.10
SVP190247	SVP190247	-0.75	-0.41	1.33	0.84	1.62	1.56	0.96	0.00	0.99
SVP190247	SVP190248	-0.90	0.49	1.24	0.70	1.02	1.37	0.83	0.05	1.02
SVP190263	SVP190263	-1.55	-0.60	1.33	0.98	1.70	1.90	0.79	0.22	1.12
SVP190263	SVP190264	-2.10	-0.55	1.34	0.89	1.38	1.73	0.95	0.14	1.10
SVP190263	SVP211120	-2.23	-0.90	1.53	0.94	1.63	1.67	1.26	0.15	1.28
SVP190267	SVP190267	-1.13	0.20	1.34	0.84	1.57	1.97	0.86	-0.02	1.25
SVP190267	SVP190268	-0.37	0.44	1.33	0.81	1.71	1.68	0.65	0.11	1.16
SVP190267	SVP205289	-0.90	-0.55	1.51	0.90	1.47	1.47	1.43	0.20	1.30
SVP190267	SVP205290	-1.22	-0.33	1.56	0.90	1.40	1.35	1.47	-0.14	1.40
SVP190267	SVP232388	-0.03	-0.29	0.90	0.88	1.39	1.68	1.02	0.07	1.05
SVP190267	SVP232389	0.10	0.07	0.87	0.80	1.14	1.86	1.10	0.05	1.02
SVP190267	SVP232390	-0.06	0.13	0.98	0.90	1.04	1.73	1.23	-0.08	0.91
SVP190309	SVP190309	-0.83	0.09	1.53	0.95	1.20	2.24	0.72	-0.08	1.39
SVP190309	SVP190310	-0.75	-0.09	1.29	0.77	0.79	1.35	1.29	-0.02	0.92
SVP190337	SVP190337	-0.40	0.15	1.11	0.18	0.30	0.69	0.35	0.10	0.50
SVP190337	SVP190338	-0.66	-0.54	1.24	0.27	0.42	1.05	0.39	-0.09	0.41
SVP190337	SVP206998	-0.26	0.03	1.34	0.30	0.35	0.87	0.24	0.07	0.55
SVP190353	SVP190353	-0.46	-0.26	1.44	0.87	1.05	1.66	0.97	-0.03	1.15
SVP190353	SVP190354	-0.50	0.10	1.74	0.96	1.24	1.53	0.74	0.03	1.34
SVP190365	SVP190365	-0.58	-0.16	1.67	0.51	0.65	1.11	0.36	0.09	0.88
SVP190365	SVP190366	-0.92	0.32	1.81	0.69	1.15	1.09	0.93	0.01	0.93
SVP201660	SVP201660	-1.65	-0.21	1.33	0.80	1.63	1.70	1.09	0.00	1.05
SVP201660	SVP201661	-0.80	-0.48	1.35	0.87	1.22	1.18	1.09	0.15	1.08
SVP207127	SVP207127	-0.91	-0.23	1.25	0.77	1.18	2.67	0.97	0.16	1.09
SVP207127	SVP207128	-0.50	-0.01	1.27	0.82	1.12	1.76	0.43	0.17	1.05
SVP207127	SVP211141	-0.66	0.19	1.26	0.74	1.24	1.91	1.10	0.08	1.19
SVP207129	SVP207129	-0.57	0.13	1.26	0.81	1.24	2.12	0.88	0.03	1.25
SVP207129	SVP207130	-0.41	0.34	1.36	0.93	1.52	1.85	1.12	0.12	1.27
SVP207129	SVP211142	-0.81	0.56	1.79	1.03	1.33	1.54	1.26	0.05	0.86
SVP207131	SVP207131	-0.64	-0.54	1.21	0.77	1.33	1.99	0.93	0.00	1.04
SVP207131	SVP207132	-0.57	-0.41	1.25	0.84	2.22	2.33	0.79	0.22	1.22
SVP263644	SVP263644	-0.02	-0.74	0.99	0.83	1.00	1.56	0.86	-0.01	1.07
SVP263644	SVP263645	-0.07	-0.75	1.09	0.87	1.49	1.69	1.46	0.03	1.36
SVP263644	SVP263646	-0.06	-0.12	1.10	1.03	1.53	1.90	1.08	0.20	1.20
SVP263644	SVP263647	0.05	-0.51	1.07	1.00	1.26	1.40	1.10	0.02	1.17
SVP263644	SVP263648	-0.06	-0.03	1.09	0.93	1.35	1.61	1.35	0.10	1.13
SVP263644	SVP263649	-0.08	0.07	0.93	0.78	1.42	1.46	0.56	0.22	1.02
SVP263644	SVP263650	0.13	-0.27	0.95	0.79	1.04	1.31	1.21	0.02	0.94
SVP263644	SVP263651	0.07	-0.15	0.98	0.74	0.88	1.21	1.29	-0.04	0.85
SVP263644	SVP263652	-0.06	0.09	0.85	0.75	1.05	1.63	0.87	0.03	1.00
SVP263653	SVP263653	0.15	-1.44	1.06	0.83	1.31	1.93	0.94	-0.08	1.09
SVP263653	SVP263654	-0.04	-0.18	1.02	0.91	1.22	1.97	1.39	0.12	1.21
SVP263653	SVP263655	0.08	-0.09	1.10	0.93	1.15	2.25	1.36	0.16	1.06
SVP263653	SVP263656	-0.02	0.09	1.18	0.93	1.20	1.64	1.22	0.17	1.13
SVP263653	SVP263657	0.07	0.17	1.01	0.80	1.20	1.72	1.07	-0.08	0.90
SVP263653	SVP263658	-0.04	0.58	1.00	0.84	0.83	1.83	1.40	0.02	1.17
SVP263653	SVP263659	0.00	-0.04	0.98	0.82	1.13	1.10	1.08	0.17	1.09
SVP263653	SVP263660	0.06	0.05	0.86	0.71	1.14	1.49	0.92	0.14	0.76
SVP263653	SVP263661	0.00	0.01	1.01	0.79	1.33	1.67	0.98	0.06	0.95
SVP263662	SVP263662	-0.05	0.02	0.97	0.70	1.41	1.34	0.95	0.08	1.05
SVP263662	SVP263663	-0.01	-0.34	1.02	0.90	1.62	2.03	1.21	0.00	1.18
SVP263662	SVP263664	0.01	0.35	1.01	1.01	1.40	2.13	1.47	0.00	1.15

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP263662	SVP263665	0.05	0.50	0.99	0.90	1.62	2.21	1.01	-0.06	1.17
SVP263662	SVP263666	0.10	-0.25	1.04	0.84	1.06	1.59	1.17	0.05	1.16
SVP263662	SVP263667	0.00	-0.21	0.93	0.73	0.88	1.29	0.67	0.12	0.89
SVP263662	SVP263668	0.06	0.05	0.98	0.84	1.22	1.46	1.04	0.12	0.94
SVP263662	SVP263669	0.07	0.12	0.91	0.83	1.26	1.21	0.91	-0.14	1.05
SVP263662	SVP263670	0.08	-0.01	0.99	0.78	0.74	1.07	0.89	0.17	1.14
SVP263671	SVP263671	-0.15	-0.57	1.08	0.82	1.32	1.78	1.23	0.03	1.04
SVP263671	SVP263672	-0.15	-0.20	1.08	0.88	1.15	2.00	0.94	0.27	1.17
SVP263671	SVP263673	-0.02	-0.12	0.97	0.94	1.07	1.54	0.92	0.06	1.33
SVP263671	SVP263674	-0.02	0.07	0.96	0.87	1.18	1.40	0.91	0.07	1.20
SVP263671	SVP263675	-0.03	-0.39	1.06	0.92	1.21	1.48	1.18	0.10	1.08
SVP263671	SVP263676	-0.01	0.08	0.91	0.77	1.23	2.01	1.33	-0.01	0.98
SVP263671	SVP263677	0.13	0.00	0.91	0.80	1.17	1.18	0.92	-0.08	0.74
SVP263671	SVP263678	0.02	-0.41	0.89	0.79	1.01	1.67	1.32	0.00	0.94
SVP263671	SVP263679	-0.07	-0.05	0.91	0.74	1.07	1.42	0.70	-0.02	0.97
SVP263680	SVP263680	0.22	-0.24	0.78	0.63	1.16	1.21	0.94	0.14	0.82
SVP263680	SVP263681	0.10	0.40	0.93	0.65	1.23	1.85	1.08	0.07	0.81
SVP263680	SVP263682	-0.01	-0.38	0.87	0.70	1.85	2.53	1.08	0.04	1.07
SVP263680	SVP263683	0.10	0.00	0.82	0.91	0.74	1.74	1.15	0.19	1.13
SVP263680	SVP263684	-0.02	0.35	0.86	0.88	1.31	2.00	1.23	0.11	1.08
SVP263680	SVP263685	-0.07	0.31	1.08	0.83	1.11	1.81	1.07	-0.02	1.12
SVP263680	SVP263686	0.12	-0.10	1.10	0.90	1.05	1.61	1.07	0.03	0.97
SVP263680	SVP263687	-0.01	0.01	0.88	0.81	1.30	1.70	1.03	0.12	0.96
SVP263680	SVP263688	-0.12	-0.30	0.88	0.76	1.21	1.87	1.16	0.04	0.91
SVP263680	SVP263689	0.13	-0.15	0.87	0.82	1.16	1.49	1.08	-0.04	0.83
SVP263680	SVP263690	0.07	-0.36	0.82	0.74	0.95	1.31	0.74	0.14	0.75
SVP263680	SVP263691	0.17	0.13	0.94	0.81	0.99	1.54	0.87	-0.12	1.14
SVP263680	SVP263692	-0.04	-0.29	1.00	0.78	1.52	2.09	0.99	-0.03	0.97
SVP263693	SVP263693	0.22	0.10	1.00	0.87	1.40	1.35	1.15	0.06	1.17
SVP263693	SVP263694	0.01	0.50	1.12	0.93	1.24	2.32	1.66	0.14	1.44
SVP263693	SVP263695	-0.09	0.24	1.06	0.94	1.42	2.24	1.21	-0.02	1.25
SVP263693	SVP263696	-0.08	0.67	0.99	0.85	1.25	1.58	1.05	-0.02	1.17
SVP263693	SVP263697	0.05	-0.18	0.93	0.81	1.02	1.26	1.02	0.00	0.97
SVP263693	SVP263698	-0.01	-0.15	0.85	0.79	0.93	1.40	0.90	0.03	1.11
SVP263693	SVP263699	-0.10	-0.43	0.96	0.81	0.97	1.00	0.43	0.08	1.11
SVP263693	SVP263700	0.09	-0.22	0.85	0.76	1.04	1.59	1.04	-0.16	0.89
SVP263693	SVP263701	-0.01	0.00	0.90	0.73	0.86	1.51	0.83	-0.01	0.91
SVP263693	SVP263702	0.00	0.05	0.95	0.82	1.70	1.89	0.89	-0.16	0.99
SVP263693	SVP263703	-0.07	-0.08	0.98	0.79	0.87	1.58	1.08	0.06	0.97
SVP263693	SVP263704	-0.05	-0.49	1.19	0.77	0.55	1.45	0.94	-0.02	0.91
SVP263693	SVP263705	-0.05	0.39	1.00	0.77	1.16	1.33	1.11	0.06	0.90
SVP263706	SVP263706	0.07	-0.07	1.06	0.88	1.51	1.86	0.76	0.22	1.21
SVP263706	SVP263707	-0.06	-0.33	1.03	0.97	1.49	1.94	0.93	0.14	1.28
SVP263706	SVP263708	0.07	-0.17	1.21	1.04	1.52	1.94	1.38	0.12	1.32
SVP263706	SVP263709	-0.06	0.02	1.06	0.92	1.12	1.75	1.05	-0.01	0.95
SVP263706	SVP263710	-0.05	0.02	1.10	0.92	1.48	1.85	0.99	0.11	0.97
SVP263706	SVP263711	0.07	0.07	1.02	0.89	1.36	2.39	1.33	0.17	0.99
SVP263706	SVP263712	0.08	0.09	0.97	0.88	1.16	1.69	1.08	0.03	1.10
SVP263706	SVP263713	0.04	-0.21	1.09	0.84	1.06	1.24	0.98	0.15	0.89
SVP263706	SVP263714	-0.04	-0.21	0.93	0.79	0.82	1.17	0.74	0.09	0.94
SVP263715	SVP263715	0.11	0.08	1.05	0.86	1.16	2.00	1.57	0.20	1.07
SVP263715	SVP263716	-0.06	0.12	1.00	0.69	1.46	1.96	1.27	0.20	1.08
SVP263715	SVP263717	-0.07	-0.37	1.09	0.90	1.51	2.14	1.25	0.05	1.09
SVP263715	SVP263718	0.09	-0.31	1.26	0.97	1.20	1.53	1.41	-0.11	1.27
SVP263715	SVP263719	-0.01	-0.05	1.13	0.88	1.21	1.78	1.24	0.06	1.09

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP263715	SVP263720	-0.07	-0.02	0.96	0.75	0.76	1.13	0.85	0.07	0.99
SVP263715	SVP263721	0.01	-0.04	0.97	0.79	0.99	1.13	0.78	0.01	1.04
SVP263715	SVP263722	-0.01	-0.47	0.85	0.73	1.30	1.23	1.01	-0.04	0.91
SVP263715	SVP263723	0.07	-0.47	0.81	0.71	0.99	1.51	0.81	0.06	0.84
SVP263715	SVP263724	-0.04	0.15	0.88	0.78	0.89	1.55	1.16	0.06	1.03
SVP263715	SVP263725	-0.01	0.06	0.78	0.71	1.22	1.49	0.97	-0.02	0.85
SVP263715	SVP263726	0.10	0.15	0.80	0.77	1.27	1.77	0.90	0.06	0.83
SVP263715	SVP263727	0.02	0.22	0.82	0.86	1.35	1.41	1.08	0.01	1.14
SVP263715	SVP263728	0.00	-0.34	0.89	0.88	1.27	1.22	1.45	0.04	0.96
SVP263715	SVP263729	-0.07	0.31	0.91	0.95	1.52	1.83	1.08	0.14	1.19
SVP263730	SVP263730	-0.07	0.06	0.95	0.75	1.11	1.85	1.36	0.02	0.84
SVP263730	SVP263731	0.04	0.27	1.10	0.89	1.18	1.68	1.20	0.06	1.14
SVP263730	SVP263732	0.13	-0.04	1.04	0.93	1.19	1.14	1.07	0.01	1.21
SVP263730	SVP263733	-0.02	0.04	1.11	0.87	0.96	1.66	1.29	-0.03	1.20
SVP263730	SVP263734	-0.07	0.03	1.06	0.85	1.49	1.48	1.07	0.00	1.22
SVP263730	SVP263735	0.13	0.14	1.07	0.88	1.32	1.31	0.97	0.09	0.81
SVP263730	SVP263736	0.15	0.77	1.08	0.85	1.33	1.93	1.16	0.03	1.14
SVP263730	SVP263737	-0.07	-0.05	1.06	0.82	1.11	2.14	1.15	-0.07	0.91
SVP263730	SVP263738	0.09	-0.20	1.24	0.82	1.00	1.84	0.95	0.04	1.12
SVP263730	SVP263739	-0.04	0.05	0.96	0.84	0.93	1.61	0.85	0.07	1.25
SVP263730	SVP263740	-0.07	0.00	1.08	0.87	0.98	1.48	1.38	-0.04	0.95
SVP263730	SVP263741	0.00	-0.04	1.02	0.79	0.97	1.29	1.13	0.09	1.09
SVP263730	SVP263742	-0.11	0.28	1.09	0.88	1.14	1.83	1.17	0.11	1.07
SVP263743	SVP263743	0.03	-0.09	1.04	0.71	1.30	1.56	1.07	-0.07	0.77
SVP263743	SVP263744	-0.07	0.19	1.00	0.80	1.04	1.18	0.80	0.11	1.03
SVP263743	SVP263745	0.10	-0.12	1.08	0.86	0.98	1.25	0.92	0.19	1.19
SVP263743	SVP263746	0.10	-0.49	1.10	0.87	1.27	1.97	1.24	0.24	1.07
SVP263743	SVP263747	0.10	0.40	1.40	1.01	1.22	1.62	1.12	0.21	1.15
SVP263743	SVP263748	-0.03	0.23	1.31	0.93	1.30	1.68	1.33	-0.08	1.15
SVP263743	SVP263749	0.03	-0.28	1.26	1.01	1.33	1.89	1.06	0.20	1.16
SVP263743	SVP263750	0.05	0.21	1.15	0.91	1.48	2.14	1.63	0.03	0.92
SVP263743	SVP263751	0.03	-0.02	1.17	0.86	1.62	1.95	1.01	0.11	1.16
SVP263743	SVP263752	-0.03	0.27	1.29	0.85	0.97	1.18	0.94	-0.11	1.20
SVP263743	SVP263753	0.03	-0.37	1.30	0.88	1.06	1.46	0.91	0.08	1.30
SVP263743	SVP263754	0.02	0.40	1.24	0.81	1.18	1.29	0.91	0.11	1.08
SVP263743	SVP263755	-0.09	0.86	1.00	0.68	1.23	1.38	0.96	0.10	0.73
SVP263756	SVP263756	-0.12	0.42	1.07	0.75	1.13	2.10	1.07	0.09	0.88
SVP263756	SVP263757	-0.05	0.17	1.02	0.80	1.23	1.89	1.32	0.03	1.11
SVP263756	SVP263758	-0.08	0.00	1.10	0.81	1.24	1.73	1.51	0.09	0.60
SVP263756	SVP263759	0.02	0.43	1.06	0.91	1.56	1.80	0.99	0.03	1.14
SVP263756	SVP263760	0.09	0.13	1.13	1.01	1.08	1.73	1.14	-0.04	0.86
SVP263756	SVP263761	-0.08	-0.05	1.14	0.88	1.15	2.10	0.98	0.04	1.21
SVP263756	SVP263762	0.18	-0.01	1.16	0.99	1.04	3.05	0.82	0.18	1.03
SVP263756	SVP263763	0.06	-0.15	1.38	0.92	1.37	2.32	1.12	0.15	1.12
SVP263756	SVP263764	0.12	-0.15	0.99	0.77	1.38	2.39	0.84	0.07	0.80

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP263756	SVP263765	0.18	-0.12	0.97	0.83	0.95	1.58	0.98	0.05	1.03
SVP263756	SVP263766	0.01	-0.08	1.05	0.84	1.03	1.14	1.05	0.05	0.92
SVP263756	SVP263767	0.00	-0.20	1.08	0.81	1.18	1.41	0.90	-0.03	0.97
SVP263756	SVP263768	0.09	-0.35	1.02	0.73	1.19	2.19	1.30	0.07	0.95
SVP263808	SVP263808	0.04	0.38	0.95	0.80	0.93	1.51	1.06	0.16	1.00
SVP263808	SVP263809	-0.07	-0.33	1.07	0.81	1.43	2.31	1.09	0.10	1.17
SVP263808	SVP263810	-0.01	-0.34	1.07	0.86	0.82	1.55	0.92	0.03	1.25
SVP263808	SVP263811	-0.03	0.54	1.15	0.93	1.48	2.02	1.02	0.00	0.82
SVP263808	SVP263812	-0.05	0.44	1.07	0.86	1.15	2.27	1.27	0.04	1.21
SVP263808	SVP263813	-0.02	-0.31	0.93	0.68	0.86	1.64	1.16	-0.09	0.92
SVP263808	SVP263814	0.02	0.32	0.86	0.69	1.12	1.89	0.84	0.04	0.85
SVP263808	SVP263815	-0.03	-0.07	0.99	0.76	1.45	1.45	1.33	0.15	1.01
SVP263808	SVP263816	0.00	-0.04	1.00	0.76	0.78	1.39	0.84	-0.05	0.96
SVP263817	SVP263817	-0.10	-0.15	0.91	0.75	0.99	1.20	1.09	-0.06	0.93
SVP263817	SVP263818	0.09	-0.57	1.03	1.02	1.41	1.79	1.27	-0.08	1.35
SVP263817	SVP263819	0.00	0.09	0.98	0.80	1.28	1.98	1.12	0.10	1.03
SVP263817	SVP263820	-0.04	-0.26	1.06	0.90	1.27	1.69	1.01	-0.06	1.32
SVP263817	SVP263821	0.13	0.27	1.02	0.84	0.87	1.34	1.26	0.15	0.89
SVP263817	SVP263822	-0.05	0.08	0.90	0.68	1.22	1.49	0.77	-0.02	0.87
SVP263817	SVP263823	0.05	-0.12	1.10	0.83	1.28	1.96	1.09	0.05	1.14
SVP263817	SVP263824	0.05	0.44	0.90	0.79	0.98	1.31	0.86	0.07	1.03
SVP263817	SVP263825	-0.03	0.18	1.08	0.84	0.96	1.63	1.48	-0.06	1.06
SVP263826	SVP263826	0.22	-0.06	0.94	0.74	1.41	1.82	0.87	0.05	0.92
SVP263826	SVP263827	0.01	-0.12	1.12	0.98	1.37	1.30	1.28	0.20	1.26
SVP263826	SVP263828	0.03	-0.16	1.32	0.91	1.03	1.98	1.45	-0.02	1.20
SVP263826	SVP263829	-0.12	0.14	1.20	0.92	1.32	1.65	1.18	0.05	1.06
SVP263826	SVP263830	-0.08	0.08	1.16	0.88	1.30	1.64	1.15	0.10	1.42
SVP263826	SVP263831	0.04	0.10	0.99	0.83	1.42	1.69	1.05	-0.11	1.02
SVP263826	SVP263832	0.01	-0.16	1.02	0.81	1.04	1.55	0.89	0.11	1.10
SVP263826	SVP263833	0.05	0.12	0.98	0.70	1.07	2.07	0.95	0.03	0.83
SVP263826	SVP263834	0.10	-0.03	0.90	0.76	0.96	2.17	0.68	-0.02	0.94
SVP263835	SVP263835	0.15	-0.50	0.97	0.85	1.53	2.61	1.44	0.02	0.96
SVP263835	SVP263836	0.05	-0.11	1.14	0.96	1.19	1.58	0.88	0.09	1.40
SVP263835	SVP263837	0.07	-0.06	1.40	1.02	1.21	2.56	1.01	0.15	1.18
SVP263835	SVP263838	0.08	-0.28	1.12	0.88	1.17	1.86	0.96	0.07	0.98
SVP263835	SVP263839	0.10	0.31	1.21	0.86	1.24	1.77	1.39	0.10	1.09
SVP263835	SVP263840	0.04	0.26	1.04	0.83	1.13	1.27	0.87	0.09	0.99
SVP263835	SVP263841	0.00	0.30	1.01	0.84	0.91	1.37	1.09	-0.01	0.96
SVP263835	SVP263842	0.01	0.20	0.89	0.75	0.91	1.67	1.10	-0.06	0.97
SVP263835	SVP263843	0.14	0.19	0.91	0.79	1.09	1.78	0.82	0.06	1.02
SVP263844	SVP263844	-0.02	0.23	1.00	0.84	1.07	1.73	1.05	0.01	0.91
SVP263844	SVP263845	-0.01	0.08	1.10	0.95	1.12	1.67	1.49	0.24	1.26
SVP263844	SVP263846	0.05	0.11	1.05	0.88	1.48	2.01	1.40	0.01	1.08
SVP263844	SVP263847	-0.04	0.57	1.14	0.88	1.24	1.83	1.13	0.17	0.90
SVP263844	SVP263848	-0.01	-0.24	1.01	0.91	1.11	1.59	0.99	-0.14	0.99
SVP263844	SVP263849	0.05	-0.34	1.11	0.94	1.42	1.88	1.29	0.02	1.16
SVP263844	SVP263850	0.08	-0.21	0.96	0.81	1.56	1.48	1.20	-0.02	0.86
SVP263844	SVP263851	0.00	-0.14	0.93	0.78	1.14	1.25	0.81	-0.08	0.97
SVP263844	SVP263852	0.15	-0.05	0.93	0.79	1.20	0.89	0.93	0.14	0.93
SVP263853	SVP263853	0.06	0.71	0.98	0.83	1.58	1.78	1.41	0.10	1.25
SVP263853	SVP263854	-0.06	-0.25	0.87	0.82	1.28	1.55	1.18	-0.01	1.33
SVP263853	SVP263855	0.01	0.12	1.09	0.94	1.54	2.01	1.17	0.08	1.43
SVP263853	SVP263856	0.04	0.10	1.02	0.86	1.05	1.32	0.84	0.05	1.20
SVP263853	SVP263857	-0.02	-0.16	0.93	0.78	1.01	1.34	0.98	-0.07	0.84
SVP263853	SVP263858	0.02	-0.10	1.16	0.85	1.06	1.52	1.08	-0.01	1.18

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP263853	SVP263859	0.02	-0.01	0.95	0.92	1.17	1.60	1.37	-0.09	1.10
SVP263853	SVP263860	0.01	0.30	0.97	0.82	1.26	1.21	0.81	0.01	1.05
SVP263853	SVP263861	0.02	-0.38	0.93	0.72	1.03	1.64	0.86	0.01	0.99
SVP263862	SVP263862	-0.07	-0.13	1.07	0.83	1.05	1.57	1.19	0.21	1.00
SVP263862	SVP263863	0.07	-0.14	1.25	0.95	1.23	2.01	0.85	0.10	1.25
SVP263862	SVP263864	-0.06	-0.17	1.19	0.90	1.16	1.90	1.48	0.03	1.20
SVP263862	SVP263865	0.02	-0.15	1.14	0.94	1.56	1.96	1.24	0.06	0.89
SVP263862	SVP263866	0.09	0.57	1.14	0.92	1.20	1.66	1.11	0.03	1.00
SVP263862	SVP263867	0.06	-0.25	0.99	0.76	1.02	1.52	1.05	0.01	0.96
SVP263862	SVP263868	0.05	0.39	1.15	0.91	1.33	1.76	0.86	0.16	1.18
SVP263862	SVP263869	0.15	0.12	1.03	0.79	1.01	1.57	1.17	-0.01	1.06
SVP263862	SVP263870	0.00	-0.02	1.01	0.92	1.51	2.06	0.95	0.06	1.10
SVP263871	SVP263871	0.18	0.52	1.08	0.86	1.12	1.50	0.85	-0.02	1.06
SVP263871	SVP263872	-0.04	-0.37	1.03	0.96	1.25	1.64	1.42	0.09	1.06
SVP263871	SVP263873	0.02	-0.03	1.18	0.93	1.21	2.16	0.78	0.22	1.23
SVP263871	SVP263874	0.08	0.11	1.23	1.03	1.22	1.91	1.33	0.07	1.20
SVP263871	SVP263875	-0.01	0.07	1.09	0.90	1.03	1.32	1.52	0.20	1.00
SVP263871	SVP263876	-0.01	0.13	0.94	0.83	1.07	1.37	1.09	0.05	0.95
SVP263871	SVP263877	-0.06	-0.06	0.92	0.83	0.87	1.34	0.89	0.13	0.96
SVP263871	SVP263878	-0.01	-0.26	0.84	0.77	0.82	1.05	0.86	-0.02	0.82
SVP263871	SVP263879	0.04	-0.21	1.22	0.73	1.12	1.30	1.05	0.12	0.85
SVP263880	SVP263880	-0.01	-0.20	1.01	0.85	0.96	1.53	1.16	0.00	1.01
SVP263880	SVP263881	0.00	-0.42	1.02	0.90	1.39	1.71	1.33	0.01	1.20
SVP263880	SVP263882	0.08	0.21	1.05	0.82	1.20	2.20	1.25	-0.06	1.09
SVP263880	SVP263883	0.00	0.06	1.03	0.86	1.15	2.09	1.33	-0.05	1.14
SVP263880	SVP263884	0.04	-0.36	1.05	0.89	0.80	2.26	1.13	-0.04	1.13
SVP263880	SVP263885	0.00	-0.12	1.01	0.90	1.31	1.64	1.09	0.01	1.13
SVP263880	SVP263886	0.00	-0.05	0.96	0.76	1.35	1.47	1.18	0.14	1.10
SVP263880	SVP263887	-0.13	0.22	0.99	0.86	1.20	2.37	0.82	-0.04	1.01
SVP263880	SVP263888	-0.05	0.58	0.85	0.73	0.83	1.25	1.22	-0.02	0.83
SVP263889	SVP263889	-0.07	-0.79	1.02	0.76	1.04	1.76	0.87	-0.01	1.10
SVP263889	SVP263890	0.09	-0.11	1.19	0.99	1.27	2.08	1.13	0.05	1.08
SVP263889	SVP263891	0.01	0.17	1.11	0.91	1.21	1.61	1.10	0.07	1.03
SVP263889	SVP263892	0.07	0.28	1.18	0.81	1.18	1.41	0.73	-0.09	1.23
SVP263889	SVP263893	0.04	-0.20	0.99	0.76	1.10	1.03	1.10	-0.11	0.97
SVP263889	SVP263894	0.06	-0.16	0.98	0.84	1.31	2.15	1.26	0.16	1.27
SVP263889	SVP263895	0.03	-0.56	1.01	0.86	1.24	1.70	1.21	0.05	0.99
SVP263889	SVP263896	0.01	0.31	0.99	0.73	1.10	1.58	0.95	-0.09	0.92
SVP263889	SVP263897	-0.04	-0.11	1.06	0.82	0.84	1.09	0.52	-0.11	0.99
SVP263889	SVP263898	-0.01	-0.34	1.09	0.84	1.11	1.92	1.03	-0.05	1.09
SVP263889	SVP263899	0.17	-0.09	1.20	0.93	1.11	1.56	1.01	-0.06	1.13
SVP263889	SVP263900	0.05	-0.18	1.05	0.82	1.10	1.60	0.90	0.07	0.89
SVP263889	SVP263901	0.05	-0.14	1.10	0.84	1.11	1.76	1.37	0.03	1.09
SVP263889	SVP263902	-0.01	-0.11	1.07	0.98	1.32	1.14	0.95	0.12	1.33
SVP263889	SVP263903	0.01	0.13	1.01	0.96	1.31	1.38	0.96	0.01	1.17
SVP263904	SVP263904	0.10	0.08	1.16	0.97	1.49	1.65	1.03	-0.09	1.18
SVP263904	SVP263905	0.15	-0.07	1.25	0.89	1.24	1.35	1.01	0.09	1.41

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP263904	SVP263906	0.15	-0.21	1.19	0.93	1.31	1.52	1.11	0.18	1.23
SVP263904	SVP263907	-0.04	-0.38	1.32	0.98	1.14	2.05	1.18	0.18	1.23
SVP263904	SVP263908	0.02	0.30	1.46	0.89	1.33	1.52	1.12	-0.09	0.93
SVP263904	SVP263909	0.09	-0.15	1.20	0.92	1.00	1.39	1.12	0.00	1.04
SVP263904	SVP263910	-0.03	0.16	1.09	0.89	0.93	1.05	0.91	0.06	1.10
SVP263904	SVP263911	0.05	0.15	1.08	0.86	0.78	1.12	1.23	0.04	0.87
SVP263904	SVP263912	0.01	-0.23	0.98	0.85	0.91	1.12	0.93	0.18	0.93
SVP263904	SVP263913	-0.08	-0.39	1.35	0.92	1.20	0.95	1.30	0.08	0.90
SVP263904	SVP263914	0.10	-0.13	1.05	0.93	1.36	1.42	1.03	0.04	1.21
SVP263904	SVP263915	0.08	-0.44	1.08	0.96	1.47	1.24	1.16	0.07	1.11
SVP263904	SVP263916	0.10	0.00	1.01	0.88	1.68	1.40	0.99	0.10	1.27
SVP263904	SVP263917	0.00	-0.19	0.99	1.05	1.31	1.39	1.16	0.10	1.27
SVP263904	SVP263918	-0.13	0.19	1.00	1.02	1.70	1.89	1.22	0.12	1.18
SVP263984	SVP263984	-0.06	-0.17	1.10	0.72	1.39	1.72	0.80	-0.04	1.07
SVP263984	SVP263985	0.01	-0.17	1.24	0.93	1.57	1.63	1.08	0.12	1.25
SVP264000	SVP264000	-0.05	0.32	0.80	0.07	0.20	0.77	0.06	0.12	0.55
SVP264000	SVP264001	-0.07	-0.48	1.17	0.77	0.85	1.31	0.81	0.13	1.29
SVP264000	SVP264002	0.12	0.39	1.25	1.02	1.21	1.72	1.55	0.08	1.14
SVP264000	SVP264003	0.01	0.26	1.36	0.98	1.35	1.92	1.24	0.06	1.20
SVP264000	SVP264004	-0.02	0.11	1.09	0.87	1.46	1.61	1.13	0.14	1.26
SVP264000	SVP264005	0.08	-0.12	0.98	0.76	0.97	1.36	0.84	-0.05	0.94
SVP264000	SVP264006	0.09	0.30	1.12	0.86	1.30	1.61	0.97	0.09	1.03
SVP264000	SVP264007	0.09	-0.05	1.12	0.94	1.22	1.54	0.68	-0.01	0.98
SVP264000	SVP264008	0.00	-0.10	1.00	0.70	0.93	1.46	1.06	0.13	1.06
SVP264009	SVP264009	0.10	0.06	1.22	1.02	1.47	2.21	1.02	-0.08	1.45
SVP264009	SVP264010	0.04	0.01	1.20	1.03	1.35	1.80	1.11	-0.15	1.22
SVP264009	SVP264011	0.06	0.07	1.18	0.93	1.41	2.22	1.22	0.03	1.14
SVP264009	SVP264012	-0.02	0.10	1.03	0.85	0.96	1.88	0.88	0.08	1.11
SVP264009	SVP264013	-0.08	0.07	0.96	0.74	1.17	1.47	0.75	0.11	0.94
SVP264009	SVP264014	0.05	0.07	0.99	0.83	1.07	1.83	1.00	0.14	1.00
SVP264009	SVP264015	0.04	-0.09	0.94	0.75	1.32	1.89	0.96	0.05	1.00
SVP264009	SVP264016	0.00	-0.08	1.08	0.88	1.12	1.59	0.66	-0.06	1.08
SVP264009	SVP264017	0.05	-0.08	0.98	0.76	0.89	1.64	1.09	0.14	0.90
SVP264018	SVP264018	-0.02	-0.07	1.09	0.87	0.80	1.56	1.16	0.00	0.96
SVP264018	SVP264019	0.00	0.09	1.17	0.91	1.31	2.04	1.47	0.11	1.10
SVP264018	SVP264020	0.08	0.38	1.32	0.86	1.01	1.86	1.04	-0.04	1.23
SVP264018	SVP264021	-0.07	-0.30	0.99	0.82	1.22	1.60	0.99	0.00	0.74
SVP264018	SVP264022	0.02	0.15	1.11	0.86	1.12	1.54	1.33	0.03	0.98
SVP264018	SVP264023	0.00	-0.42	0.97	0.78	1.14	1.60	1.03	0.09	0.96
SVP264018	SVP264024	0.05	0.65	0.99	0.81	1.38	1.62	1.04	0.00	0.92
SVP264018	SVP264025	0.03	0.21	0.98	0.83	1.35	1.57	0.92	0.04	0.85
SVP264018	SVP264026	0.04	-0.09	0.87	0.70	1.29	1.15	0.81	0.05	0.59
SVP264027	SVP264027	0.05	-0.08	1.00	0.77	1.26	1.96	1.64	-0.04	1.04
SVP264027	SVP264028	0.09	0.25	1.19	0.83	1.35	1.35	1.19	0.11	1.13
SVP264027	SVP264029	0.11	-0.26	1.23	0.89	1.44	1.45	1.44	-0.10	1.24
SVP264027	SVP264030	0.11	0.02	0.76	0.65	1.09	1.12	0.79	-0.06	0.78
SVP264027	SVP264031	0.01	-0.18	0.94	0.81	1.18	1.55	1.29	-0.06	1.15
SVP264027	SVP264032	0.04	-0.38	1.05	0.89	1.11	1.91	1.13	0.12	1.10
SVP264027	SVP264033	0.02	0.16	0.90	0.77	1.20	1.33	0.72	-0.05	0.92
SVP264027	SVP264034	0.04	0.04	0.82	0.71	0.68	1.17	0.80	0.01	0.77
SVP264027	SVP264035	-0.01	-0.28	0.93	0.76	0.91	1.56	0.77	0.06	0.91
SVP264036	SVP264036	0.01	0.27	1.02	0.83	0.93	1.31	0.83	0.19	1.04

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP264036	SVP264037	-0.03	-0.22	1.01	0.92	1.21	1.73	0.94	-0.05	1.28
SVP264036	SVP264038	0.09	0.08	0.97	0.82	1.31	1.74	1.02	0.07	1.16
SVP264036	SVP264039	-0.08	0.17	0.96	0.89	1.21	1.45	1.19	0.01	1.03
SVP264036	SVP264040	0.00	0.00	0.88	0.66	1.02	1.50	0.79	-0.01	0.84
SVP264036	SVP264041	0.18	-0.29	0.86	0.74	1.12	1.61	1.38	0.03	0.95
SVP264036	SVP264042	-0.04	-0.30	1.04	0.86	1.43	1.41	1.00	0.05	1.14
SVP264036	SVP264043	0.07	-0.07	0.90	0.80	1.14	1.66	0.99	-0.06	1.07
SVP264036	SVP264044	-0.04	-0.03	1.09	0.83	0.79	1.34	1.50	0.04	1.10
SVP264045	SVP264045	0.02	-0.16	0.94	0.63	1.58	2.04	1.06	0.04	1.14
SVP264045	SVP264046	-0.04	0.05	1.24	0.93	1.51	1.89	1.32	-0.02	1.44
SVP264045	SVP264047	-0.07	0.13	1.23	0.98	1.07	1.65	1.05	-0.01	1.39
SVP264045	SVP264048	0.02	-0.03	1.11	0.87	1.09	1.88	1.21	0.12	0.91
SVP264045	SVP264049	0.08	-0.34	1.13	0.87	1.25	1.69	1.09	0.13	1.27
SVP264045	SVP264050	-0.08	-0.02	0.97	0.80	0.59	1.27	0.87	0.09	1.08
SVP264045	SVP264051	-0.03	-0.19	1.14	0.85	1.11	2.51	1.22	0.05	1.05
SVP264045	SVP264052	0.00	0.30	0.96	0.77	1.01	2.22	1.13	0.12	0.92
SVP264045	SVP264053	0.09	-0.15	1.02	0.92	1.02	1.00	0.93	-0.04	1.31
SVP264054	SVP264054	0.01	-0.22	0.86	0.71	1.13	1.17	0.86	0.20	0.97
SVP264054	SVP264055	0.12	-0.31	1.08	0.94	1.32	1.82	1.24	-0.13	1.25
SVP264054	SVP264056	0.00	0.06	1.06	0.85	1.20	1.53	1.02	-0.06	1.05
SVP264054	SVP264057	-0.05	0.81	1.01	0.90	1.24	1.92	1.09	0.03	1.02
SVP264054	SVP264058	-0.02	-0.18	1.05	0.84	1.24	1.42	0.88	-0.09	0.84
SVP264054	SVP264059	0.02	-0.12	0.98	0.83	1.36	1.49	1.08	-0.05	0.90
SVP264054	SVP264060	-0.09	-0.08	1.03	0.77	1.04	1.39	1.11	0.11	1.01
SVP264054	SVP264061	0.12	-0.05	1.03	0.81	1.13	1.06	1.04	-0.09	0.78
SVP264062	SVP264062	0.09	0.07	1.13	0.99	1.04	1.71	1.10	-0.01	1.21
SVP264062	SVP264063	0.51	0.33	1.17	0.99	1.09	1.45	1.08	0.01	1.15
SVP264062	SVP264064	0.13	0.12	1.17	0.99	1.20	1.80	1.00	0.07	1.32
SVP264062	SVP264065	0.00	-0.26	1.12	0.91	1.41	1.68	1.06	0.03	1.02
SVP264062	SVP264066	0.06	0.20	1.06	0.84	1.19	1.46	0.99	-0.19	1.10
SVP264062	SVP264067	0.02	-0.28	1.06	0.89	1.26	1.54	1.01	0.11	1.26
SVP264062	SVP264068	0.01	-0.21	1.02	0.81	1.55	1.95	1.24	0.00	1.03
SVP264062	SVP264069	0.05	-0.35	1.03	0.81	1.08	1.37	0.87	0.08	1.00
SVP264062	SVP264070	-0.02	-0.04	0.95	0.76	1.05	1.65	0.70	0.03	0.98
SVP264071	SVP264071	0.19	0.46	1.25	0.96	1.35	2.02	1.54	-0.07	1.04
SVP264071	SVP264072	0.08	0.28	1.35	0.97	1.12	1.77	0.91	0.02	1.20
SVP264071	SVP264073	-0.05	0.11	1.31	0.95	1.06	1.57	0.79	0.11	1.15
SVP264071	SVP264074	-0.03	0.05	1.26	1.00	1.43	1.93	1.09	0.09	1.23
SVP264071	SVP264075	-0.01	-0.24	1.27	1.00	1.11	2.11	1.10	0.14	1.14
SVP264071	SVP264076	0.11	0.29	1.25	0.90	1.84	1.92	1.20	-0.03	1.15
SVP264071	SVP264077	-0.07	0.12	1.22	0.94	1.60	1.46	1.03	0.20	1.43
SVP264071	SVP264078	0.06	0.07	1.01	0.88	1.44	1.71	0.95	0.10	0.98
SVP264071	SVP264079	-0.08	-0.16	1.04	0.77	1.31	1.91	1.21	0.03	1.05
SVP264080	SVP264080	0.15	-0.17	1.00	0.80	1.57	2.05	1.59	-0.18	1.13
SVP264080	SVP264081	0.15	-0.41	1.17	0.90	1.27	2.05	1.21	-0.12	1.12
SVP264080	SVP264082	0.09	0.13	1.19	0.88	1.51	1.58	1.20	-0.02	1.00
SVP264080	SVP264083	-0.10	-0.31	1.22	0.87	0.91	1.37	1.03	-0.05	1.04
SVP264080	SVP264084	0.02	-0.14	1.20	0.89	1.13	1.51	1.05	0.12	0.92
SVP264080	SVP264085	0.03	-0.14	1.24	0.94	1.16	1.47	1.58	0.11	1.10
SVP264080	SVP264086	0.03	-0.09	1.07	0.86	1.44	1.36	1.02	0.01	0.94
SVP264080	SVP264087	0.13	-0.43	1.03	0.73	1.35	1.14	0.98	-0.01	0.96
SVP264080	SVP264088	-0.04	0.15	0.99	0.67	0.95	1.25	0.66	0.09	0.93
SVP264089	SVP264089	-0.07	-0.01	1.31	1.05	1.14	1.86	1.02	0.00	1.09
SVP264089	SVP264090	-0.03	0.01	1.44	1.04	1.40	1.74	1.22	0.10	1.32
SVP264089	SVP264091	0.01	0.02	1.47	1.00	1.34	1.86	1.29	-0.15	1.22

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP264089	SVP264092	-0.07	-0.06	1.14	0.80	0.93	1.37	0.98	0.07	0.97
SVP264089	SVP264093	0.06	0.09	1.26	0.91	1.05	1.11	1.02	0.02	1.05
SVP264089	SVP264094	0.12	-0.11	1.22	0.81	0.95	1.53	0.83	-0.05	1.02
SVP264089	SVP264095	0.05	0.65	1.17	0.85	1.19	1.69	0.82	0.22	0.89
SVP264089	SVP264096	0.07	-0.11	1.14	0.75	1.14	1.97	0.89	0.18	0.89
SVP264089	SVP264097	0.06	0.32	1.01	0.72	1.05	1.54	0.80	0.13	0.77
SVP264089	SVP264098	0.04	-0.09	1.17	0.85	1.07	1.28	0.75	-0.11	0.78
SVP264089	SVP264099	-0.01	0.03	1.10	0.83	1.16	1.41	1.03	0.04	0.86
SVP264089	SVP264100	-0.05	-0.28	1.03	0.76	1.00	1.06	0.94	0.01	0.82
SVP264089	SVP264101	-0.08	-0.10	1.11	0.87	0.99	1.13	0.86	0.00	1.08
SVP264089	SVP264102	0.02	-0.34	1.01	0.87	1.10	1.33	0.97	-0.01	0.95
SVP264089	SVP264103	0.02	-0.03	0.96	0.88	0.98	1.42	1.58	-0.02	0.91
SVP264104	SVP264104	0.08	-0.49	1.16	0.74	0.83	1.15	1.05	-0.11	1.03
SVP264104	SVP264105	-0.08	0.02	1.31	1.00	1.12	1.87	1.06	0.15	1.30
SVP264104	SVP264106	0.00	-0.98	1.18	0.96	1.27	1.92	1.16	0.03	0.92
SVP264104	SVP264107	0.03	-0.38	1.04	0.74	1.01	1.51	0.85	0.00	0.84
SVP264104	SVP264108	0.04	0.30	1.11	0.87	1.15	1.66	1.29	-0.05	0.87
SVP264104	SVP264109	-0.06	-0.61	0.96	0.81	0.94	1.40	1.11	0.11	0.84
SVP264104	SVP264110	0.20	0.17	1.01	0.90	1.35	1.77	0.89	0.06	0.91
SVP264104	SVP264111	-0.12	0.06	0.86	0.77	0.96	0.99	1.04	0.02	0.79
SVP264104	SVP264112	0.05	0.01	0.93	0.82	1.14	1.83	0.97	-0.02	0.86
SVP264104	SVP264113	0.10	-0.03	0.91	0.93	1.15	1.27	1.48	-0.02	1.04
SVP264104	SVP264114	0.07	0.00	0.87	1.00	1.35	1.21	0.96	0.12	1.04
SVP264104	SVP264115	-0.01	0.06	0.89	1.00	1.51	1.40	1.19	0.05	1.14
SVP264104	SVP264116	0.05	0.36	0.93	0.95	1.39	1.36	0.97	0.12	1.14
SVP264145	SVP264146	0.13	0.13	0.94	0.19	0.55	1.52	0.18	0.07	0.59
SVP264147	SVP264147	0.09	-0.50	0.92	0.33	0.75	1.13	0.83	0.18	0.74
SVP264147	SVP264148	0.03	-0.19	1.21	0.83	1.55	1.07	0.72	-0.05	1.22
SVP264149	SVP264149	0.13	-0.61	0.82	0.13	0.48	0.95	0.29	0.00	0.44
SVP264149	SVP264150	0.05	0.2	1.29	0.87	1.31	1.67	0.93	0.20	1.24
SVP264151	SVP264151	0.0	-0.08	0.62	0.09	0.16	0.70	0.10	0.06	0.50
SVP264151	SVP264152	0.16	-0.37	1.27	0.92	1.16	1.85	1.56	0.10	1.23
SVP264289	SVP264289	-0.21	-0.56	0.62	0.32	0.57	0.82	0.44	0.16	0.53
SVP264289	SVP264290	0.0	-0.20	1.20	0.87	1.34	1.81	0.82	-0.08	1.26
SVP264291	SVP264291	0.07	-0.03	1.21	0.83	1.11	2.12	1.16	0.05	1.28
SVP264291	SVP264292	-0.07	0.06	1.43	1.12	1.47	2.08	1.46	0.42	1.33
SVP264291	SVP264293	0.0	-0.18	1.39	0.97	1.49	1.85	1.06	0.03	1.13
SVP264291	SVP264294	0.03	-0.7	1.38	1.03	1.27	1.83	1.18	-0.07	1.15
SVP264291	SVP264295	0.10	-0.6	1.30	0.92	1.29	2.05	1.01	0.01	1.16
SVP264291	SVP264296	0.0	-0.11	1.26	0.89	0.75	1.50	0.98	0.08	1.10
SVP264291	SVP264297	-0.01	-0.26	0.92	0.79	1.24	1.26	0.89	0.05	0.87
SVP264291	SVP264298	0.06	0.24	0.89	0.77	1.26	2.38	0.92	-0.01	0.95
SVP264291	SVP264299	0.06	-0.08	0.90	0.76	0.89	1.45	0.93	0.12	0.96
SVP264300	SVP264300	-0.02	0.21	1.06	0.78	1.33	1.45	1.04	-0.04	0.98
SVP264300	SVP264301	0.07	-0.02	1.24	0.88	1.34	1.79	1.22	-0.10	1.25
SVP264300	SVP264302	0.04	-0.17	1.12	0.83	1.33	1.60	1.32	0.09	1.12
SVP264300	SVP264303	0.02	0.13	1.15	0.97	1.59	2.29	1.23	0.09	1.19

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
SVP264300	SVP264304	-0.02	0.18	1.06	0.89	0.93	2.66	1.26	-0.10	1.41
SVP264300	SVP264305	-0.09	0.31	1.13	0.90	1.90	2.37	1.19	0.18	0.94
SVP264300	SVP264306	0.14	0.21	1.16	0.85	1.17	2.37	0.89	0.09	1.16
SVP264300	SVP264307	0.05	0.01	1.18	0.95	1.63	2.20	1.13	0.15	0.94
SVP264300	SVP264308	0.01	-0.29	1.14	0.76	1.28	1.32	1.01	0.12	1.13

Determination of Exposure Point Concentration for Jana Elementary School Soil:
CWC-365 and CWC-386 (Partial)
GWS-Based Soil Samples

Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
	(pCi/g)								
Background	0.21	0.20	1.05	0.98	1.18	1.66	1.11	0.06	1.18
Maximum	0.15	-0.21	1.04	0.84	1.41	2.14	1.23	0.06	1.08
EPC	0.00	0.00	0.00	0.00	0.23	0.48	0.12	0.00	0.00

Station_ID	Sample_ID	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238
HTZ250127	HTZ250127	0.04	-0.26	0.92	0.65	0.89	2.14	0.53	0.04	0.95
HTZ250128	HTZ250128	0.09	-0.21	1.00	0.80	1.18	2.07	0.97	0.06	1.08
HTZ250129	HTZ250129	0.15	-0.38	1.04	0.84	1.41	1.80	1.23	0.04	1.06

ATTACHMENT J-2

RESRAD-ONSITE OUTPUT SUMMARY REPORTS

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CWC-365 and CWC-386 Student
RESRAD Dose Summary

Summary : CWC-365, 386 (Partial) Jana Parcels - Student
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA STUDENT.RAD

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Dose Conversion Factor (and Related) Parameter Summary
Dose Library: DCFPAK3.02 (Age 5)

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: DCFPAK3.02)	5.567E-05	5.567E-05	DCF1(1)
A-1	Bi-210 (Source: DCFPAK3.02)	5.473E-03	5.473E-03	DCF1(2)
A-1	Bi-212 (Source: DCFPAK3.02)	6.258E-01	6.258E-01	DCF1(3)
A-1	Bi-214 (Source: DCFPAK3.02)	9.135E+00	9.135E+00	DCF1(4)
A-1	Hg-206 (Source: DCFPAK3.02)	6.127E-01	6.127E-01	DCF1(5)
A-1	Pb-210 (Source: DCFPAK3.02)	2.092E-03	2.092E-03	DCF1(6)
A-1	Pb-212 (Source: DCFPAK3.02)	6.314E-01	6.314E-01	DCF1(7)
A-1	Pb-214 (Source: DCFPAK3.02)	1.257E+00	1.257E+00	DCF1(8)
A-1	Po-210 (Source: DCFPAK3.02)	5.641E-05	5.641E-05	DCF1(9)
A-1	Po-212 (Source: DCFPAK3.02)	0.000E+00	0.000E+00	DCF1(10)
A-1	Po-214 (Source: DCFPAK3.02)	4.801E-04	4.801E-04	DCF1(11)
A-1	Po-216 (Source: DCFPAK3.02)	8.873E-05	8.873E-05	DCF1(12)
A-1	Po-218 (Source: DCFPAK3.02)	9.228E-09	9.228E-09	DCF1(13)
A-1	Ra-224 (Source: DCFPAK3.02)	4.950E-02	4.950E-02	DCF1(14)
A-1	Ra-226 (Source: DCFPAK3.02)	3.176E-02	3.176E-02	DCF1(15)
A-1	Rn-218 (Source: DCFPAK3.02)	4.259E-03	4.259E-03	DCF1(16)
A-1	Rn-220 (Source: DCFPAK3.02)	3.474E-03	3.474E-03	DCF1(17)
A-1	Rn-222 (Source: DCFPAK3.02)	2.130E-03	2.130E-03	DCF1(18)
A-1	Th-228 (Source: DCFPAK3.02)	7.248E-03	7.248E-03	DCF1(19)
A-1	Th-230 (Source: DCFPAK3.02)	1.106E-03	1.106E-03	DCF1(20)
A-1	Tl-206 (Source: DCFPAK3.02)	1.278E-02	1.278E-02	DCF1(21)
A-1	Tl-208 (Source: DCFPAK3.02)	2.167E+01	2.167E+01	DCF1(22)
A-1	Tl-210 (Source: DCFPAK3.02)	1.677E+01	1.677E+01	DCF1(23)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	7.536E-02	4.240E-02	DCF2(1)
B-1	Ra-226+D	7.025E-02	7.003E-02	DCF2(2)
B-1	Th-228+D	3.309E-01	3.074E-01	DCF2(3)
B-1	Th-230	5.216E-01	5.216E-01	DCF2(4)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	2.429E-02	8.066E-03	DCF3(1)
D-1	Ra-226+D	2.282E-03	2.279E-03	DCF3(2)
D-1	Th-228+D	2.212E-03	8.103E-04	DCF3(3)
D-1	Th-230	1.143E-03	1.143E-03	DCF3(4)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(3,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)
D-34				

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: DCFPAK3.02 (Age 5)

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(3,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(3,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	6.670E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.000E-01	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.900E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	6.000E+00	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Pb-210	2.900E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.200E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Th-228	3.000E-02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Th-230	2.000E-02	0.000E+00	---	S1(4)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(4)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.109E-02	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.582E-02	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.852E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.852E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R017	Inhalation rate (m**3/yr)	4.380E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	6.000E+00	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	1.940E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	6.110E-02	2.500E-01	---	FOTD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	7.300E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Summary : CWC-365, 386 (Partial) Jana Parcels - Student
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA STUDENT.RAD

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	66701.00 square meters	Pb-210	2.900E-01
Thickness:	0.30 meters	Ra-226	1.200E-01
Cover Depth:	0.00 meters	Th-228	3.000E-02
		Th-230	2.000E-02

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.900E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	6.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	3.298E-01	3.140E-01	2.905E-01	2.663E-01	1.624E-01	4.810E-02	3.240E-03	1.434E-03
M(t):	1.736E-02	1.652E-02	1.529E-02	1.402E-02	8.549E-03	2.532E-03	1.705E-04	7.548E-05

0Maximum TDOSE(t): 3.298E-01 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.963E-04	0.0009	2.667E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.284E-01	0.3895
Ra-226	1.635E-01	0.4957	1.060E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.890E-03	0.0179
Th-228	2.960E-02	0.0898	1.038E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.037E-03	0.0031
Th-230	8.951E-06	0.0000	1.300E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.260E-04	0.0013
Total	1.934E-01	0.5864	6.065E-04	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.358E-01	0.4118

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.290E-01	0.3912
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.695E-01	0.5139
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.074E-02	0.0932
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.650E-04	0.0017
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.298E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.840E-04	0.0009	2.557E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.231E-01	0.3921
Ra-226	1.608E-01	0.5122	1.076E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.407E-03	0.0236
Th-228	2.060E-02	0.0656	7.222E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.213E-04	0.0023
Th-230	2.066E-05	0.0001	1.300E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.265E-04	0.0014
Total	1.817E-01	0.5788	5.655E-04	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.317E-01	0.4194

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.237E-01	0.3939
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.683E-01	0.5362
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.139E-02	0.0681
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.772E-04	0.0018
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.140E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.610E-04	0.0009	2.349E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.131E-01	0.3894
Ra-226	1.557E-01	0.5358	1.104E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.017E-02	0.0350
Th-228	9.973E-03	0.0343	3.497E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.493E-04	0.0012
Th-230	4.350E-05	0.0001	1.300E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.277E-04	0.0015
Total	1.660E-01	0.5712	5.103E-04	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.241E-01	0.4271

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.136E-01	0.3911
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.660E-01	0.5712
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.036E-02	0.0356
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.013E-04	0.0021
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.905E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 6.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.299E-04	0.0009	2.069E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.964E-02	0.3742
Ra-226	1.483E-01	0.5568	1.135E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.370E-02	0.0515
Th-228	3.360E-03	0.0126	1.178E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.177E-04	0.0004
Th-230	7.641E-05	0.0003	1.301E-04	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.303E-04	0.0016
Total	1.519E-01	0.5706	4.622E-04	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.139E-01	0.4277

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 6.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.001E-01	0.3758
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.621E-01	0.6087
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.489E-03	0.0131
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.368E-04	0.0024
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.663E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	8.326E-05	0.0005	7.495E-05	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.610E-02	0.2222
Ra-226	1.004E-01	0.6178	1.091E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.483E-02	0.1528
Th-228	5.578E-07	0.0000	1.957E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.955E-08	0.0000
Th-230	2.889E-04	0.0018	1.302E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.668E-04	0.0029
Total	1.007E-01	0.6201	3.142E-04	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.139E-02	0.3779

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.625E-02	0.2232
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.253E-01	0.7714
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.793E-07	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.859E-04	0.0055
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.624E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	4.307E-06	0.0001	3.877E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.867E-03	0.0388
Ra-226	3.213E-02	0.6679	4.495E-05	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.277E-02	0.2654
Th-228	5.270E-18	0.0000	1.853E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.850E-19	0.0000
Th-230	5.902E-04	0.0123	1.303E-04	0.0027	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.658E-04	0.0118
Total	3.272E-02	0.6803	1.791E-04	0.0037	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.520E-02	0.3160

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.875E-03	0.0390
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.494E-02	0.9343
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.473E-18	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.286E-03	0.0267
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.810E-02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	9.105E-10	0.0000	8.194E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.946E-07	0.0001
Ra-226	1.239E-03	0.3823	1.814E-06	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.298E-04	0.1635
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	7.205E-04	0.2224	1.298E-04	0.0400	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.193E-04	0.1911
Total	1.959E-03	0.6046	1.316E-04	0.0406	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.150E-03	0.3548

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.963E-07	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.770E-03	0.5463
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.470E-03	0.4535
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.240E-03	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.249E-22	0.0000	1.124E-22	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.415E-20	0.0000
Ra-226	1.384E-08	0.0000	2.071E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.051E-09	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	6.971E-04	0.4861	1.273E-04	0.0888	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.097E-04	0.4251
Total	6.971E-04	0.4861	1.273E-04	0.0888	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.097E-04	0.4251

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.439E-20	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.991E-08	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.434E-03	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.434E-03	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	6.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	4.448E-01	4.264E-01	3.918E-01	3.451E-01	1.250E-01	6.467E-03	1.367E-06	1.875E-19
0Ra-226+D	Ra-226+D	1.000E+00	1.405E+00	1.382E+00	1.338E+00	1.274E+00	8.623E-01	2.760E-01	1.064E-02	1.190E-07
Ra-226+D	Pb-210+D	1.000E+00	6.956E-03	2.033E-02	4.480E-02	7.629E-02	1.818E-01	9.851E-02	4.112E-03	4.696E-08
Ra-226+D	ΣDSR(j)		1.412E+00	1.403E+00	1.383E+00	1.351E+00	1.044E+00	3.745E-01	1.475E-02	1.659E-07
0Th-228+D	Th-228+D	1.000E+00	1.025E+00	7.130E-01	3.452E-01	1.163E-01	1.931E-05	1.824E-16	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	2.794E-02	2.794E-02	2.794E-02	2.794E-02	2.792E-02	2.787E-02	2.771E-02	2.718E-02
Th-230	Ra-226+D	1.000E+00	3.052E-04	9.090E-04	2.087E-03	3.784E-03	1.474E-02	3.027E-02	3.699E-02	3.581E-02
Th-230	Pb-210+D	1.000E+00	1.009E-06	6.949E-06	3.538E-05	1.147E-04	1.631E-03	6.173E-03	8.771E-03	8.710E-03
Th-230	ΣDSR(j)		2.825E-02	2.886E-02	3.006E-02	3.184E-02	4.429E-02	6.431E-02	7.348E-02	7.170E-02

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.
0

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 1.900E+01 mrem/yr

0Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	6.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	4.271E+01	4.456E+01	4.849E+01	5.506E+01	1.520E+02	2.938E+03	1.390E+07	*7.632E+13
Ra-226	1.345E+01	1.354E+01	1.374E+01	1.407E+01	1.820E+01	5.074E+01	1.288E+03	1.145E+08
Th-228	1.854E+01	2.665E+01	5.504E+01	1.634E+02	9.840E+05	*8.201E+14	*8.201E+14	*8.201E+14
Th-230	6.726E+02	6.584E+02	6.320E+02	5.968E+02	4.290E+02	2.954E+02	2.586E+02	2.650E+02

*At specific activity limit
0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	2.900E-01	0.000E+00	4.448E-01	4.271E+01	4.448E-01	4.271E+01
Ra-226	1.200E-01	0.000E+00	1.412E+00	1.345E+01	1.412E+00	1.345E+01
Th-228	3.000E-02	0.000E+00	1.025E+00	1.854E+01	1.025E+00	1.854E+01
Th-230	2.000E-02	348.8 ± 0.7	7.355E-02	2.583E+02	2.825E-02	6.726E+02

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

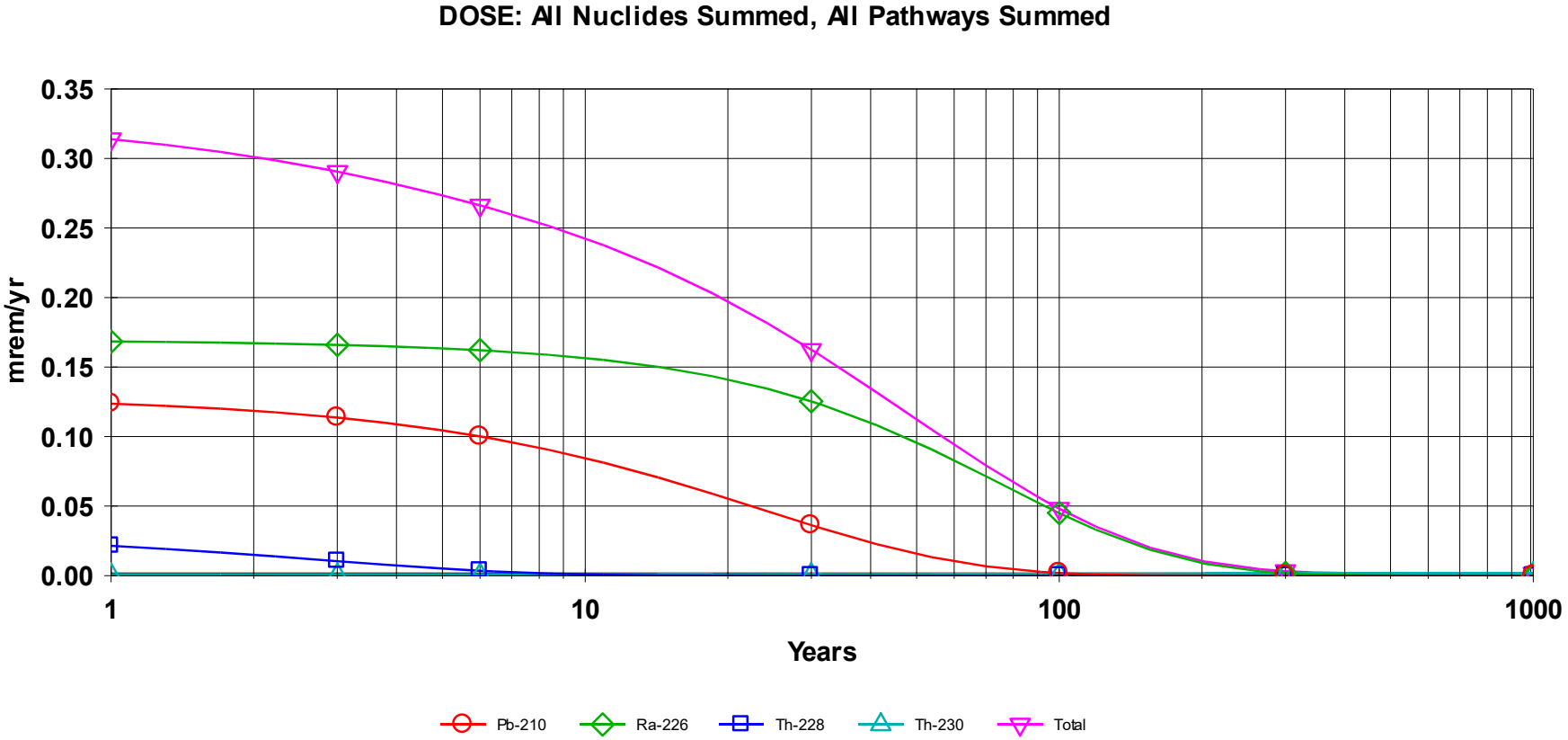
0Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	6.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	1.290E-01	1.237E-01	1.136E-01	1.001E-01	3.625E-02	1.875E-03	3.963E-07	5.439E-20
Pb-210	Ra-226	1.000E+00	8.347E-04	2.440E-03	5.376E-03	9.154E-03	2.182E-02	1.182E-02	4.935E-04	5.636E-09
Pb-210	Th-230	1.000E+00	2.019E-08	1.390E-07	7.075E-07	2.294E-06	3.261E-05	1.235E-04	1.754E-04	1.742E-04
Pb-210	ΣDOSE(j)		1.298E-01	1.261E-01	1.190E-01	1.092E-01	5.810E-02	1.382E-02	6.693E-04	1.742E-04
0Ra-226	Ra-226	1.000E+00	1.686E-01	1.659E-01	1.606E-01	1.529E-01	1.035E-01	3.312E-02	1.277E-03	1.428E-08
Ra-226	Th-230	1.000E+00	6.104E-06	1.818E-05	4.175E-05	7.569E-05	2.949E-04	6.054E-04	7.399E-04	7.163E-04
Ra-226	ΣDOSE(j)		1.686E-01	1.659E-01	1.606E-01	1.530E-01	1.038E-01	3.372E-02	2.017E-03	7.163E-04
0Th-228	Th-228	1.000E+00	3.074E-02	2.139E-02	1.036E-02	3.489E-03	5.793E-07	5.473E-18	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	5.589E-04	5.589E-04	5.588E-04	5.588E-04	5.584E-04	5.573E-04	5.542E-04	5.436E-04

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	6.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	2.900E-01	2.780E-01	2.554E-01	2.250E-01	8.150E-02	4.216E-03	8.910E-07	1.223E-19
Pb-210	Ra-226	1.000E+00	0.000E+00	3.639E-03	1.030E-02	1.888E-02	4.789E-02	2.621E-02	1.095E-03	1.251E-08
Pb-210	Th-230	1.000E+00	0.000E+00	1.327E-07	1.148E-06	4.337E-06	7.005E-05	2.708E-04	3.861E-04	3.834E-04
Pb-210	ΣS(j):		2.900E-01	2.816E-01	2.657E-01	2.439E-01	1.295E-01	3.069E-02	1.482E-03	3.834E-04
0Ra-226	Ra-226	1.000E+00	1.200E-01	1.181E-01	1.143E-01	1.088E-01	7.368E-02	2.361E-02	9.141E-04	1.043E-08
Ra-226	Th-230	1.000E+00	0.000E+00	8.594E-06	2.537E-05	4.953E-05	2.056E-04	4.273E-04	5.254E-04	5.193E-04
Ra-226	ΣS(j):		1.200E-01	1.181E-01	1.143E-01	1.089E-01	7.389E-02	2.404E-02	1.439E-03	5.193E-04
0Th-228	Th-228	1.000E+00	3.000E-02	2.088E-02	1.011E-02	3.406E-03	5.657E-07	5.355E-18	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	2.000E-02	2.000E-02	2.000E-02	2.000E-02	1.998E-02	1.994E-02	1.983E-02	1.945E-02

THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 4.95 seconds



Note: The data line for each radionuclide includes dose contributions from that radionuclide's decay chain isotopes (e.g., the Th-230 data line includes the dose contribution from Ra-226 that results from the radioactive decay of Th-230; the Ra-226 data line does not include the Ra-226 resulting from Th-230 decay).

CWC-365 and CWC-386 Student
RESRAD Risk Summary

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Cancer Risk Slope Factors Summary Table
Risk Library: DCFPAK3.02 Morbidity

0 Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Pb-210+D	4.30E-09	1.48E-09	SLPF(1,1)
Sf-1	Ra-226+D	8.37E-06	2.50E-08	SLPF(2,1)
Sf-1	Th-228+D	7.33E-06	5.64E-09	SLPF(3,1)
Sf-1	Th-230	8.45E-10	8.45E-10	SLPF(4,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Pb-210+D	3.08E-08	1.59E-08	SLPF(1,2)
Sf-2	Ra-226+D	2.82E-08	2.81E-08	SLPF(2,2)
Sf-2	Th-228+D	1.44E-07	1.32E-07	SLPF(3,2)
Sf-2	Th-230	3.41E-08	3.41E-08	SLPF(4,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,3)
Sf-3	Th-228+D	4.23E-10	1.48E-10	SLPF(3,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(4,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	2.67E-09	8.84E-10	SLPF(1,4)
Sf-3	Ra-226+D	3.85E-10	3.85E-10	SLPF(2,4)
Sf-3	Th-228+D	3.00E-10	1.08E-10	SLPF(3,4)
Sf-3	Th-230	9.14E-11	9.14E-11	SLPF(4,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,5)
Sf-3	Th-228+D	4.23E-10	1.48E-10	SLPF(3,5)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(4,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Rn-220	1.90E-13	1.90E-13	SLPFRN(2,1)
Sf-Rn	Po-216	3.00E-15	3.00E-15	SLPFRN(2,2)
Sf-Rn	Pb-212	3.90E-11	3.90E-11	SLPFRN(2,3)
Sf-Rn	Bi-212	3.70E-11	3.70E-11	SLPFRN(2,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	3.88E+02	3.88E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	3.88E+02	3.88E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.88E+02	1.88E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	1.88E+02	1.88E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

0Nuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless)							
	t=	0.000E+00	1.000E+00	3.000E+00	6.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
At-218	2.740E-11	1.355E-01	1.355E-01	1.355E-01	1.355E-01	1.355E-01	1.355E-01	1.355E-01	1.352E-01
Bi-210	2.770E-09	1.363E-01	1.363E-01	1.363E-01	1.363E-01	1.363E-01	1.363E-01	1.363E-01	1.363E-01
Bi-212	4.960E-07	1.330E-01	1.330E-01	1.330E-01	1.330E-01	1.330E-01	1.329E-01	1.324E-01	1.302E-01
Bi-214	7.340E-06	1.311E-01	1.311E-01	1.311E-01	1.311E-01	1.310E-01	1.308E-01	1.302E-01	1.272E-01
Hg-206	4.830E-07	1.359E-01	1.359E-01	1.359E-01	1.359E-01	1.359E-01	1.358E-01	1.357E-01	1.348E-01
Pb-210	1.480E-09	1.387E-01	1.387E-01	1.387E-01	1.387E-01	1.387E-01	1.387E-01	1.387E-01	1.387E-01
Pb-212	4.960E-07	1.363E-01	1.363E-01	1.363E-01	1.363E-01	1.363E-01	1.363E-01	1.362E-01	1.357E-01
Pb-214	9.940E-07	1.358E-01	1.358E-01	1.358E-01	1.358E-01	1.358E-01	1.358E-01	1.356E-01	1.347E-01
Po-210	4.510E-11	1.332E-01	1.332E-01	1.332E-01	1.332E-01	1.332E-01	1.330E-01	1.326E-01	1.306E-01
Po-212	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-214	3.850E-10	1.332E-01	1.332E-01	1.332E-01	1.332E-01	1.332E-01	1.331E-01	1.327E-01	1.307E-01
Po-216	7.100E-11	1.333E-01	1.333E-01	1.333E-01	1.333E-01	1.332E-01	1.331E-01	1.327E-01	1.307E-01
Po-218	6.840E-15	1.372E-01	1.372E-01	1.372E-01	1.372E-01	1.372E-01	1.372E-01	1.372E-01	1.372E-01
Ra-224	3.910E-08	1.362E-01	1.362E-01	1.362E-01	1.362E-01	1.362E-01	1.362E-01	1.361E-01	1.355E-01
Ra-226	2.500E-08	1.364E-01	1.364E-01	1.364E-01	1.364E-01	1.364E-01	1.364E-01	1.364E-01	1.360E-01
Rn-218	3.390E-09	1.339E-01	1.339E-01	1.339E-01	1.339E-01	1.338E-01	1.337E-01	1.335E-01	1.318E-01
Rn-220	2.770E-09	1.344E-01	1.344E-01	1.344E-01	1.344E-01	1.344E-01	1.343E-01	1.340E-01	1.326E-01
Rn-222	1.690E-09	1.346E-01	1.346E-01	1.346E-01	1.346E-01	1.346E-01	1.345E-01	1.343E-01	1.330E-01
Th-228	5.640E-09	1.369E-01	1.369E-01	1.369E-01	1.369E-01	1.369E-01	1.369E-01	1.369E-01	1.367E-01
Th-230	8.450E-10	1.372E-01	1.372E-01	1.372E-01	1.372E-01	1.372E-01	1.372E-01	1.372E-01	1.371E-01
Tl-206	6.110E-09	1.358E-01	1.358E-01	1.358E-01	1.358E-01	1.358E-01	1.359E-01	1.359E-01	1.359E-01
Tl-208	1.750E-05	1.283E-01	1.282E-01	1.282E-01	1.282E-01	1.281E-01	1.279E-01	1.270E-01	1.231E-01
Tl-210	1.340E-05	1.316E-01	1.316E-01	1.316E-01	1.316E-01	1.315E-01	1.314E-01	1.308E-01	1.280E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	3.615E-03	0.000E+00	0.000E+00	0.000E+00	5.400E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.400E+00
Ra-226	1.496E-03	0.000E+00	0.000E+00	0.000E+00	2.235E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.235E+00
Th-228	3.739E-04	0.000E+00	0.000E+00	0.000E+00	5.587E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.587E-01
Th-230	2.493E-04	0.000E+00	0.000E+00	0.000E+00	3.724E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.724E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.401E-10	0.0010	6.135E-10	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.024E-07	0.1093
Ra-226	7.555E-07	0.8065	2.413E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.580E-09	0.0070
Th-228	6.946E-08	0.0742	1.321E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.779E-10	0.0006
Th-230	1.391E-11	0.0000	5.095E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.661E-10	0.0003
Total	8.259E-07	0.8817	1.038E-09	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.098E-07	0.1172

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.039E-07	0.1109
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.623E-07	0.8138
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.017E-08	0.0749
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.310E-10	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.367E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	9.047E-10	0.0010	5.904E-10	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.850E-08	0.1052
Ra-226	7.554E-07	0.8064	2.644E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.043E-08	0.0111
Th-228	6.946E-08	0.0742	1.321E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.779E-10	0.0006
Th-230	1.802E-10	0.0002	5.101E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.681E-10	0.0003
Total	8.259E-07	0.8817	1.038E-09	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.098E-07	0.1172

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.000E-07	0.1067
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.661E-07	0.8178
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.017E-08	0.0749
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.993E-10	0.0005
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.367E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	3.510E-03	0.000E+00	0.000E+00	0.000E+00	5.245E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.245E+00
Ra-226	1.472E-03	0.000E+00	0.000E+00	0.000E+00	2.199E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.199E+00
Th-228	2.602E-04	0.000E+00	0.000E+00	0.000E+00	3.888E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.888E-01
Th-230	2.493E-04	0.000E+00	0.000E+00	0.000E+00	3.724E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.724E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.134E-10	0.0010	5.961E-10	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.944E-08	0.1105
Ra-226	7.434E-07	0.8258	2.375E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.474E-09	0.0072
Th-228	4.833E-08	0.0537	9.192E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.022E-10	0.0004
Th-230	1.391E-11	0.0000	5.095E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.661E-10	0.0003
Total	7.926E-07	0.8805	9.764E-10	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.066E-07	0.1184

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.010E-07	0.1121
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.501E-07	0.8332
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.883E-08	0.0542
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.310E-10	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.002E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	8.672E-10	0.0010	5.659E-10	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.442E-08	0.1049
Ra-226	7.432E-07	0.8256	2.675E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.150E-08	0.0128
Th-228	4.833E-08	0.0537	9.192E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.022E-10	0.0004
Th-230	2.343E-10	0.0003	5.103E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.689E-10	0.0003
Total	7.926E-07	0.8805	9.764E-10	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.066E-07	0.1184

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.585E-08	0.1065
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.550E-07	0.8387
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.883E-08	0.0542
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.542E-10	0.0006
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.002E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	3.312E-03	0.000E+00	0.000E+00	0.000E+00	4.948E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.948E+00
Ra-226	1.425E-03	0.000E+00	0.000E+00	0.000E+00	2.129E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.129E+00
Th-228	1.260E-04	0.000E+00	0.000E+00	0.000E+00	1.882E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.882E-01
Th-230	2.493E-04	0.000E+00	0.000E+00	0.000E+00	3.724E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.724E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.627E-10	0.0010	5.630E-10	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.392E-08	0.1111
Ra-226	7.197E-07	0.8512	2.299E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.268E-09	0.0074
Th-228	2.340E-08	0.0277	4.451E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.947E-10	0.0002
Th-230	1.391E-11	0.0000	5.095E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.661E-10	0.0003
Total	7.440E-07	0.8799	8.883E-10	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.007E-07	0.1190

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.535E-08	0.1128
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.262E-07	0.8589
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.364E-08	0.0280
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.310E-10	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.455E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	7.968E-10	0.0009	5.200E-10	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.676E-08	0.1026
Ra-226	7.194E-07	0.8509	2.728E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.343E-08	0.0159
Th-228	2.340E-08	0.0277	4.451E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.947E-10	0.0002
Th-230	3.398E-10	0.0004	5.106E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.707E-10	0.0003
Total	7.440E-07	0.8799	8.883E-10	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.007E-07	0.1190

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.808E-08	0.1042
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.331E-07	0.8671
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.364E-08	0.0280
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.616E-10	0.0008
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.455E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 6.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	3.039E-03	0.000E+00	0.000E+00	0.000E+00	4.541E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.541E+00
Ra-226	1.357E-03	0.000E+00	0.000E+00	0.000E+00	2.028E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.028E+00
Th-228	4.245E-05	0.000E+00	0.000E+00	0.000E+00	6.342E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.342E-02
Th-230	2.492E-04	0.000E+00	0.000E+00	0.000E+00	3.724E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.724E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 6.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 6.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	7.929E-10	0.0010	5.174E-10	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.632E-08	0.1096
Ra-226	6.856E-07	0.8704	2.190E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.971E-09	0.0076
Th-228	7.884E-09	0.0100	1.500E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.561E-11	0.0001
Th-230	1.390E-11	0.0000	5.094E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.661E-10	0.0003
Total	6.942E-07	0.8814	8.024E-10	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.263E-08	0.1176

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 6.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.763E-08	0.1113
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.917E-07	0.8782
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.965E-09	0.0101
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.309E-10	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.877E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 6.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 6.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	7.019E-10	0.0009	4.580E-10	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.642E-08	0.0970
Ra-226	6.852E-07	0.8699	2.782E-10	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.587E-08	0.0201
Th-228	7.884E-09	0.0100	1.500E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.561E-11	0.0001
Th-230	4.919E-10	0.0006	5.112E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.739E-10	0.0003
Total	6.942E-07	0.8814	8.024E-10	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.263E-08	0.1176

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 6.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.758E-08	0.0985
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.013E-07	0.8904
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.965E-09	0.0101
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.169E-10	0.0010
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.877E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.614E-03	0.000E+00	0.000E+00	0.000E+00	2.411E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.411E+00
Ra-226	9.209E-04	0.000E+00	0.000E+00	0.000E+00	1.376E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.376E+00
Th-228	7.051E-09	0.000E+00	0.000E+00	0.000E+00	1.054E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.054E-05
Th-230	2.491E-04	0.000E+00	0.000E+00	0.000E+00	3.721E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.721E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.256E-10	0.0008	2.778E-10	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.634E-08	0.0897
Ra-226	4.650E-07	0.9002	1.486E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.052E-09	0.0078
Th-228	1.309E-12	0.0000	2.491E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.090E-14	0.0000
Th-230	1.390E-11	0.0000	5.091E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.659E-10	0.0005
Total	4.654E-07	0.9010	4.773E-10	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.066E-08	0.0981

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.705E-08	0.0911
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.692E-07	0.9083
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.322E-12	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.307E-10	0.0006
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.166E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	2.542E-10	0.0005	1.659E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.768E-08	0.0536
Ra-226	4.637E-07	0.8977	2.598E-10	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.267E-08	0.0439
Th-228	1.309E-12	0.0000	2.491E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.090E-14	0.0000
Th-230	1.474E-09	0.0029	5.156E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.096E-10	0.0006
Total	4.654E-07	0.9010	4.773E-10	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.066E-08	0.0981

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.810E-08	0.0544
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.866E-07	0.9420
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.322E-12	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.835E-09	0.0036
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.166E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	3.825E-04	0.000E+00	0.000E+00	0.000E+00	5.716E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.716E-01
Ra-226	2.996E-04	0.000E+00	0.000E+00	0.000E+00	4.476E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.476E-01
Th-228	6.675E-20	0.000E+00	0.000E+00	0.000E+00	9.973E-17	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.973E-17
Th-230	2.486E-04	0.000E+00	0.000E+00	0.000E+00	3.714E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.714E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.028E-10	0.0006	6.711E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.120E-08	0.0682
Ra-226	1.512E-07	0.9205	4.839E-11	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.319E-09	0.0080
Th-228	1.237E-23	0.0000	2.358E-26	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.032E-25	0.0000
Th-230	1.387E-11	0.0001	5.081E-11	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.654E-10	0.0016
Total	1.513E-07	0.9212	1.663E-10	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.278E-08	0.0778

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.137E-08	0.0692
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.526E-07	0.9288
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.249E-23	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.301E-10	0.0020
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.643E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	1.315E-11	0.0001	8.583E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.432E-09	0.0087
Ra-226	1.484E-07	0.9036	1.054E-10	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.095E-08	0.0667
Th-228	1.237E-23	0.0000	2.358E-26	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.032E-25	0.0000
Th-230	2.865E-09	0.0174	5.236E-11	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.965E-10	0.0024
Total	1.513E-07	0.9212	1.663E-10	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.278E-08	0.0778

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.454E-09	0.0089
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.595E-07	0.9710
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.249E-23	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.314E-09	0.0202
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.643E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.847E-05	0.000E+00	0.000E+00	0.000E+00	2.760E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.760E-02
Ra-226	1.794E-05	0.000E+00	0.000E+00	0.000E+00	2.681E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.681E-02
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	2.472E-04	0.000E+00	0.000E+00	0.000E+00	3.694E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.694E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 3.000E+02 years

0

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.053E-12	0.0005	3.297E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.501E-10	0.0543
Ra-226	9.169E-09	0.9043	2.947E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.034E-11	0.0079
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.379E-11	0.0014	5.053E-11	0.0050	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.639E-10	0.0260
Total	9.188E-09	0.9062	5.678E-11	0.0056	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.944E-10	0.0882

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.585E-10	0.0551
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.252E-09	0.9125
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.282E-10	0.0324
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.014E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	2.780E-15	0.0000	1.814E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.026E-13	0.0000
Ra-226	5.722E-09	0.5644	4.243E-12	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.514E-10	0.0445
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	3.466E-09	0.3418	5.253E-11	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.427E-10	0.0437
Total	9.188E-09	0.9062	5.678E-11	0.0056	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.944E-10	0.0882

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.072E-13	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.178E-09	0.6093
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.961E-09	0.3907
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.014E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	4.779E-06	0.000E+00	0.000E+00	0.000E+00	7.141E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.141E-03
Ra-226	6.472E-06	0.000E+00	0.000E+00	0.000E+00	9.670E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.670E-03
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	2.425E-04	0.000E+00	0.000E+00	0.000E+00	3.623E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.623E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.354E-12	0.0004	8.838E-13	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.475E-10	0.0384
Ra-226	3.337E-09	0.8691	1.096E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.987E-11	0.0078
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.352E-11	0.0035	4.956E-11	0.0129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.589E-10	0.0674
Total	3.352E-09	0.8730	5.154E-11	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.362E-10	0.1136

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.497E-10	0.0390
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.368E-09	0.8772
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.219E-10	0.0838
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.840E-09	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	3.814E-28	0.0000	2.489E-28	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.153E-26	0.0000
Ra-226	6.394E-14	0.0000	4.845E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.154E-15	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	3.352E-09	0.8730	5.154E-11	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.362E-10	0.1136
Total	3.352E-09	0.8730	5.154E-11	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.362E-10	0.1136

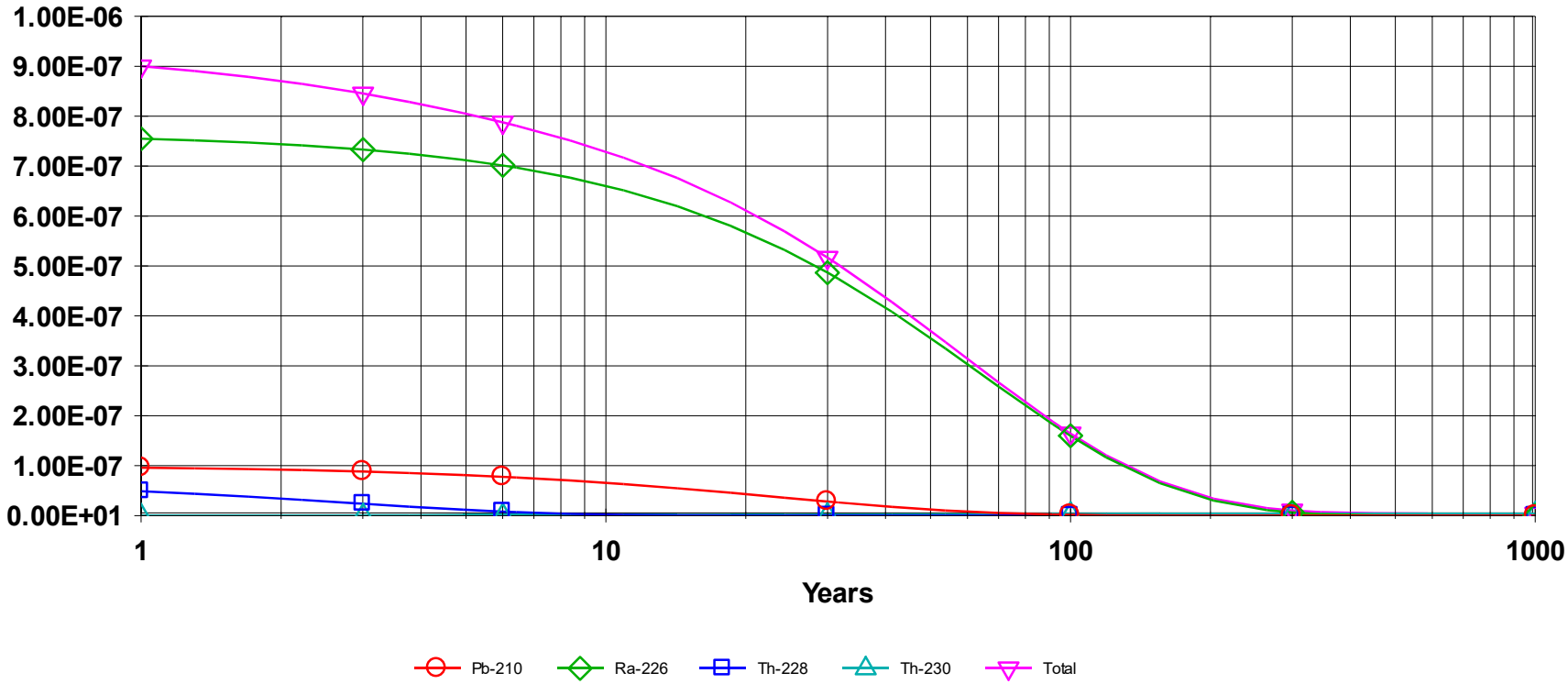
Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.216E-26	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.915E-14	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.840E-09	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.840E-09	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

EXCESS CANCER RISK: All Nuclides Summed, All Pathways Summed



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Note: The data line for each radionuclide includes risk contributions from that radionuclide's decay chain isotopes (e.g., the Th-230 data line includes the risk contribution from Ra-226 that results from the radioactive decay of Th-230; the Ra-226 data line does not include the Ra-226 resulting from Th-230 decay).

CWC-365 and CWC-386 School Staff
RESRAD Dose Summary

Summary : CWC-365, 386 (Partial) Jana Parcels - Staff
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA STAFF.RAD

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Dose Conversion Factor (and Related) Parameter Summary
Dose Library: DCFPAK3.02 (Adult)

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: DCFPAK3.02)	5.567E-05	5.567E-05	DCF1(1)
A-1	Bi-210 (Source: DCFPAK3.02)	5.473E-03	5.473E-03	DCF1(2)
A-1	Bi-212 (Source: DCFPAK3.02)	6.258E-01	6.258E-01	DCF1(3)
A-1	Bi-214 (Source: DCFPAK3.02)	9.135E+00	9.135E+00	DCF1(4)
A-1	Hg-206 (Source: DCFPAK3.02)	6.127E-01	6.127E-01	DCF1(5)
A-1	Pb-210 (Source: DCFPAK3.02)	2.092E-03	2.092E-03	DCF1(6)
A-1	Pb-212 (Source: DCFPAK3.02)	6.314E-01	6.314E-01	DCF1(7)
A-1	Pb-214 (Source: DCFPAK3.02)	1.257E+00	1.257E+00	DCF1(8)
A-1	Po-210 (Source: DCFPAK3.02)	5.641E-05	5.641E-05	DCF1(9)
A-1	Po-212 (Source: DCFPAK3.02)	0.000E+00	0.000E+00	DCF1(10)
A-1	Po-214 (Source: DCFPAK3.02)	4.801E-04	4.801E-04	DCF1(11)
A-1	Po-216 (Source: DCFPAK3.02)	8.873E-05	8.873E-05	DCF1(12)
A-1	Po-218 (Source: DCFPAK3.02)	9.228E-09	9.228E-09	DCF1(13)
A-1	Ra-224 (Source: DCFPAK3.02)	4.950E-02	4.950E-02	DCF1(14)
A-1	Ra-226 (Source: DCFPAK3.02)	3.176E-02	3.176E-02	DCF1(15)
A-1	Rn-218 (Source: DCFPAK3.02)	4.259E-03	4.259E-03	DCF1(16)
A-1	Rn-220 (Source: DCFPAK3.02)	3.474E-03	3.474E-03	DCF1(17)
A-1	Rn-222 (Source: DCFPAK3.02)	2.130E-03	2.130E-03	DCF1(18)
A-1	Th-228 (Source: DCFPAK3.02)	7.248E-03	7.248E-03	DCF1(19)
A-1	Th-230 (Source: DCFPAK3.02)	1.106E-03	1.106E-03	DCF1(20)
A-1	Tl-206 (Source: DCFPAK3.02)	1.278E-02	1.278E-02	DCF1(21)
A-1	Tl-208 (Source: DCFPAK3.02)	2.167E+01	2.167E+01	DCF1(22)
A-1	Tl-210 (Source: DCFPAK3.02)	1.677E+01	1.677E+01	DCF1(23)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	3.708E-02	2.077E-02	DCF2(1)
B-1	Ra-226+D	3.528E-02	3.517E-02	DCF2(2)
B-1	Th-228+D	1.600E-01	1.468E-01	DCF2(3)
B-1	Th-230	3.759E-01	3.759E-01	DCF2(4)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	7.057E-03	2.575E-03	DCF3(1)
D-1	Ra-226+D	1.037E-03	1.036E-03	DCF3(2)
D-1	Th-228+D	5.286E-04	2.664E-04	DCF3(3)
D-1	Th-230	7.918E-04	7.918E-04	DCF3(4)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(3,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)
D-34				

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: DCFPAK3.02 (Adult)

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(3,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(3,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	6.670E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.000E-01	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.900E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	2.500E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Pb-210	2.900E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.200E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Th-228	3.000E-02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Th-230	2.000E-02	0.000E+00	---	S1(4)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(4)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.109E-02	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.582E-02	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.852E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.852E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R017	Inhalation rate (m**3/yr)	5.840E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	2.500E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	1.800E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	9.030E-02	2.500E-01	---	FOTD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Summary : CWC-365, 386 (Partial) Jana Parcels - Staff
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA STAFF.RAD

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	66701.00 square meters	Pb-210	2.900E-01
Thickness:	0.30 meters	Ra-226	1.200E-01
Cover Depth:	0.00 meters	Th-228	3.000E-02
		Th-230	2.000E-02

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.900E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	2.500E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.482E-01	2.339E-01	2.142E-01	1.804E-01	1.392E-01	4.099E-02	2.712E-03	1.143E-03
M(t):	1.306E-02	1.231E-02	1.128E-02	9.495E-03	7.324E-03	2.157E-03	1.427E-04	6.013E-05

0Maximum TDOSE(t): 2.482E-01 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.467E-04	0.0014	2.048E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.977E-02	0.0797
Ra-226	1.913E-01	0.7707	8.299E-05	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.346E-03	0.0054
Th-228	3.464E-02	0.1396	7.831E-05	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.312E-04	0.0005
Th-230	1.047E-05	0.0000	1.462E-04	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.563E-04	0.0006
Total	2.263E-01	0.9117	5.123E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.140E-02	0.0862

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.032E-02	0.0819
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.927E-01	0.7764
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.485E-02	0.1404
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.130E-04	0.0013
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.482E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.323E-04	0.0014	1.963E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.895E-02	0.0810
Ra-226	1.882E-01	0.8046	8.422E-05	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.572E-03	0.0067
Th-228	2.410E-02	0.1030	5.449E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.131E-05	0.0004
Th-230	2.417E-05	0.0001	1.462E-04	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.564E-04	0.0007
Total	2.126E-01	0.9091	4.812E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.077E-02	0.0888

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.948E-02	0.0833
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.898E-01	0.8117
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.425E-02	0.1037
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.268E-04	0.0014
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.339E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.054E-04	0.0014	1.803E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.741E-02	0.0813
Ra-226	1.822E-01	0.8503	8.631E-05	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.984E-03	0.0093
Th-228	1.167E-02	0.0545	2.639E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.421E-05	0.0002
Th-230	5.091E-05	0.0002	1.462E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.566E-04	0.0007
Total	1.942E-01	0.9065	4.392E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.960E-02	0.0915

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.790E-02	0.0835
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.842E-01	0.8600
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.174E-02	0.0548
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.537E-04	0.0017
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.142E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.271E-04	0.0013	1.341E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.295E-02	0.0718
Ra-226	1.626E-01	0.9012	9.033E-05	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.055E-03	0.0169
Th-228	9.217E-04	0.0051	2.084E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.493E-06	0.0000
Th-230	1.379E-04	0.0008	1.462E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.579E-04	0.0009
Total	1.639E-01	0.9083	3.728E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.617E-02	0.0896

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.331E-02	0.0738
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.657E-01	0.9186
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.273E-04	0.0051
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.420E-04	0.0025
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.804E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.500E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.204E-04	0.0009	7.110E-05	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.865E-03	0.0493
Ra-226	1.274E-01	0.9154	8.764E-05	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.022E-03	0.0289
Th-228	4.001E-06	0.0000	9.052E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.517E-08	0.0000
Th-230	2.940E-04	0.0021	1.463E-04	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.618E-04	0.0012
Total	1.278E-01	0.9184	3.050E-04	0.0022	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.105E-02	0.0794

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.500E+01 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.056E-03	0.0507
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.315E-01	0.9449
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.025E-06	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.020E-04	0.0043
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.392E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.040E-06	0.0001	2.977E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.874E-04	0.0070
Ra-226	3.759E-02	0.9171	3.483E-05	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.051E-03	0.0500
Th-228	6.167E-18	0.0000	1.398E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.342E-20	0.0000
Th-230	6.906E-04	0.0168	1.463E-04	0.0036	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.791E-04	0.0044
Total	3.829E-02	0.9341	1.841E-04	0.0045	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.518E-03	0.0614

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
0 Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.954E-04	0.0072
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.968E-02	0.9680
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.204E-18	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.016E-03	0.0248
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.099E-02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.065E-09	0.0000	6.291E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.074E-08	0.0000
Ra-226	1.449E-03	0.5345	1.405E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.490E-05	0.0313
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	8.431E-04	0.3109	1.456E-04	0.0537	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.872E-04	0.0690
Total	2.292E-03	0.8454	1.470E-04	0.0542	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.722E-04	0.1004

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.243E-08	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.536E-03	0.5663
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.176E-03	0.4337
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.712E-03	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.462E-22	0.0000	8.633E-23	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.335E-21	0.0000
Ra-226	1.620E-08	0.0000	1.605E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.695E-10	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	8.157E-04	0.7140	1.428E-04	0.1250	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.840E-04	0.1610
Total	8.158E-04	0.7140	1.428E-04	0.1250	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.840E-04	0.1610

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.567E-21	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.718E-08	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.143E-03	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.143E-03	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	2.500E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	7.007E-02	6.717E-02	6.172E-02	4.590E-02	2.433E-02	1.019E-03	2.153E-07	2.954E-20
0Ra-226+D	Ra-226+D	1.000E+00	1.605E+00	1.579E+00	1.528E+00	1.364E+00	1.068E+00	3.152E-01	1.215E-02	1.358E-07
Ra-226+D	Pb-210+D	1.000E+00	1.096E-03	3.203E-03	7.057E-03	1.730E-02	2.750E-02	1.552E-02	6.478E-04	7.398E-09
Ra-226+D	ΣDSR(j)		1.606E+00	1.582E+00	1.535E+00	1.381E+00	1.096E+00	3.307E-01	1.280E-02	1.432E-07
0Th-228+D	Th-228+D	1.000E+00	1.162E+00	8.082E-01	3.913E-01	3.091E-02	1.342E-04	2.068E-16	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	1.530E-02	1.530E-02	1.530E-02	1.529E-02	1.529E-02	1.526E-02	1.517E-02	1.488E-02
Th-230	Ra-226+D	1.000E+00	3.485E-04	1.038E-03	2.384E-03	6.763E-03	1.462E-02	3.457E-02	4.224E-02	4.087E-02
Th-230	Pb-210+D	1.000E+00	1.590E-07	1.095E-06	5.573E-06	4.367E-05	1.960E-04	9.724E-04	1.382E-03	1.372E-03
Th-230	ΣDSR(j)		1.565E-02	1.634E-02	1.769E-02	2.210E-02	3.010E-02	5.080E-02	5.879E-02	5.713E-02

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.
0

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 1.900E+01 mrem/yr

0Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	2.500E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	2.711E+02	2.829E+02	3.078E+02	4.140E+02	7.809E+02	1.865E+04	8.825E+07	*7.632E+13
Ra-226	1.183E+01	1.201E+01	1.238E+01	1.376E+01	1.734E+01	5.746E+01	1.485E+03	1.327E+08
Th-228	1.636E+01	2.351E+01	4.855E+01	6.147E+02	1.416E+05	*8.201E+14	*8.201E+14	*8.201E+14
Th-230	1.214E+03	1.163E+03	1.074E+03	8.597E+02	6.312E+02	3.740E+02	3.232E+02	3.326E+02

*At specific activity limit
0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	2.900E-01	0.000E+00	7.007E-02	2.711E+02	7.007E-02	2.711E+02
Ra-226	1.200E-01	0.000E+00	1.606E+00	1.183E+01	1.606E+00	1.183E+01
Th-228	3.000E-02	0.000E+00	1.162E+00	1.636E+01	1.162E+00	1.636E+01
Th-230	2.000E-02	345.9 ± 0.7	5.885E-02	3.228E+02	1.565E-02	1.214E+03

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

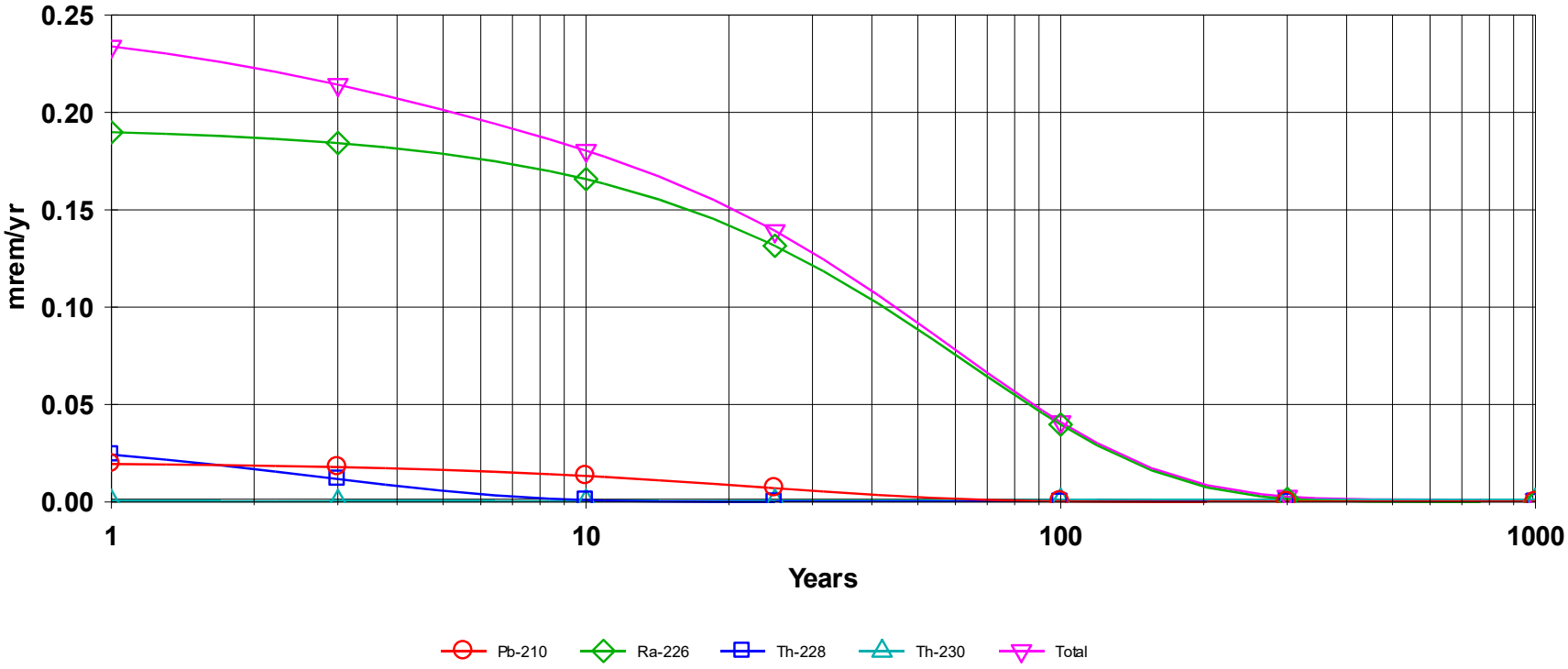
0Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	2.500E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	2.032E-02	1.948E-02	1.790E-02	1.331E-02	7.056E-03	2.954E-04	6.243E-08	8.567E-21
Pb-210	Ra-226	1.000E+00	1.315E-04	3.843E-04	8.468E-04	2.076E-03	3.300E-03	1.862E-03	7.773E-05	8.877E-10
Pb-210	Th-230	1.000E+00	3.180E-09	2.189E-08	1.115E-07	8.734E-07	3.919E-06	1.945E-05	2.763E-05	2.744E-05
Pb-210	ΣDOSE(j)		2.045E-02	1.986E-02	1.875E-02	1.539E-02	1.036E-02	2.177E-03	1.054E-04	2.744E-05
0Ra-226	Ra-226	1.000E+00	1.926E-01	1.895E-01	1.834E-01	1.636E-01	1.282E-01	3.782E-02	1.458E-03	1.630E-08
Ra-226	Th-230	1.000E+00	6.971E-06	2.076E-05	4.768E-05	1.353E-04	2.924E-04	6.914E-04	8.448E-04	8.175E-04
Ra-226	ΣDOSE(j)		1.926E-01	1.895E-01	1.834E-01	1.638E-01	1.285E-01	3.851E-02	2.303E-03	8.175E-04
0Th-228	Th-228	1.000E+00	3.485E-02	2.425E-02	1.174E-02	9.273E-04	4.025E-06	6.204E-18	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	3.060E-04	3.060E-04	3.060E-04	3.059E-04	3.058E-04	3.051E-04	3.034E-04	2.976E-04

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	2.500E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	2.900E-01	2.780E-01	2.554E-01	1.900E-01	1.007E-01	4.216E-03	8.910E-07	1.223E-19
Pb-210	Ra-226	1.000E+00	0.000E+00	3.639E-03	1.030E-02	2.804E-02	4.585E-02	2.621E-02	1.095E-03	1.251E-08
Pb-210	Th-230	1.000E+00	0.000E+00	1.327E-07	1.148E-06	1.117E-05	5.310E-05	2.708E-04	3.861E-04	3.834E-04
Pb-210	ΣS(j):		2.900E-01	2.816E-01	2.657E-01	2.180E-01	1.466E-01	3.069E-02	1.482E-03	3.834E-04
0Ra-226	Ra-226	1.000E+00	1.200E-01	1.181E-01	1.143E-01	1.020E-01	7.992E-02	2.361E-02	9.141E-04	1.043E-08
Ra-226	Th-230	1.000E+00	0.000E+00	8.594E-06	2.537E-05	7.996E-05	1.779E-04	4.273E-04	5.254E-04	5.193E-04
Ra-226	ΣS(j):		1.200E-01	1.181E-01	1.143E-01	1.021E-01	8.010E-02	2.404E-02	1.439E-03	5.193E-04
0Th-228	Th-228	1.000E+00	3.000E-02	2.088E-02	1.011E-02	7.985E-04	3.468E-06	5.355E-18	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	2.000E-02	2.000E-02	2.000E-02	1.999E-02	1.999E-02	1.994E-02	1.983E-02	1.945E-02

THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 4.21 seconds



Note: The data line for each radionuclide includes dose contributions from that radionuclide's decay chain isotopes (e.g., the Th-230 data line includes the dose contribution from Ra-226 that results from the radioactive decay of Th-230; the Ra-226 data line does not include the Ra-226 resulting from Th-230 decay).

CWC-365 and CWC-386 School Staff
RESRAD Risk Summary

Intrisk : CWC-365, 386 (Partial) Jana Parcels - Staff
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA STAFF.RAD

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Cancer Risk Slope Factors Summary Table
Risk Library: DCFPAK3.02 Morbidity

0 Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Pb-210+D	4.30E-09	1.48E-09	SLPF(1,1)
Sf-1	Ra-226+D	8.37E-06	2.50E-08	SLPF(2,1)
Sf-1	Th-228+D	7.33E-06	5.64E-09	SLPF(3,1)
Sf-1	Th-230	8.45E-10	8.45E-10	SLPF(4,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Pb-210+D	3.08E-08	1.59E-08	SLPF(1,2)
Sf-2	Ra-226+D	2.82E-08	2.81E-08	SLPF(2,2)
Sf-2	Th-228+D	1.44E-07	1.32E-07	SLPF(3,2)
Sf-2	Th-230	3.41E-08	3.41E-08	SLPF(4,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,3)
Sf-3	Th-228+D	4.23E-10	1.48E-10	SLPF(3,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(4,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	2.67E-09	8.84E-10	SLPF(1,4)
Sf-3	Ra-226+D	3.85E-10	3.85E-10	SLPF(2,4)
Sf-3	Th-228+D	3.00E-10	1.08E-10	SLPF(3,4)
Sf-3	Th-230	9.14E-11	9.14E-11	SLPF(4,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,5)
Sf-3	Th-228+D	4.23E-10	1.48E-10	SLPF(3,5)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(4,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Rn-220	1.90E-13	1.90E-13	SLPFRN(2,1)
Sf-Rn	Po-216	3.00E-15	3.00E-15	SLPFRN(2,2)
Sf-Rn	Pb-212	3.90E-11	3.90E-11	SLPFRN(2,3)
Sf-Rn	Bi-212	3.70E-11	3.70E-11	SLPFRN(2,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	3.88E+02	3.88E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	3.88E+02	3.88E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.88E+02	1.88E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	1.88E+02	1.88E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

0Nuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	2.500E+01	1.000E+02	3.000E+02	1.000E+03
At-218	2.740E-11	1.585E-01	1.585E-01	1.585E-01	1.585E-01	1.585E-01	1.585E-01	1.585E-01	1.582E-01
Bi-210	2.770E-09	1.594E-01	1.594E-01	1.594E-01	1.594E-01	1.594E-01	1.595E-01	1.595E-01	1.595E-01
Bi-212	4.960E-07	1.557E-01	1.557E-01	1.557E-01	1.557E-01	1.556E-01	1.555E-01	1.550E-01	1.524E-01
Bi-214	7.340E-06	1.534E-01	1.534E-01	1.534E-01	1.533E-01	1.533E-01	1.531E-01	1.523E-01	1.488E-01
Hg-206	4.830E-07	1.590E-01	1.590E-01	1.590E-01	1.590E-01	1.590E-01	1.589E-01	1.588E-01	1.578E-01
Pb-210	1.480E-09	1.623E-01	1.623E-01	1.623E-01	1.623E-01	1.623E-01	1.623E-01	1.623E-01	1.623E-01
Pb-212	4.960E-07	1.595E-01	1.595E-01	1.595E-01	1.595E-01	1.595E-01	1.595E-01	1.594E-01	1.588E-01
Pb-214	9.940E-07	1.589E-01	1.589E-01	1.589E-01	1.589E-01	1.589E-01	1.589E-01	1.587E-01	1.576E-01
Po-210	4.510E-11	1.559E-01	1.559E-01	1.559E-01	1.559E-01	1.558E-01	1.557E-01	1.552E-01	1.528E-01
Po-212	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-214	3.850E-10	1.559E-01	1.559E-01	1.559E-01	1.559E-01	1.559E-01	1.557E-01	1.553E-01	1.530E-01
Po-216	7.100E-11	1.560E-01	1.560E-01	1.559E-01	1.559E-01	1.559E-01	1.558E-01	1.553E-01	1.529E-01
Po-218	6.840E-15	1.606E-01	1.606E-01	1.606E-01	1.606E-01	1.606E-01	1.606E-01	1.606E-01	1.605E-01
Ra-224	3.910E-08	1.594E-01	1.594E-01	1.594E-01	1.594E-01	1.593E-01	1.593E-01	1.592E-01	1.586E-01
Ra-226	2.500E-08	1.596E-01	1.596E-01	1.596E-01	1.596E-01	1.596E-01	1.596E-01	1.596E-01	1.592E-01
Rn-218	3.390E-09	1.566E-01	1.566E-01	1.566E-01	1.566E-01	1.566E-01	1.565E-01	1.562E-01	1.543E-01
Rn-220	2.770E-09	1.573E-01	1.573E-01	1.573E-01	1.573E-01	1.572E-01	1.571E-01	1.569E-01	1.552E-01
Rn-222	1.690E-09	1.575E-01	1.575E-01	1.575E-01	1.575E-01	1.575E-01	1.574E-01	1.572E-01	1.556E-01
Th-228	5.640E-09	1.602E-01	1.602E-01	1.602E-01	1.602E-01	1.602E-01	1.602E-01	1.602E-01	1.600E-01
Th-230	8.450E-10	1.605E-01	1.605E-01	1.605E-01	1.605E-01	1.605E-01	1.605E-01	1.605E-01	1.605E-01
Tl-206	6.110E-09	1.590E-01	1.590E-01	1.590E-01	1.590E-01	1.590E-01	1.590E-01	1.590E-01	1.590E-01
Tl-208	1.750E-05	1.501E-01	1.501E-01	1.501E-01	1.500E-01	1.500E-01	1.496E-01	1.486E-01	1.441E-01
Tl-210	1.340E-05	1.540E-01	1.540E-01	1.540E-01	1.540E-01	1.539E-01	1.537E-01	1.530E-01	1.497E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.639E-03	0.000E+00	0.000E+00	0.000E+00	2.861E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.861E+00
Ra-226	2.334E-03	0.000E+00	0.000E+00	0.000E+00	1.184E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.184E+00
Th-228	5.834E-04	0.000E+00	0.000E+00	0.000E+00	2.960E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.960E-01
Th-230	3.889E-04	0.000E+00	0.000E+00	0.000E+00	1.973E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.973E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.589E-09	0.0010	3.123E-09	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.769E-07	0.0510
Ra-226	3.179E-06	0.9162	1.354E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.254E-08	0.0036
Th-228	9.168E-08	0.0264	2.325E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.454E-10	0.0001
Th-230	6.779E-11	0.0000	3.312E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.873E-10	0.0002
Total	3.274E-06	0.9437	5.041E-09	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.904E-07	0.0549

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.836E-07	0.0529
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.193E-06	0.9202
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.226E-08	0.0266
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.863E-10	0.0003
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.470E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	3.082E-09	0.0009	2.682E-09	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.519E-07	0.0438
Ra-226	3.176E-06	0.9155	1.794E-09	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.751E-08	0.0108
Th-228	9.168E-08	0.0264	2.325E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.454E-10	0.0001
Th-230	3.127E-09	0.0009	3.328E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.163E-10	0.0002
Total	3.274E-06	0.9437	5.041E-09	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.904E-07	0.0549

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.577E-07	0.0455
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.216E-06	0.9268
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.226E-08	0.0266
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.076E-09	0.0012
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.470E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.477E-03	0.000E+00	0.000E+00	0.000E+00	2.778E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.778E+00
Ra-226	2.296E-03	0.000E+00	0.000E+00	0.000E+00	1.165E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.165E+00
Th-228	4.059E-04	0.000E+00	0.000E+00	0.000E+00	2.060E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.060E-01
Th-230	3.889E-04	0.000E+00	0.000E+00	0.000E+00	1.973E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.973E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.492E-09	0.0010	3.039E-09	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.721E-07	0.0509
Ra-226	3.128E-06	0.9239	1.332E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.234E-08	0.0036
Th-228	6.380E-08	0.0188	1.618E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.403E-10	0.0001
Th-230	6.779E-11	0.0000	3.311E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.873E-10	0.0002
Total	3.195E-06	0.9438	4.864E-09	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.853E-07	0.0547

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.787E-07	0.0528
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.141E-06	0.9280
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.420E-08	0.0190
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.862E-10	0.0003
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.385E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	2.955E-09	0.0009	2.571E-09	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.456E-07	0.0430
Ra-226	3.125E-06	0.9231	1.799E-09	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.881E-08	0.0115
Th-228	6.380E-08	0.0188	1.618E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.403E-10	0.0001
Th-230	3.354E-09	0.0010	3.329E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.190E-10	0.0002
Total	3.195E-06	0.9438	4.864E-09	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.853E-07	0.0547

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.512E-07	0.0447
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.166E-06	0.9351
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.420E-08	0.0190
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.306E-09	0.0013
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.385E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.167E-03	0.000E+00	0.000E+00	0.000E+00	2.622E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.622E+00
Ra-226	2.223E-03	0.000E+00	0.000E+00	0.000E+00	1.128E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.128E+00
Th-228	1.966E-04	0.000E+00	0.000E+00	0.000E+00	9.973E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.973E-02
Th-230	3.889E-04	0.000E+00	0.000E+00	0.000E+00	1.973E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.973E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.307E-09	0.0010	2.878E-09	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.630E-07	0.0503
Ra-226	3.028E-06	0.9338	1.290E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.194E-08	0.0037
Th-228	3.089E-08	0.0095	7.833E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.164E-10	0.0000
Th-230	6.778E-11	0.0000	3.311E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.873E-10	0.0002
Total	3.062E-06	0.9444	4.577E-09	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.757E-07	0.0542

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.692E-07	0.0522
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.041E-06	0.9379
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.108E-08	0.0096
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.862E-10	0.0003
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.243E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	2.715E-09	0.0008	2.362E-09	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.338E-07	0.0413
Ra-226	3.025E-06	0.9329	1.804E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.111E-08	0.0127
Th-228	3.089E-08	0.0095	7.833E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.164E-10	0.0000
Th-230	3.798E-09	0.0012	3.331E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.247E-10	0.0002
Total	3.062E-06	0.9444	4.577E-09	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.757E-07	0.0542

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.389E-07	0.0428
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.068E-06	0.9461
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.108E-08	0.0096
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.756E-09	0.0015
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.243E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	4.239E-03	0.000E+00	0.000E+00	0.000E+00	2.151E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.151E+00
Ra-226	1.985E-03	0.000E+00	0.000E+00	0.000E+00	1.007E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.007E+00
Th-228	1.553E-05	0.000E+00	0.000E+00	0.000E+00	7.878E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.878E-03
Th-230	3.888E-04	0.000E+00	0.000E+00	0.000E+00	1.973E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.973E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.748E-09	0.0010	2.391E-09	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.355E-07	0.0474
Ra-226	2.704E-06	0.9455	1.152E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.067E-08	0.0037
Th-228	2.440E-09	0.0009	6.188E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.193E-12	0.0000
Th-230	6.777E-11	0.0000	3.311E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.872E-10	0.0002
Total	2.709E-06	0.9473	3.881E-09	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.467E-07	0.0513

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.406E-07	0.0492
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.716E-06	0.9496
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.455E-09	0.0009
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.860E-10	0.0003
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.860E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	2.019E-09	0.0007	1.757E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.952E-08	0.0348
Ra-226	2.699E-06	0.9439	1.784E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.657E-08	0.0163
Th-228	2.440E-09	0.0009	6.188E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.193E-12	0.0000
Th-230	5.242E-09	0.0018	3.340E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.469E-10	0.0002
Total	2.709E-06	0.9473	3.881E-09	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.467E-07	0.0513

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.033E-07	0.0361
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.748E-06	0.9608
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.455E-09	0.0009
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.223E-09	0.0022
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.860E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 2.500E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.851E-03	0.000E+00	0.000E+00	0.000E+00	1.446E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.446E+00
Ra-226	1.558E-03	0.000E+00	0.000E+00	0.000E+00	7.903E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.903E-01
Th-228	6.743E-08	0.000E+00	0.000E+00	0.000E+00	3.421E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.421E-05
Th-230	3.887E-04	0.000E+00	0.000E+00	0.000E+00	1.972E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.972E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 2.500E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.897E-09	0.0009	1.650E-09	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.350E-08	0.0419
Ra-226	2.122E-06	0.9519	9.043E-10	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.372E-09	0.0038
Th-228	1.059E-11	0.0000	2.687E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.992E-14	0.0000
Th-230	6.774E-11	0.0000	3.309E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.869E-10	0.0003
Total	2.124E-06	0.9527	2.886E-09	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.025E-07	0.0460

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.704E-08	0.0435
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.131E-06	0.9560
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.066E-11	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.856E-10	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.229E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 2.500E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	1.070E-09	0.0005	9.313E-10	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.276E-08	0.0237
Ra-226	2.115E-06	0.9487	1.619E-09	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.900E-08	0.0220
Th-228	1.059E-11	0.0000	2.687E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.992E-14	0.0000
Th-230	7.831E-09	0.0035	3.357E-10	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.993E-10	0.0003
Total	2.124E-06	0.9527	2.886E-09	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.025E-07	0.0460

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.500E+01 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.476E-08	0.0246
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.166E-06	0.9715
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.066E-11	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.866E-09	0.0040
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.229E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.969E-04	0.000E+00	0.000E+00	0.000E+00	3.028E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.028E-01
Ra-226	4.674E-04	0.000E+00	0.000E+00	0.000E+00	2.372E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.372E-01
Th-228	1.041E-19	0.000E+00	0.000E+00	0.000E+00	5.283E-17	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.283E-17
Th-230	3.878E-04	0.000E+00	0.000E+00	0.000E+00	1.968E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.968E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.000E+02 years

0

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.281E-10	0.0006	3.725E-10	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.110E-08	0.0318
Ra-226	6.380E-07	0.9613	2.723E-10	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.521E-09	0.0038
Th-228	1.632E-23	0.0000	4.150E-26	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.165E-26	0.0000
Th-230	6.760E-11	0.0001	3.302E-10	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.857E-10	0.0009
Total	6.385E-07	0.9621	9.750E-10	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.421E-08	0.0365

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.190E-08	0.0330
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.408E-07	0.9655
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.643E-23	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.835E-10	0.0015
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.637E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	4.481E-11	0.0001	3.899E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.209E-09	0.0033
Ra-226	6.240E-07	0.9403	5.953E-10	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.111E-08	0.0318
Th-228	1.632E-23	0.0000	4.150E-26	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.165E-26	0.0000
Th-230	1.440E-08	0.0217	3.407E-10	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.900E-10	0.0013
Total	6.385E-07	0.9621	9.750E-10	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.421E-08	0.0365

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.293E-09	0.0035
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.457E-07	0.9730
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.643E-23	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.564E-08	0.0236
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.637E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.882E-05	0.000E+00	0.000E+00	0.000E+00	1.462E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.462E-02
Ra-226	2.799E-05	0.000E+00	0.000E+00	0.000E+00	1.420E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.420E-02
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	3.857E-04	0.000E+00	0.000E+00	0.000E+00	1.957E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.957E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.217E-11	0.0005	1.929E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.093E-09	0.0253
Ra-226	4.087E-08	0.9469	1.752E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.622E-10	0.0038
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	6.723E-11	0.0016	3.284E-10	0.0076	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.825E-10	0.0135
Total	4.096E-08	0.9490	3.652E-10	0.0085	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.837E-09	0.0426

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.134E-09	0.0263
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.105E-08	0.9511
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.781E-10	0.0227
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.316E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	9.471E-15	0.0000	8.240E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.668E-13	0.0000
Ra-226	2.406E-08	0.5573	2.379E-11	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.594E-10	0.0199
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.691E-08	0.3917	3.414E-10	0.0079	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.776E-10	0.0226
Total	4.096E-08	0.9490	3.652E-10	0.0085	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.837E-09	0.0426

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.845E-13	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.494E-08	0.5778
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.823E-08	0.4222
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.316E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	7.457E-06	0.000E+00	0.000E+00	0.000E+00	3.783E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.783E-03
Ra-226	1.010E-05	0.000E+00	0.000E+00	0.000E+00	5.123E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.123E-03
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	3.783E-04	0.000E+00	0.000E+00	0.000E+00	1.919E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.919E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	6.601E-12	0.0004	5.744E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.254E-10	0.0185
Ra-226	1.626E-08	0.9223	7.122E-12	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.593E-11	0.0037
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	6.591E-11	0.0037	3.221E-10	0.0183	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.713E-10	0.0324
Total	1.633E-08	0.9264	3.350E-10	0.0190	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.626E-10	0.0546

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.378E-10	0.0192
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.633E-08	0.9264
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.593E-10	0.0544
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.763E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	1.299E-27	0.0000	1.131E-27	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.406E-26	0.0000
Ra-226	2.688E-13	0.0000	2.716E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.813E-15	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.633E-08	0.9264	3.350E-10	0.0190	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.626E-10	0.0546
Total	1.633E-08	0.9264	3.350E-10	0.0190	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.626E-10	0.0546

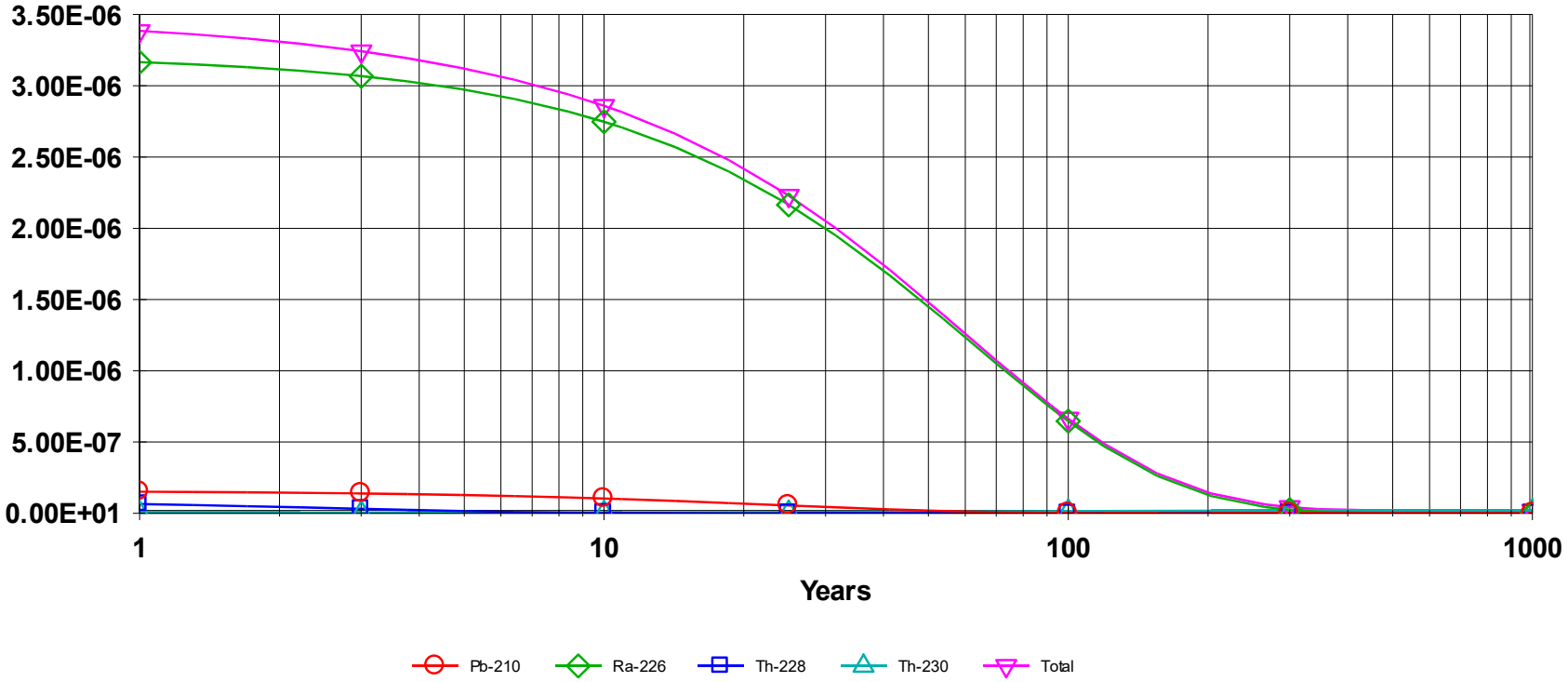
Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.649E-26	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.789E-13	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.763E-08	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.763E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

EXCESS CANCER RISK: All Nuclides Summed, All Pathways Summed



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA STAFF.RAD 05/11/2023 09:29 GRAPHICS.ASC Includes All Pathways

Note: The data line for each radionuclide includes risk contributions from that radionuclide's decay chain isotopes (e.g., the Th-230 data line includes the risk contribution from Ra-226 that results from the radioactive decay of Th-230; the Ra-226 data line does not include the Ra-226 resulting from Th-230 decay).

CWC-365 and CWC-386 Suburban Resident
RESRAD Dose Summary

Summary : CWC-365, 386 (Partial) Jana Parcels - Suburban Resident
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA PARCELS SUB RESIDENT.RAD

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Dose Conversion Factor (and Related) Parameter Summary
Dose Library: DCFPAK3.02 (Age 10)

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: DCFPAK3.02)	5.567E-05	5.567E-05	DCF1(1)
A-1	Bi-210 (Source: DCFPAK3.02)	5.473E-03	5.473E-03	DCF1(2)
A-1	Bi-212 (Source: DCFPAK3.02)	6.258E-01	6.258E-01	DCF1(3)
A-1	Bi-214 (Source: DCFPAK3.02)	9.135E+00	9.135E+00	DCF1(4)
A-1	Hg-206 (Source: DCFPAK3.02)	6.127E-01	6.127E-01	DCF1(5)
A-1	Pb-210 (Source: DCFPAK3.02)	2.092E-03	2.092E-03	DCF1(6)
A-1	Pb-212 (Source: DCFPAK3.02)	6.314E-01	6.314E-01	DCF1(7)
A-1	Pb-214 (Source: DCFPAK3.02)	1.257E+00	1.257E+00	DCF1(8)
A-1	Po-210 (Source: DCFPAK3.02)	5.641E-05	5.641E-05	DCF1(9)
A-1	Po-212 (Source: DCFPAK3.02)	0.000E+00	0.000E+00	DCF1(10)
A-1	Po-214 (Source: DCFPAK3.02)	4.801E-04	4.801E-04	DCF1(11)
A-1	Po-216 (Source: DCFPAK3.02)	8.873E-05	8.873E-05	DCF1(12)
A-1	Po-218 (Source: DCFPAK3.02)	9.228E-09	9.228E-09	DCF1(13)
A-1	Ra-224 (Source: DCFPAK3.02)	4.950E-02	4.950E-02	DCF1(14)
A-1	Ra-226 (Source: DCFPAK3.02)	3.176E-02	3.176E-02	DCF1(15)
A-1	Rn-218 (Source: DCFPAK3.02)	4.259E-03	4.259E-03	DCF1(16)
A-1	Rn-220 (Source: DCFPAK3.02)	3.474E-03	3.474E-03	DCF1(17)
A-1	Rn-222 (Source: DCFPAK3.02)	2.130E-03	2.130E-03	DCF1(18)
A-1	Th-228 (Source: DCFPAK3.02)	7.248E-03	7.248E-03	DCF1(19)
A-1	Th-230 (Source: DCFPAK3.02)	1.106E-03	1.106E-03	DCF1(20)
A-1	Tl-206 (Source: DCFPAK3.02)	1.278E-02	1.278E-02	DCF1(21)
A-1	Tl-208 (Source: DCFPAK3.02)	2.167E+01	2.167E+01	DCF1(22)
A-1	Tl-210 (Source: DCFPAK3.02)	1.677E+01	1.677E+01	DCF1(23)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	4.899E-02	2.641E-02	DCF2(1)
B-1	Ra-226+D	4.570E-02	4.554E-02	DCF2(2)
B-1	Th-228+D	2.217E-01	2.042E-01	DCF2(3)
B-1	Th-230	4.177E-01	4.177E-01	DCF2(4)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	1.681E-02	7.215E-03	DCF3(1)
D-1	Ra-226+D	2.969E-03	2.967E-03	DCF3(2)
D-1	Th-228+D	1.531E-03	5.069E-04	DCF3(3)
D-1	Th-230	9.102E-04	9.102E-04	DCF3(4)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(3,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)
D-34				

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: DCFPAK3.02 (Age 10)

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(3,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(3,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	6.670E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.000E-01	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.900E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Pb-210	2.900E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.200E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Th-228	3.000E-02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Th-230	2.000E-02	0.000E+00	---	S1(4)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(4)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.109E-02	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.582E-02	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.852E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.852E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R017	Inhalation rate (m**3/yr)	5.402E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.390E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.030E-01	2.500E-01	---	FOTD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	4.380E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Summary : CWC-365, 386 (Partial) Jana Parcels - Suburban Resident
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA PARCELS SUB RESIDENT.RAD

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	66701.00 square meters	Pb-210	2.900E-01
Thickness:	0.30 meters	Ra-226	1.200E-01
Cover Depth:	0.00 meters	Th-228	3.000E-02
		Th-230	2.000E-02

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.900E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	6.707E-01	6.355E-01	5.852E-01	4.908E-01	3.387E-01	1.045E-01	6.929E-03	2.962E-03
M(t):	3.530E-02	3.345E-02	3.080E-02	2.583E-02	1.783E-02	5.502E-03	3.647E-04	1.559E-04

0Maximum TDOSE(t): 6.707E-01 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.660E-04	0.0011	5.528E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.551E-01	0.2313
Ra-226	4.226E-01	0.6301	2.198E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.249E-02	0.0186
Th-228	7.653E-02	0.1141	2.217E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.252E-03	0.0019
Th-230	2.314E-05	0.0000	3.320E-04	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.921E-04	0.0009
Total	4.999E-01	0.7454	1.326E-03	0.0020	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.694E-01	0.2526

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.564E-01	0.2332
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.353E-01	0.6490
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.800E-02	0.1163
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.472E-04	0.0014
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.707E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.343E-04	0.0012	5.299E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.487E-01	0.2340
Ra-226	4.158E-01	0.6543	2.232E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.424E-02	0.0224
Th-228	5.325E-02	0.0838	1.543E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.715E-04	0.0014
Th-230	5.341E-05	0.0001	3.320E-04	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.930E-04	0.0009
Total	4.698E-01	0.7394	1.239E-03	0.0020	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.644E-01	0.2587

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.500E-01	0.2360
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.303E-01	0.6771
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.428E-02	0.0854
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.784E-04	0.0015
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.355E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.747E-04	0.0012	4.869E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.366E-01	0.2335
Ra-226	4.025E-01	0.6878	2.290E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.740E-02	0.0297
Th-228	2.578E-02	0.0441	7.470E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.220E-04	0.0007
Th-230	1.125E-04	0.0002	3.320E-04	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.953E-04	0.0010
Total	4.291E-01	0.7332	1.123E-03	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.550E-01	0.2649

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.378E-01	0.2354
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.201E-01	0.7179
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.628E-02	0.0449
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.040E-03	0.0018
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.852E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.017E-04	0.0010	3.621E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.016E-01	0.2070
Ra-226	3.592E-01	0.7318	2.402E-04	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.561E-02	0.0522
Th-228	2.037E-03	0.0041	5.901E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.334E-05	0.0001
Th-230	3.047E-04	0.0006	3.321E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.062E-04	0.0012
Total	3.620E-01	0.7376	9.404E-04	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.279E-01	0.2605

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.025E-01	0.2088
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.851E-01	0.7845
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.076E-03	0.0042
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.243E-03	0.0025
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.908E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.153E-04	0.0006	1.554E-04	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.359E-02	0.1287
Ra-226	2.595E-01	0.7661	2.262E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.328E-02	0.0983
Th-228	1.442E-06	0.0000	4.181E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.362E-08	0.0000
Th-230	7.470E-04	0.0022	3.323E-04	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.504E-04	0.0019
Total	2.604E-01	0.7690	7.139E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.753E-02	0.2289

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.396E-02	0.1298
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.930E-01	0.8651
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.470E-06	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.730E-03	0.0051
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.387E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.114E-05	0.0001	8.037E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.255E-03	0.0216
Ra-226	8.306E-02	0.7945	9.320E-05	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.647E-02	0.1576
Th-228	1.362E-17	0.0000	3.957E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.236E-19	0.0000
Th-230	1.526E-03	0.0146	3.324E-04	0.0032	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.797E-04	0.0075
Total	8.460E-02	0.8092	4.336E-04	0.0041	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.951E-02	0.1866

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.274E-03	0.0218
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.963E-02	0.9530
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.389E-17	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.638E-03	0.0252
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.045E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.354E-09	0.0000	1.698E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.766E-07	0.0001
Ra-226	3.202E-03	0.4621	3.762E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.808E-04	0.0983
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.863E-03	0.2688	3.310E-04	0.0478	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.483E-04	0.1224
Total	5.065E-03	0.7309	3.347E-04	0.0483	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.530E-03	0.2207

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.806E-07	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.887E-03	0.5609
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.042E-03	0.4390
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.929E-03	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.229E-22	0.0000	2.331E-22	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.540E-20	0.0000
Ra-226	3.579E-08	0.0000	4.295E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.775E-09	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.802E-03	0.6085	3.246E-04	0.1096	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.350E-04	0.2819
Total	1.802E-03	0.6085	3.246E-04	0.1096	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.350E-04	0.2819

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.595E-20	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.361E-08	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.962E-03	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.962E-03	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	5.394E-01	5.171E-01	4.751E-01	3.533E-01	1.516E-01	7.842E-03	1.657E-06	2.274E-19
0Ra-226+D	Ra-226+D	1.000E+00	3.619E+00	3.561E+00	3.447E+00	3.076E+00	2.221E+00	7.108E-01	2.740E-02	3.064E-07
Ra-226+D	Pb-210+D	1.000E+00	8.435E-03	2.466E-02	5.432E-02	1.332E-01	2.205E-01	1.195E-01	4.987E-03	5.695E-08
Ra-226+D	ΣDSR(j)		3.628E+00	3.585E+00	3.501E+00	3.209E+00	2.442E+00	8.303E-01	3.239E-02	3.634E-07
0Th-228+D	Th-228+D	1.000E+00	2.600E+00	1.809E+00	8.760E-01	6.919E-02	4.900E-05	4.629E-16	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	4.657E-02	4.657E-02	4.657E-02	4.656E-02	4.653E-02	4.644E-02	4.619E-02	4.530E-02
Th-230	Ra-226+D	1.000E+00	7.861E-04	2.341E-03	5.376E-03	1.525E-02	3.797E-02	7.797E-02	9.528E-02	9.224E-02
Th-230	Pb-210+D	1.000E+00	1.224E-06	8.426E-06	4.290E-05	3.362E-04	1.977E-03	7.485E-03	1.064E-02	1.056E-02
Th-230	ΣDSR(j)		4.736E-02	4.892E-02	5.199E-02	6.215E-02	8.649E-02	1.319E-01	1.521E-01	1.481E-01

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.
0

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 1.900E+01 mrem/yr

0Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	3.522E+01	3.674E+01	3.999E+01	5.377E+01	1.253E+02	2.423E+03	1.146E+07	*7.632E+13
Ra-226	5.238E+00	5.299E+00	5.427E+00	5.921E+00	7.782E+00	2.288E+01	5.866E+02	5.229E+07
Th-228	7.307E+00	1.050E+01	2.169E+01	2.746E+02	3.878E+05	*8.201E+14	*8.201E+14	*8.201E+14
Th-230	4.012E+02	3.884E+02	3.655E+02	3.057E+02	2.197E+02	1.440E+02	1.249E+02	1.283E+02

*At specific activity limit
0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	2.900E-01	0.000E+00	5.394E-01	3.522E+01	5.394E-01	3.522E+01
Ra-226	1.200E-01	0.000E+00	3.628E+00	5.238E+00	3.628E+00	5.238E+00
Th-228	3.000E-02	0.000E+00	2.600E+00	7.307E+00	2.600E+00	7.307E+00
Th-230	2.000E-02	348.0 ± 0.7	1.523E-01	1.248E+02	4.736E-02	4.012E+02

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

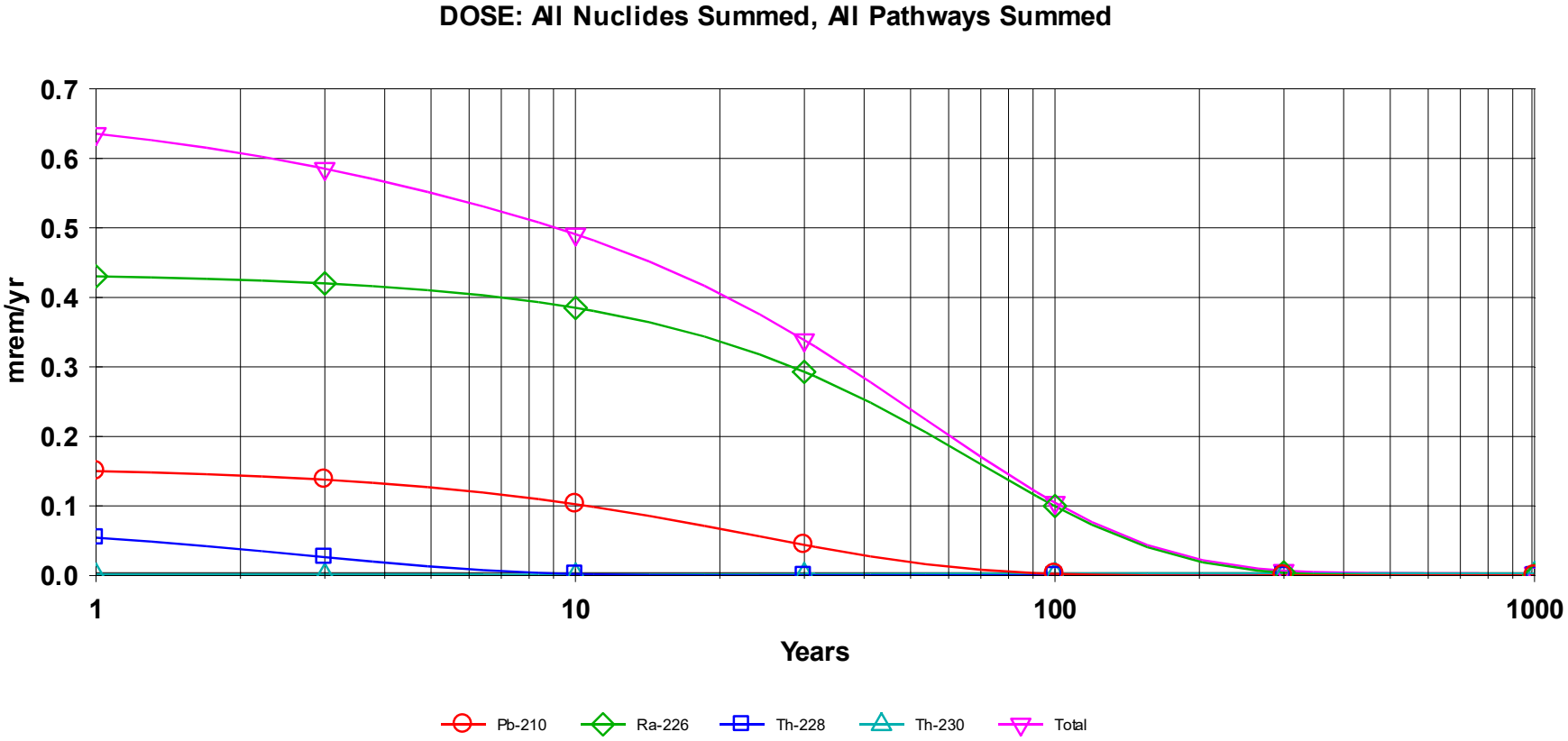
0Nuclide (j)	Parent (i)	THF(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
			DOSE(j,t), mrem/yr							
Pb-210	Pb-210	1.000E+00	1.564E-01	1.500E-01	1.378E-01	1.025E-01	4.396E-02	2.274E-03	4.806E-07	6.595E-20
Pb-210	Ra-226	1.000E+00	1.012E-03	2.959E-03	6.519E-03	1.598E-02	2.645E-02	1.434E-02	5.984E-04	6.834E-09
Pb-210	Th-230	1.000E+00	2.448E-08	1.685E-07	8.580E-07	6.723E-06	3.955E-05	1.497E-04	2.127E-04	2.112E-04
Pb-210	ΣDOSE(j)		1.574E-01	1.529E-01	1.443E-01	1.185E-01	7.046E-02	1.676E-02	8.116E-04	2.112E-04
0Ra-226	Ra-226	1.000E+00	4.343E-01	4.273E-01	4.136E-01	3.691E-01	2.665E-01	8.530E-02	3.288E-03	3.677E-08
Ra-226	Th-230	1.000E+00	1.572E-05	4.682E-05	1.075E-04	3.050E-04	7.595E-04	1.559E-03	1.906E-03	1.845E-03
Ra-226	ΣDOSE(j)		4.343E-01	4.273E-01	4.137E-01	3.694E-01	2.673E-01	8.686E-02	5.194E-03	1.845E-03
0Th-228	Th-228	1.000E+00	7.800E-02	5.428E-02	2.628E-02	2.076E-03	1.470E-06	1.389E-17	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	9.315E-04	9.314E-04	9.314E-04	9.312E-04	9.307E-04	9.289E-04	9.238E-04	9.060E-04

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
			S(j,t), pCi/g							
Pb-210	Pb-210	1.000E+00	2.900E-01	2.780E-01	2.554E-01	1.900E-01	8.150E-02	4.216E-03	8.910E-07	1.223E-19
Pb-210	Ra-226	1.000E+00	0.000E+00	3.639E-03	1.030E-02	2.804E-02	4.789E-02	2.621E-02	1.095E-03	1.251E-08
Pb-210	Th-230	1.000E+00	0.000E+00	1.327E-07	1.148E-06	1.117E-05	7.005E-05	2.708E-04	3.861E-04	3.834E-04
Pb-210	ΣS(j):		2.900E-01	2.816E-01	2.657E-01	2.180E-01	1.295E-01	3.069E-02	1.482E-03	3.834E-04
0Ra-226	Ra-226	1.000E+00	1.200E-01	1.181E-01	1.143E-01	1.020E-01	7.368E-02	2.361E-02	9.141E-04	1.043E-08
Ra-226	Th-230	1.000E+00	0.000E+00	8.594E-06	2.537E-05	7.996E-05	2.056E-04	4.273E-04	5.254E-04	5.193E-04
Ra-226	ΣS(j):		1.200E-01	1.181E-01	1.143E-01	1.021E-01	7.389E-02	2.404E-02	1.439E-03	5.193E-04
0Th-228	Th-228	1.000E+00	3.000E-02	2.088E-02	1.011E-02	7.985E-04	5.657E-07	5.355E-18	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	2.000E-02	2.000E-02	2.000E-02	1.999E-02	1.998E-02	1.994E-02	1.983E-02	1.945E-02

THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 5.10 seconds



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Note: The data line for each radionuclide includes dose contributions from that radionuclide's decay chain isotopes (e.g., the Th-230 data line includes the dose contribution from Ra-226 that results from the radioactive decay of Th-230; the Ra-226 data line does not include the Ra-226 resulting from Th-230 decay).

CWC-365 and CWC-386 Residential Gardener
RESRAD Risk Summary

Table of Contents

Part III: Intake Quantities and Health Risk Factors

Cancer Risk Slope Factors 2
Risk Slope and ETFG for the Ground Pathway 3
Amount of Intake Quantities and Excess Cancer Risks
Time= 0.000E+00 4
Time= 1.000E+00 7
Time= 3.000E+00 10
Time= 1.000E+01 13
Time= 3.000E+01 16
Time= 1.000E+02 19
Time= 3.000E+02 22
Time= 1.000E+03 25

Cancer Risk Slope Factors Summary Table
Risk Library: DCFPAK3.02 Morbidity

0 Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Pb-210+D	4.30E-09	1.48E-09	SLPF(1,1)
Sf-1	Ra-226+D	8.37E-06	2.50E-08	SLPF(2,1)
Sf-1	Th-228+D	7.33E-06	5.64E-09	SLPF(3,1)
Sf-1	Th-230	8.45E-10	8.45E-10	SLPF(4,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Pb-210+D	3.08E-08	1.59E-08	SLPF(1,2)
Sf-2	Ra-226+D	2.82E-08	2.81E-08	SLPF(2,2)
Sf-2	Th-228+D	1.44E-07	1.32E-07	SLPF(3,2)
Sf-2	Th-230	3.41E-08	3.41E-08	SLPF(4,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,3)
Sf-3	Th-228+D	4.23E-10	1.48E-10	SLPF(3,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(4,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	2.67E-09	8.84E-10	SLPF(1,4)
Sf-3	Ra-226+D	3.85E-10	3.85E-10	SLPF(2,4)
Sf-3	Th-228+D	3.00E-10	1.08E-10	SLPF(3,4)
Sf-3	Th-230	9.14E-11	9.14E-11	SLPF(4,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,5)
Sf-3	Th-228+D	4.23E-10	1.48E-10	SLPF(3,5)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(4,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Rn-220	1.90E-13	1.90E-13	SLPFRN(2,1)
Sf-Rn	Po-216	3.00E-15	3.00E-15	SLPFRN(2,2)
Sf-Rn	Pb-212	3.90E-11	3.90E-11	SLPFRN(2,3)
Sf-Rn	Bi-212	3.70E-11	3.70E-11	SLPFRN(2,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	3.88E+02	3.88E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	3.88E+02	3.88E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.88E+02	1.88E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	1.88E+02	1.88E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

0Nuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless)							
	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
At-218	2.740E-11	3.503E-01	3.503E-01	3.503E-01	3.503E-01	3.503E-01	3.503E-01	3.502E-01	3.495E-01
Bi-210	2.770E-09	3.523E-01	3.523E-01	3.523E-01	3.523E-01	3.523E-01	3.523E-01	3.524E-01	3.523E-01
Bi-212	4.960E-07	3.440E-01	3.440E-01	3.440E-01	3.439E-01	3.438E-01	3.435E-01	3.424E-01	3.367E-01
Bi-214	7.340E-06	3.389E-01	3.389E-01	3.389E-01	3.388E-01	3.387E-01	3.382E-01	3.366E-01	3.288E-01
Hg-206	4.830E-07	3.513E-01	3.513E-01	3.513E-01	3.513E-01	3.513E-01	3.512E-01	3.508E-01	3.486E-01
Pb-210	1.480E-09	3.586E-01	3.586E-01	3.586E-01	3.586E-01	3.586E-01	3.586E-01	3.586E-01	3.586E-01
Pb-212	4.960E-07	3.524E-01	3.524E-01	3.524E-01	3.524E-01	3.524E-01	3.524E-01	3.522E-01	3.509E-01
Pb-214	9.940E-07	3.512E-01	3.512E-01	3.512E-01	3.512E-01	3.512E-01	3.510E-01	3.507E-01	3.483E-01
Po-210	4.510E-11	3.444E-01	3.444E-01	3.444E-01	3.444E-01	3.443E-01	3.440E-01	3.429E-01	3.375E-01
Po-212	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-214	3.850E-10	3.445E-01	3.445E-01	3.445E-01	3.445E-01	3.444E-01	3.441E-01	3.432E-01	3.380E-01
Po-216	7.100E-11	3.446E-01	3.446E-01	3.446E-01	3.445E-01	3.445E-01	3.442E-01	3.432E-01	3.378E-01
Po-218	6.840E-15	3.548E-01	3.548E-01	3.548E-01	3.548E-01	3.548E-01	3.548E-01	3.548E-01	3.547E-01
Ra-224	3.910E-08	3.521E-01	3.521E-01	3.521E-01	3.521E-01	3.521E-01	3.520E-01	3.518E-01	3.504E-01
Ra-226	2.500E-08	3.527E-01	3.527E-01	3.527E-01	3.527E-01	3.527E-01	3.527E-01	3.526E-01	3.517E-01
Rn-218	3.390E-09	3.461E-01	3.461E-01	3.461E-01	3.461E-01	3.460E-01	3.458E-01	3.451E-01	3.409E-01
Rn-220	2.770E-09	3.475E-01	3.475E-01	3.475E-01	3.474E-01	3.474E-01	3.472E-01	3.466E-01	3.428E-01
Rn-222	1.690E-09	3.480E-01	3.480E-01	3.480E-01	3.480E-01	3.480E-01	3.478E-01	3.473E-01	3.439E-01
Th-228	5.640E-09	3.539E-01	3.539E-01	3.539E-01	3.539E-01	3.539E-01	3.539E-01	3.539E-01	3.535E-01
Th-230	8.450E-10	3.546E-01	3.546E-01	3.546E-01	3.546E-01	3.546E-01	3.546E-01	3.546E-01	3.545E-01
Tl-206	6.110E-09	3.512E-01	3.512E-01	3.512E-01	3.512E-01	3.512E-01	3.513E-01	3.514E-01	3.513E-01
Tl-208	1.750E-05	3.316E-01	3.316E-01	3.316E-01	3.315E-01	3.313E-01	3.306E-01	3.284E-01	3.183E-01
Tl-210	1.340E-05	3.403E-01	3.403E-01	3.402E-01	3.402E-01	3.401E-01	3.396E-01	3.381E-01	3.309E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.153E-02	0.000E+00	0.000E+00	0.000E+00	9.425E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.425E+00
Ra-226	4.769E-03	0.000E+00	0.000E+00	0.000E+00	3.900E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.900E+00
Th-228	1.192E-03	0.000E+00	0.000E+00	0.000E+00	9.750E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.750E-01
Th-230	7.949E-04	0.000E+00	0.000E+00	0.000E+00	6.500E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.500E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.979E-09	0.0010	7.227E-09	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.599E-07	0.0729
Ra-226	8.118E-06	0.8968	3.199E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.774E-08	0.0053
Th-228	2.025E-07	0.0224	4.750E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.137E-09	0.0001
Th-230	1.797E-10	0.0000	8.121E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.321E-09	0.0003
Total	8.330E-06	0.9202	1.171E-08	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.111E-07	0.0786

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.761E-07	0.0747
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.169E-06	0.9024
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.041E-07	0.0225
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.313E-09	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.053E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	7.501E-09	0.0008	6.037E-09	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.513E-07	0.0609
Ra-226	8.110E-06	0.8959	4.384E-09	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.562E-07	0.0173
Th-228	2.025E-07	0.0224	4.750E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.137E-09	0.0001
Th-230	9.671E-09	0.0011	8.168E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.467E-09	0.0003
Total	8.330E-06	0.9202	1.171E-08	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.111E-07	0.0786

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.648E-07	0.0624
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.271E-06	0.9136
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.041E-07	0.0225
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.295E-08	0.0014
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.053E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.119E-02	0.000E+00	0.000E+00	0.000E+00	9.153E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.153E+00
Ra-226	4.693E-03	0.000E+00	0.000E+00	0.000E+00	3.837E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.837E+00
Th-228	8.297E-04	0.000E+00	0.000E+00	0.000E+00	6.784E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.784E-01
Th-230	7.948E-04	0.000E+00	0.000E+00	0.000E+00	6.500E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.500E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.739E-09	0.0010	7.034E-09	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.423E-07	0.0726
Ra-226	7.988E-06	0.9035	3.148E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.697E-08	0.0053
Th-228	1.409E-07	0.0159	3.305E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.914E-10	0.0001
Th-230	1.797E-10	0.0000	8.121E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.321E-09	0.0003
Total	8.138E-06	0.9204	1.132E-08	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.923E-07	0.0783

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.580E-07	0.0744
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.038E-06	0.9091
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.420E-07	0.0161
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.313E-09	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.842E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	7.190E-09	0.0008	5.787E-09	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.284E-07	0.0598
Ra-226	7.980E-06	0.9025	4.389E-09	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.606E-07	0.0182
Th-228	1.409E-07	0.0159	3.305E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.914E-10	0.0001
Th-230	1.025E-08	0.0012	8.171E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.479E-09	0.0003
Total	8.138E-06	0.9204	1.132E-08	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.923E-07	0.0783

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.414E-07	0.0612
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.145E-06	0.9212
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.420E-07	0.0161
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.355E-08	0.0015
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.842E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.056E-02	0.000E+00	0.000E+00	0.000E+00	8.636E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.636E+00
Ra-226	4.543E-03	0.000E+00	0.000E+00	0.000E+00	3.715E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.715E+00
Th-228	4.017E-04	0.000E+00	0.000E+00	0.000E+00	3.285E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.285E-01
Th-230	7.948E-04	0.000E+00	0.000E+00	0.000E+00	6.499E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.499E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.282E-09	0.0010	6.666E-09	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.086E-07	0.0718
Ra-226	7.734E-06	0.9122	3.048E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.548E-08	0.0054
Th-228	6.822E-08	0.0080	1.600E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.832E-10	0.0000
Th-230	1.797E-10	0.0000	8.120E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.321E-09	0.0003
Total	7.810E-06	0.9213	1.069E-08	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.568E-07	0.0775

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.236E-07	0.0736
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.782E-06	0.9179
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.877E-08	0.0081
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.313E-09	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.478E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	6.607E-09	0.0008	5.318E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.855E-07	0.0573
Ra-226	7.724E-06	0.9111	4.390E-09	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.684E-07	0.0199
Th-228	6.822E-08	0.0080	1.600E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.832E-10	0.0000
Th-230	1.138E-08	0.0013	8.177E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.502E-09	0.0003
Total	7.810E-06	0.9213	1.069E-08	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.568E-07	0.0775

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.975E-07	0.0587
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.897E-06	0.9315
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.877E-08	0.0081
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.470E-08	0.0017
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.478E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	8.664E-03	0.000E+00	0.000E+00	0.000E+00	7.085E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.085E+00
Ra-226	4.057E-03	0.000E+00	0.000E+00	0.000E+00	3.317E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.317E+00
Th-228	3.174E-05	0.000E+00	0.000E+00	0.000E+00	2.595E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.595E-02
Th-230	7.947E-04	0.000E+00	0.000E+00	0.000E+00	6.498E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.498E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	6.896E-09	0.0009	5.551E-09	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.068E-07	0.0678
Ra-226	6.906E-06	0.9236	2.722E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.061E-08	0.0054
Th-228	5.389E-09	0.0007	1.264E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.027E-11	0.0000
Th-230	1.797E-10	0.0000	8.119E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.321E-09	0.0003
Total	6.918E-06	0.9253	9.097E-09	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.498E-07	0.0735

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.193E-07	0.0694
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.949E-06	0.9294
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.431E-09	0.0007
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.312E-09	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.477E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.913E-09	0.0007	3.954E-09	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.611E-07	0.0483
Ra-226	6.893E-06	0.9219	4.310E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.861E-07	0.0249
Th-228	5.389E-09	0.0007	1.264E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.027E-11	0.0000
Th-230	1.507E-08	0.0020	8.198E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.592E-09	0.0003
Total	6.918E-06	0.9253	9.097E-09	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.498E-07	0.0735

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.699E-07	0.0495
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.083E-06	0.9473
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.431E-09	0.0007
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.848E-08	0.0025
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.477E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.145E-03	0.000E+00	0.000E+00	0.000E+00	4.207E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.207E+00
Ra-226	2.937E-03	0.000E+00	0.000E+00	0.000E+00	2.401E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.401E+00
Th-228	2.248E-08	0.000E+00	0.000E+00	0.000E+00	1.839E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.839E-05
Th-230	7.942E-04	0.000E+00	0.000E+00	0.000E+00	6.495E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.495E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.259E-09	0.0008	3.428E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.130E-07	0.0585
Ra-226	5.000E-06	0.9336	1.971E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.941E-08	0.0055
Th-228	3.816E-12	0.0000	8.957E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.145E-14	0.0000
Th-230	1.796E-10	0.0000	8.114E-10	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.320E-09	0.0004
Total	5.004E-06	0.9345	6.211E-09	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.448E-07	0.0644

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.207E-07	0.0599
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.031E-06	0.9395
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.846E-12	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.311E-09	0.0006
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.355E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.108E-09	0.0004	1.697E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.549E-07	0.0289
Ra-226	4.978E-06	0.9297	3.689E-09	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.870E-07	0.0349
Th-228	3.816E-12	0.0000	8.957E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.145E-14	0.0000
Th-230	2.355E-08	0.0044	8.251E-10	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.866E-09	0.0005
Total	5.004E-06	0.9345	6.211E-09	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.448E-07	0.0644

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.587E-07	0.0296
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.169E-06	0.9653
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.846E-12	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.724E-08	0.0051
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.355E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.220E-03	0.000E+00	0.000E+00	0.000E+00	9.975E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.975E-01
Ra-226	9.554E-04	0.000E+00	0.000E+00	0.000E+00	7.812E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.812E-01
Th-228	2.128E-19	0.000E+00	0.000E+00	0.000E+00	1.740E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.740E-16
Th-230	7.927E-04	0.000E+00	0.000E+00	0.000E+00	6.482E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.482E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.091E-09	0.0006	8.781E-10	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.018E-08	0.0464
Ra-226	1.631E-06	0.9446	6.438E-10	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.607E-09	0.0056
Th-228	3.605E-23	0.0000	8.478E-26	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.030E-25	0.0000
Th-230	1.792E-10	0.0001	8.099E-10	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.315E-09	0.0013
Total	1.632E-06	0.9453	2.332E-09	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.210E-08	0.0533

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.215E-08	0.0476
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.641E-06	0.9505
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.634E-23	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.304E-09	0.0019
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.726E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	1.091E-10	0.0001	8.777E-11	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.014E-09	0.0046
Ra-226	1.593E-06	0.9230	1.408E-09	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.056E-08	0.0467
Th-228	3.605E-23	0.0000	8.478E-26	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.030E-25	0.0000
Th-230	3.846E-08	0.0223	8.358E-10	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.532E-09	0.0020
Total	1.632E-06	0.9453	2.332E-09	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.210E-08	0.0533

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.211E-09	0.0048
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.675E-06	0.9704
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.634E-23	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.283E-08	0.0248
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.726E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.890E-05	0.000E+00	0.000E+00	0.000E+00	4.816E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.816E-02
Ra-226	5.721E-05	0.000E+00	0.000E+00	0.000E+00	4.678E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.678E-02
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	7.883E-04	0.000E+00	0.000E+00	0.000E+00	6.446E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.446E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.728E-11	0.0005	4.609E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.209E-09	0.0368
Ra-226	1.060E-07	0.9277	4.204E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.273E-10	0.0055
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.782E-10	0.0016	8.054E-10	0.0070	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.302E-09	0.0201
Total	1.063E-07	0.9297	8.935E-10	0.0078	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.138E-09	0.0625

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.312E-09	0.0377
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.067E-07	0.9335
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.286E-09	0.0288
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.143E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	2.305E-14	0.0000	1.855E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.694E-12	0.0000
Ra-226	6.142E-08	0.5375	5.619E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.272E-09	0.0286
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	4.483E-08	0.3923	8.373E-10	0.0073	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.865E-09	0.0338
Total	1.063E-07	0.9297	8.935E-10	0.0078	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.138E-09	0.0625

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.735E-12	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.475E-08	0.5666
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.953E-08	0.4334
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.143E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.524E-05	0.000E+00	0.000E+00	0.000E+00	1.246E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.246E-02
Ra-226	2.064E-05	0.000E+00	0.000E+00	0.000E+00	1.688E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.688E-02
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	7.731E-04	0.000E+00	0.000E+00	0.000E+00	6.322E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.322E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.750E-11	0.0004	1.409E-11	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.286E-09	0.0268
Ra-226	4.311E-08	0.8995	1.746E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.606E-10	0.0054
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.748E-10	0.0036	7.899E-10	0.0165	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.258E-09	0.0471
Total	4.330E-08	0.9035	8.215E-10	0.0171	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.805E-09	0.0794

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.318E-09	0.0275
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.338E-08	0.9053
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.223E-09	0.0672
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.792E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.162E-27	0.0000	2.545E-27	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.324E-25	0.0000
Ra-226	6.863E-13	0.0000	6.416E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.736E-14	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	4.330E-08	0.9035	8.215E-10	0.0171	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.805E-09	0.0794
Total	4.330E-08	0.9035	8.215E-10	0.0171	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.805E-09	0.0794

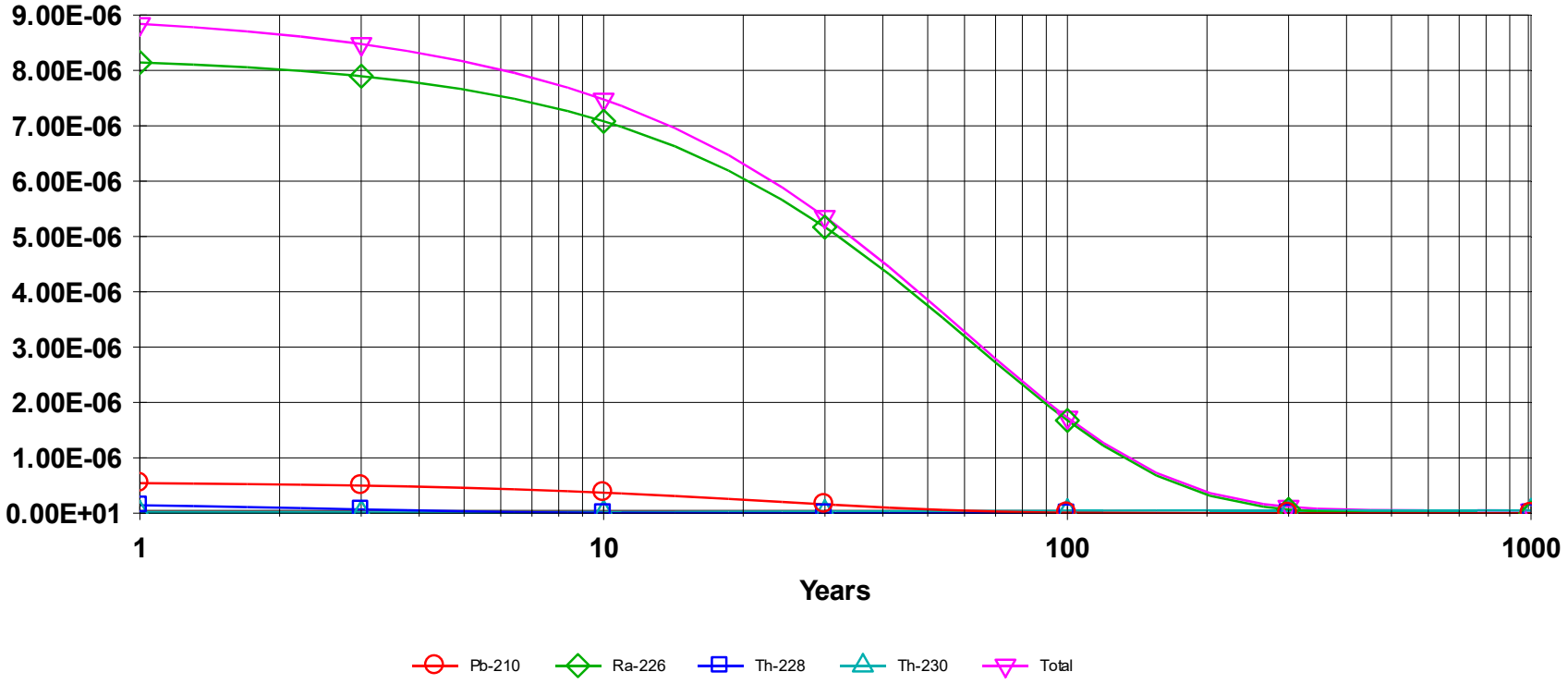
Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.381E-25	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.243E-13	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.792E-08	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.792E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

EXCESS CANCER RISK: All Nuclides Summed, All Pathways Summed



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Note: The data line for each radionuclide includes risk contributions from that radionuclide's decay chain isotopes (e.g., the Th-230 data line includes the risk contribution from Ra-226 that results from the radioactive decay of Th-230; the Ra-226 data line does not include the Ra-226 resulting from Th-230 decay).

CWC-365 and CWC-386 Hypothetical Residential Gardener
RESRAD Dose Summary

Summary : CWC-365 and 386 Jana Parcels - Hyp Res Gardener
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA PARCELS - RES GARDENER.RAD

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Dose Conversion Factor (and Related) Parameter Summary
Dose Library: DCFPAK3.02 (Age 10)

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: DCFPAK3.02)	5.567E-05	5.567E-05	DCF1(1)
A-1	Bi-210 (Source: DCFPAK3.02)	5.473E-03	5.473E-03	DCF1(2)
A-1	Bi-212 (Source: DCFPAK3.02)	6.258E-01	6.258E-01	DCF1(3)
A-1	Bi-214 (Source: DCFPAK3.02)	9.135E+00	9.135E+00	DCF1(4)
A-1	Hg-206 (Source: DCFPAK3.02)	6.127E-01	6.127E-01	DCF1(5)
A-1	Pb-210 (Source: DCFPAK3.02)	2.092E-03	2.092E-03	DCF1(6)
A-1	Pb-212 (Source: DCFPAK3.02)	6.314E-01	6.314E-01	DCF1(7)
A-1	Pb-214 (Source: DCFPAK3.02)	1.257E+00	1.257E+00	DCF1(8)
A-1	Po-210 (Source: DCFPAK3.02)	5.641E-05	5.641E-05	DCF1(9)
A-1	Po-212 (Source: DCFPAK3.02)	0.000E+00	0.000E+00	DCF1(10)
A-1	Po-214 (Source: DCFPAK3.02)	4.801E-04	4.801E-04	DCF1(11)
A-1	Po-216 (Source: DCFPAK3.02)	8.873E-05	8.873E-05	DCF1(12)
A-1	Po-218 (Source: DCFPAK3.02)	9.228E-09	9.228E-09	DCF1(13)
A-1	Ra-224 (Source: DCFPAK3.02)	4.950E-02	4.950E-02	DCF1(14)
A-1	Ra-226 (Source: DCFPAK3.02)	3.176E-02	3.176E-02	DCF1(15)
A-1	Rn-218 (Source: DCFPAK3.02)	4.259E-03	4.259E-03	DCF1(16)
A-1	Rn-220 (Source: DCFPAK3.02)	3.474E-03	3.474E-03	DCF1(17)
A-1	Rn-222 (Source: DCFPAK3.02)	2.130E-03	2.130E-03	DCF1(18)
A-1	Th-228 (Source: DCFPAK3.02)	7.248E-03	7.248E-03	DCF1(19)
A-1	Th-230 (Source: DCFPAK3.02)	1.106E-03	1.106E-03	DCF1(20)
A-1	Tl-206 (Source: DCFPAK3.02)	1.278E-02	1.278E-02	DCF1(21)
A-1	Tl-208 (Source: DCFPAK3.02)	2.167E+01	2.167E+01	DCF1(22)
A-1	Tl-210 (Source: DCFPAK3.02)	1.677E+01	1.677E+01	DCF1(23)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	4.899E-02	2.641E-02	DCF2(1)
B-1	Ra-226+D	4.570E-02	4.554E-02	DCF2(2)
B-1	Th-228+D	2.217E-01	2.042E-01	DCF2(3)
B-1	Th-230	4.177E-01	4.177E-01	DCF2(4)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	1.681E-02	7.215E-03	DCF3(1)
D-1	Ra-226+D	2.969E-03	2.967E-03	DCF3(2)
D-1	Th-228+D	1.531E-03	5.069E-04	DCF3(3)
D-1	Th-230	9.102E-04	9.102E-04	DCF3(4)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(3,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)
D-34				

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: DCFPAK3.02 (Age 10)

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(3,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(3,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	6.670E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.000E-01	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.900E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Pb-210	2.900E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.200E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Th-228	3.000E-02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Th-230	2.000E-02	0.000E+00	---	S1(4)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(4)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone b parameter	5.300E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	4.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.109E-02	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.582E-02	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.852E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.852E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R017	Inhalation rate (m**3/yr)	5.402E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.390E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.030E-01	2.500E-01	---	FOTD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	4.270E+01	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	4.660E+00	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	4.380E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.500E+00	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Summary : CWC-365 and 386 Jana Parcels - Hyp Res Gardener
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA PARCELS - RES GARDENER.RAD

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	66701.00 square meters	Pb-210	2.900E-01
Thickness:	0.30 meters	Ra-226	1.200E-01
Cover Depth:	0.00 meters	Th-228	3.000E-02
		Th-230	2.000E-02

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.900E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.163E+00	1.115E+00	1.040E+00	8.711E-01	5.763E-01	1.663E-01	1.017E-02	1.523E-02
M(t):	6.119E-02	5.866E-02	5.473E-02	4.585E-02	3.033E-02	8.752E-03	5.353E-04	8.017E-04

0Maximum TDOSE(t): 1.163E+00 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.660E-04	0.0007	5.528E-04	0.0005	0.000E+00	0.0000	3.770E-01	0.3242	0.000E+00	0.0000	0.000E+00	0.0000	1.551E-01	0.1334
Ra-226	4.226E-01	0.3635	2.198E-04	0.0002	0.000E+00	0.0000	1.145E-01	0.0985	0.000E+00	0.0000	0.000E+00	0.0000	1.249E-02	0.0107
Th-228	7.653E-02	0.0658	2.217E-04	0.0002	0.000E+00	0.0000	3.056E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	1.252E-03	0.0011
Th-230	2.314E-05	0.0000	3.320E-04	0.0003	0.000E+00	0.0000	1.482E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	5.921E-04	0.0005
Total	4.999E-01	0.4300	1.326E-03	0.0011	0.000E+00	0.0000	4.920E-01	0.4231	0.000E+00	0.0000	0.000E+00	0.0000	1.694E-01	0.1457

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.334E-01	0.4588
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.498E-01	0.4729
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.831E-02	0.0674
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.095E-03	0.0009
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.163E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.343E-04	0.0007	5.299E-04	0.0005	0.000E+00	0.0000	3.613E-01	0.3242	0.000E+00	0.0000	0.000E+00	0.0000	1.487E-01	0.1334
Ra-226	4.158E-01	0.3730	2.232E-04	0.0002	0.000E+00	0.0000	1.175E-01	0.1054	0.000E+00	0.0000	0.000E+00	0.0000	1.424E-02	0.0128
Th-228	5.325E-02	0.0478	1.543E-04	0.0001	0.000E+00	0.0000	2.126E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	8.715E-04	0.0008
Th-230	5.341E-05	0.0000	3.320E-04	0.0003	0.000E+00	0.0000	1.565E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	5.930E-04	0.0005
Total	4.698E-01	0.4215	1.239E-03	0.0011	0.000E+00	0.0000	4.792E-01	0.4299	0.000E+00	0.0000	0.000E+00	0.0000	1.644E-01	0.1475

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.113E-01	0.4587
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.477E-01	0.4914
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.449E-02	0.0489
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.135E-03	0.0010
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.115E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.747E-04	0.0006	4.869E-04	0.0005	0.000E+00	0.0000	3.319E-01	0.3192	0.000E+00	0.0000	0.000E+00	0.0000	1.366E-01	0.1314
Ra-226	4.025E-01	0.3871	2.290E-04	0.0002	0.000E+00	0.0000	1.225E-01	0.1178	0.000E+00	0.0000	0.000E+00	0.0000	1.740E-02	0.0167
Th-228	2.578E-02	0.0248	7.470E-05	0.0001	0.000E+00	0.0000	1.029E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	4.220E-04	0.0004
Th-230	1.125E-04	0.0001	3.320E-04	0.0003	0.000E+00	0.0000	1.738E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	5.953E-04	0.0006
Total	4.291E-01	0.4126	1.123E-03	0.0011	0.000E+00	0.0000	4.546E-01	0.4372	0.000E+00	0.0000	0.000E+00	0.0000	1.550E-01	0.1491

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.697E-01	0.4517
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.426E-01	0.5218
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.638E-02	0.0254
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E-03	0.0012
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.040E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.017E-04	0.0006	3.621E-04	0.0004	0.000E+00	0.0000	2.465E-01	0.2829	0.000E+00	0.0000	0.000E+00	0.0000	1.016E-01	0.1166
Ra-226	3.592E-01	0.4123	2.402E-04	0.0003	0.000E+00	0.0000	1.336E-01	0.1534	0.000E+00	0.0000	0.000E+00	0.0000	2.561E-02	0.0294
Th-228	2.037E-03	0.0023	5.901E-06	0.0000	0.000E+00	0.0000	8.117E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.334E-05	0.0000
Th-230	3.047E-04	0.0003	3.321E-04	0.0004	0.000E+00	0.0000	2.385E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	6.062E-04	0.0007
Total	3.620E-01	0.4156	9.404E-04	0.0011	0.000E+00	0.0000	3.803E-01	0.4366	0.000E+00	0.0000	0.000E+00	0.0000	1.279E-01	0.1468

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.489E-01	0.4005
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.187E-01	0.5954
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.084E-03	0.0024
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.482E-03	0.0017
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.711E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.153E-04	0.0004	1.554E-04	0.0003	0.000E+00	0.0000	1.053E-01	0.1828	0.000E+00	0.0000	0.000E+00	0.0000	4.359E-02	0.0756
Ra-226	2.595E-01	0.4503	2.262E-04	0.0004	0.000E+00	0.0000	1.318E-01	0.2288	0.000E+00	0.0000	0.000E+00	0.0000	3.328E-02	0.0578
Th-228	1.442E-06	0.0000	4.181E-09	0.0000	0.000E+00	0.0000	5.728E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.362E-08	0.0000
Th-230	7.470E-04	0.0013	3.323E-04	0.0006	0.000E+00	0.0000	4.329E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	6.504E-04	0.0011
Total	2.604E-01	0.4519	7.139E-04	0.0012	0.000E+00	0.0000	2.376E-01	0.4123	0.000E+00	0.0000	0.000E+00	0.0000	7.753E-02	0.1345

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.493E-01	0.2590
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.248E-01	0.7372
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.476E-06	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.163E-03	0.0038
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.763E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.114E-05	0.0001	8.037E-06	0.0000	0.000E+00	0.0000	5.371E-03	0.0323	0.000E+00	0.0000	0.000E+00	0.0000	2.255E-03	0.0136
Ra-226	8.306E-02	0.4995	9.320E-05	0.0006	0.000E+00	0.0000	5.549E-02	0.3337	0.000E+00	0.0000	0.000E+00	0.0000	1.647E-02	0.0991
Th-228	1.362E-17	0.0000	3.957E-20	0.0000	0.000E+00	0.0000	5.346E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.236E-19	0.0000
Th-230	1.526E-03	0.0092	3.324E-04	0.0020	0.000E+00	0.0000	8.898E-04	0.0054	0.000E+00	0.0000	0.000E+00	0.0000	7.797E-04	0.0047
Total	8.460E-02	0.5087	4.336E-04	0.0026	0.000E+00	0.0000	6.175E-02	0.3713	0.000E+00	0.0000	0.000E+00	0.0000	1.951E-02	0.1173

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.645E-03	0.0460
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.551E-01	0.9328
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.394E-17	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.528E-03	0.0212
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.663E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.354E-09	0.0000	1.698E-09	0.0000	0.000E+00	0.0000	1.089E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	4.766E-07	0.0000
Ra-226	3.202E-03	0.3148	3.762E-06	0.0004	0.000E+00	0.0000	2.159E-03	0.2123	0.000E+00	0.0000	0.000E+00	0.0000	6.808E-04	0.0669
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.863E-03	0.1831	3.310E-04	0.0325	0.000E+00	0.0000	1.082E-03	0.1063	0.000E+00	0.0000	0.000E+00	0.0000	8.483E-04	0.0834
Total	5.065E-03	0.4980	3.347E-04	0.0329	0.000E+00	0.0000	3.242E-03	0.3187	0.000E+00	0.0000	0.000E+00	0.0000	1.530E-03	0.1504

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.569E-06	0.0002
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.046E-03	0.5944
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.124E-03	0.4054
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.017E-02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.229E-22	0.0000	2.331E-22	0.0000	0.000E+00	0.0000	1.272E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.540E-20	0.0000
Ra-226	3.579E-08	0.0000	4.295E-11	0.0000	0.000E+00	0.0000	2.098E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.775E-09	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.802E-03	0.1183	3.246E-04	0.0213	0.000E+00	0.0000	9.110E-04	0.0598	0.000E+00	0.0000	0.000E+00	0.0000	8.350E-04	0.0548
Total	1.802E-03	0.1183	3.246E-04	0.0213	0.000E+00	0.0000	9.110E-04	0.0598	0.000E+00	0.0000	0.000E+00	0.0000	8.350E-04	0.0548

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.218E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.220E-16	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.102E-02	0.7237	0.000E+00	0.0000	0.000E+00	0.0000	1.102E-02	0.7237
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.359E-04	0.0221	0.000E+00	0.0000	0.000E+00	0.0000	4.209E-03	0.2763
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.136E-02	0.7457	0.000E+00	0.0000	0.000E+00	0.0000	1.523E-02	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.839E+00	1.763E+00	1.620E+00	1.203E+00	5.148E-01	2.636E-02	5.412E-06	2.835E-15
0Ra-226+D	Ra-226+D	1.000E+00	4.550E+00	4.476E+00	4.332E+00	3.865E+00	2.789E+00	8.902E-01	3.407E-02	1.839E-02
Ra-226+D	Pb-210+D	1.000E+00	3.242E-02	8.829E-02	1.893E-01	4.572E-01	7.512E-01	4.024E-01	1.631E-02	7.347E-02
Ra-226+D	ΣDSR(j)		4.582E+00	4.564E+00	4.522E+00	4.322E+00	3.540E+00	1.293E+00	5.038E-02	9.186E-02
0Th-228+D	Th-228+D	1.000E+00	2.610E+00	1.816E+00	8.795E-01	6.946E-02	4.919E-05	4.647E-16	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	5.379E-02	5.379E-02	5.378E-02	5.376E-02	5.370E-02	5.350E-02	5.292E-02	5.092E-02
Th-230	Ra-226+D	1.000E+00	9.764E-04	2.929E-03	6.744E-03	1.915E-02	4.767E-02	9.764E-02	1.184E-01	1.151E-01
Th-230	Pb-210+D	1.000E+00	5.018E-06	3.143E-05	1.525E-04	1.163E-03	6.759E-03	2.526E-02	3.484E-02	4.437E-02
Th-230	ΣDSR(j)		5.477E-02	5.675E-02	6.068E-02	7.408E-02	1.081E-01	1.764E-01	2.062E-01	2.104E-01

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.
0

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 1.900E+01 mrem/yr

0Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	1.033E+01	1.078E+01	1.173E+01	1.579E+01	3.691E+01	7.207E+02	3.511E+06	*7.632E+13
Ra-226	4.147E+00	4.163E+00	4.202E+00	4.396E+00	5.367E+00	1.470E+01	3.771E+02	2.068E+02
Th-228	7.279E+00	1.046E+01	2.160E+01	2.735E+02	3.863E+05	*8.201E+14	*8.201E+14	*8.201E+14
Th-230	3.469E+02	3.348E+02	3.131E+02	2.565E+02	1.757E+02	1.077E+02	9.215E+01	9.029E+01

*At specific activity limit
0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	2.900E-01	0.000E+00	1.839E+00	1.033E+01	1.839E+00	1.033E+01
Ra-226	1.200E-01	0.000E+00	4.582E+00	4.147E+00	4.582E+00	4.147E+00
Th-228	3.000E-02	0.000E+00	2.610E+00	7.279E+00	2.610E+00	7.279E+00
Th-230	2.000E-02	1.000E+03	2.104E-01	9.029E+01	5.477E-02	3.469E+02

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

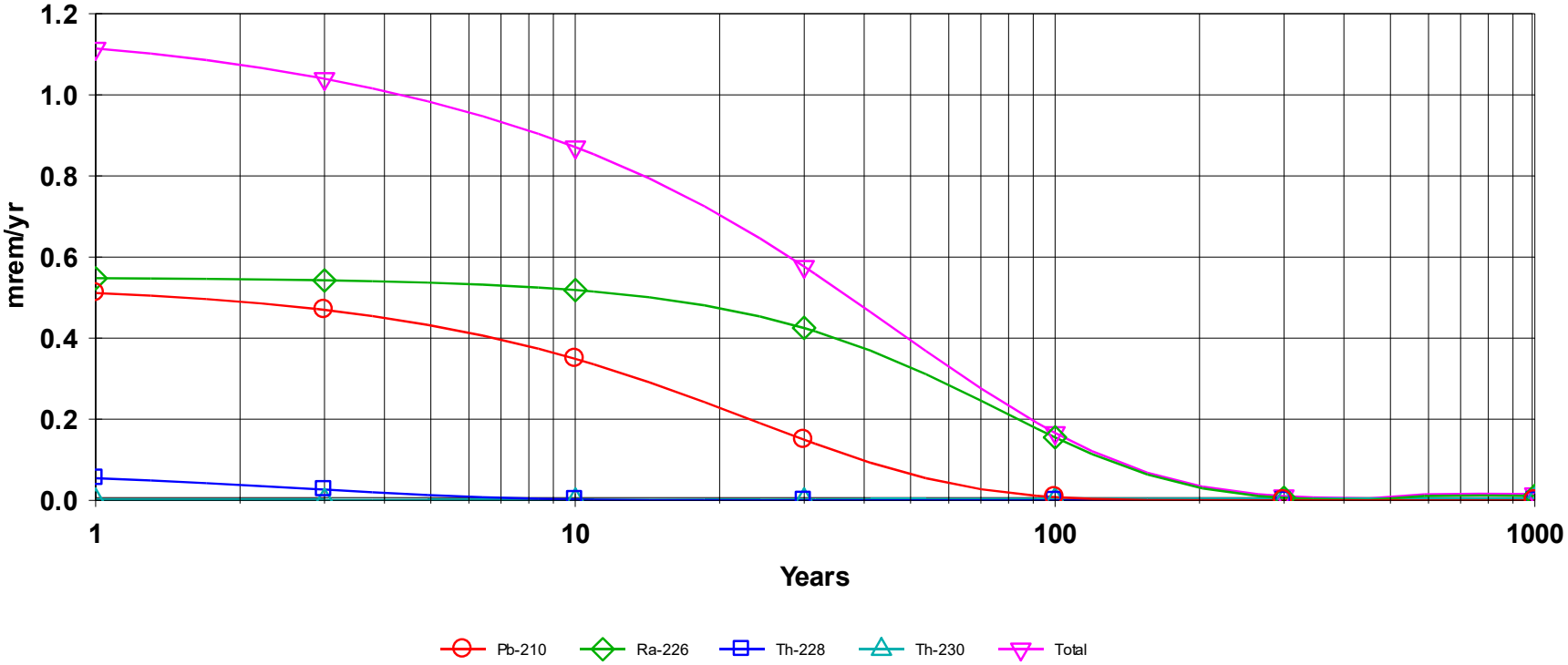
0Nuclide (j)	Parent (i)	THF(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
			DOSE(j,t), mrem/yr							
Pb-210	Pb-210	1.000E+00	5.334E-01	5.113E-01	4.697E-01	3.489E-01	1.493E-01	7.645E-03	1.569E-06	8.220E-16
Pb-210	Ra-226	1.000E+00	3.891E-03	1.059E-02	2.271E-02	5.486E-02	9.014E-02	4.829E-02	1.958E-03	8.816E-03
Pb-210	Th-230	1.000E+00	1.004E-07	6.285E-07	3.050E-06	2.325E-05	1.352E-04	5.051E-04	6.968E-04	8.874E-04
Pb-210	ΣDOSE(j)		5.373E-01	5.219E-01	4.924E-01	4.038E-01	2.396E-01	5.644E-02	2.656E-03	9.703E-03
0Ra-226	Ra-226	1.000E+00	5.460E-01	5.371E-01	5.199E-01	4.638E-01	3.347E-01	1.068E-01	4.088E-03	2.207E-03
Ra-226	Th-230	1.000E+00	1.953E-05	5.858E-05	1.349E-04	3.830E-04	9.534E-04	1.953E-03	2.369E-03	2.303E-03
Ra-226	ΣDOSE(j)		5.460E-01	5.372E-01	5.200E-01	4.642E-01	3.356E-01	1.088E-01	6.457E-03	4.510E-03
0Th-228	Th-228	1.000E+00	7.831E-02	5.449E-02	2.638E-02	2.084E-03	1.476E-06	1.394E-17	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	1.076E-03	1.076E-03	1.076E-03	1.075E-03	1.074E-03	1.070E-03	1.058E-03	1.018E-03

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
			S(j,t), pCi/g							
Pb-210	Pb-210	1.000E+00	2.900E-01	2.780E-01	2.554E-01	1.900E-01	8.150E-02	4.216E-03	8.910E-07	1.223E-19
Pb-210	Ra-226	1.000E+00	0.000E+00	3.639E-03	1.030E-02	2.804E-02	4.789E-02	2.621E-02	1.095E-03	1.251E-08
Pb-210	Th-230	1.000E+00	0.000E+00	1.327E-07	1.148E-06	1.117E-05	7.005E-05	2.708E-04	3.861E-04	3.834E-04
Pb-210	ΣS(j):		2.900E-01	2.816E-01	2.657E-01	2.180E-01	1.295E-01	3.069E-02	1.482E-03	3.834E-04
0Ra-226	Ra-226	1.000E+00	1.200E-01	1.181E-01	1.143E-01	1.020E-01	7.368E-02	2.361E-02	9.141E-04	1.043E-08
Ra-226	Th-230	1.000E+00	0.000E+00	8.594E-06	2.537E-05	7.996E-05	2.056E-04	4.273E-04	5.254E-04	5.193E-04
Ra-226	ΣS(j):		1.200E-01	1.181E-01	1.143E-01	1.021E-01	7.389E-02	2.404E-02	1.439E-03	5.193E-04
0Th-228	Th-228	1.000E+00	3.000E-02	2.088E-02	1.011E-02	7.985E-04	5.657E-07	5.355E-18	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	2.000E-02	2.000E-02	2.000E-02	1.999E-02	1.998E-02	1.994E-02	1.983E-02	1.945E-02

THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 5.07 seconds



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Note: The data line for each radionuclide includes dose contributions from that radionuclide's decay chain isotopes (e.g., the Th-230 data line includes the dose contribution from Ra-226 that results from the radioactive decay of Th-230; the Ra-226 data line does not include the Ra-226 resulting from Th-230 decay).

CWC-365 and CWC-386 Hypothetical Residential Gardener
RESRAD Risk Summary

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Cancer Risk Slope Factors Summary Table
Risk Library: DCFPAK3.02 Morbidity

0 Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Pb-210+D	4.30E-09	1.48E-09	SLPF(1,1)
Sf-1	Ra-226+D	8.37E-06	2.50E-08	SLPF(2,1)
Sf-1	Th-228+D	7.33E-06	5.64E-09	SLPF(3,1)
Sf-1	Th-230	8.45E-10	8.45E-10	SLPF(4,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Pb-210+D	3.08E-08	1.59E-08	SLPF(1,2)
Sf-2	Ra-226+D	2.82E-08	2.81E-08	SLPF(2,2)
Sf-2	Th-228+D	1.44E-07	1.32E-07	SLPF(3,2)
Sf-2	Th-230	3.41E-08	3.41E-08	SLPF(4,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,3)
Sf-3	Th-228+D	4.23E-10	1.48E-10	SLPF(3,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(4,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	2.67E-09	8.84E-10	SLPF(1,4)
Sf-3	Ra-226+D	3.85E-10	3.85E-10	SLPF(2,4)
Sf-3	Th-228+D	3.00E-10	1.08E-10	SLPF(3,4)
Sf-3	Th-230	9.14E-11	9.14E-11	SLPF(4,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,5)
Sf-3	Th-228+D	4.23E-10	1.48E-10	SLPF(3,5)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(4,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Rn-220	1.90E-13	1.90E-13	SLPFRN(2,1)
Sf-Rn	Po-216	3.00E-15	3.00E-15	SLPFRN(2,2)
Sf-Rn	Pb-212	3.90E-11	3.90E-11	SLPFRN(2,3)
Sf-Rn	Bi-212	3.70E-11	3.70E-11	SLPFRN(2,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	3.88E+02	3.88E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	3.88E+02	3.88E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.88E+02	1.88E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	1.88E+02	1.88E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

0Nuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless)							
	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
At-218	2.740E-11	3.503E-01	3.503E-01	3.503E-01	3.503E-01	3.503E-01	3.503E-01	3.502E-01	3.495E-01
Bi-210	2.770E-09	3.523E-01	3.523E-01	3.523E-01	3.523E-01	3.523E-01	3.523E-01	3.524E-01	3.523E-01
Bi-212	4.960E-07	3.440E-01	3.440E-01	3.440E-01	3.439E-01	3.438E-01	3.435E-01	3.424E-01	3.367E-01
Bi-214	7.340E-06	3.389E-01	3.389E-01	3.389E-01	3.388E-01	3.387E-01	3.382E-01	3.366E-01	3.288E-01
Hg-206	4.830E-07	3.513E-01	3.513E-01	3.513E-01	3.513E-01	3.513E-01	3.512E-01	3.508E-01	3.486E-01
Pb-210	1.480E-09	3.586E-01	3.586E-01	3.586E-01	3.586E-01	3.586E-01	3.586E-01	3.586E-01	3.586E-01
Pb-212	4.960E-07	3.524E-01	3.524E-01	3.524E-01	3.524E-01	3.524E-01	3.524E-01	3.522E-01	3.509E-01
Pb-214	9.940E-07	3.512E-01	3.512E-01	3.512E-01	3.512E-01	3.512E-01	3.510E-01	3.507E-01	3.483E-01
Po-210	4.510E-11	3.444E-01	3.444E-01	3.444E-01	3.444E-01	3.443E-01	3.440E-01	3.429E-01	3.375E-01
Po-212	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-214	3.850E-10	3.445E-01	3.445E-01	3.445E-01	3.445E-01	3.444E-01	3.441E-01	3.432E-01	3.380E-01
Po-216	7.100E-11	3.446E-01	3.446E-01	3.446E-01	3.445E-01	3.445E-01	3.442E-01	3.432E-01	3.378E-01
Po-218	6.840E-15	3.548E-01	3.548E-01	3.548E-01	3.548E-01	3.548E-01	3.548E-01	3.548E-01	3.547E-01
Ra-224	3.910E-08	3.521E-01	3.521E-01	3.521E-01	3.521E-01	3.521E-01	3.520E-01	3.518E-01	3.504E-01
Ra-226	2.500E-08	3.527E-01	3.527E-01	3.527E-01	3.527E-01	3.527E-01	3.527E-01	3.526E-01	3.517E-01
Rn-218	3.390E-09	3.461E-01	3.461E-01	3.461E-01	3.461E-01	3.460E-01	3.458E-01	3.451E-01	3.409E-01
Rn-220	2.770E-09	3.475E-01	3.475E-01	3.475E-01	3.474E-01	3.474E-01	3.472E-01	3.466E-01	3.428E-01
Rn-222	1.690E-09	3.480E-01	3.480E-01	3.480E-01	3.480E-01	3.480E-01	3.478E-01	3.473E-01	3.439E-01
Th-228	5.640E-09	3.539E-01	3.539E-01	3.539E-01	3.539E-01	3.539E-01	3.539E-01	3.539E-01	3.535E-01
Th-230	8.450E-10	3.546E-01	3.546E-01	3.546E-01	3.546E-01	3.546E-01	3.546E-01	3.546E-01	3.545E-01
Tl-206	6.110E-09	3.512E-01	3.512E-01	3.512E-01	3.512E-01	3.512E-01	3.513E-01	3.514E-01	3.513E-01
Tl-208	1.750E-05	3.316E-01	3.316E-01	3.316E-01	3.315E-01	3.313E-01	3.306E-01	3.284E-01	3.183E-01
Tl-210	1.340E-05	3.403E-01	3.403E-01	3.402E-01	3.402E-01	3.401E-01	3.396E-01	3.381E-01	3.309E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.153E-02	2.290E+01	0.000E+00	0.000E+00	9.425E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.233E+01
Ra-226	4.769E-03	3.789E+01	0.000E+00	0.000E+00	3.900E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.179E+01
Th-228	1.192E-03	2.379E-01	0.000E+00	0.000E+00	9.750E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.213E+00
Th-230	7.949E-04	1.586E-01	0.000E+00	0.000E+00	6.500E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.086E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.979E-09	0.0008	7.227E-09	0.0006	1.602E-06	0.1441	0.000E+00	0.0000	0.000E+00	0.0000	6.599E-07	0.0594
Ra-226	8.118E-06	0.7301	3.199E-09	0.0003	4.628E-07	0.0416	0.000E+00	0.0000	0.000E+00	0.0000	4.774E-08	0.0043
Th-228	2.025E-07	0.0182	4.750E-10	0.0000	2.774E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.137E-09	0.0001
Th-230	1.797E-10	0.0000	8.121E-10	0.0001	5.647E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.321E-09	0.0002
Total	8.330E-06	0.7492	1.171E-08	0.0011	2.066E-06	0.1858	0.000E+00	0.0000	0.000E+00	0.0000	7.111E-07	0.0640

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.279E-06	0.2049
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.632E-06	0.7763
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.044E-07	0.0184
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.878E-09	0.0003
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.112E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	7.501E-09	0.0007	6.037E-09	0.0005	0.000E+00	0.0000	1.337E-06	0.1202	0.000E+00	0.0000	0.000E+00	0.0000	5.513E-07	0.0496
Ra-226	8.110E-06	0.7294	4.384E-09	0.0004	0.000E+00	0.0000	7.277E-07	0.0654	0.000E+00	0.0000	0.000E+00	0.0000	1.562E-07	0.0141
Th-228	2.025E-07	0.0182	4.750E-10	0.0000	0.000E+00	0.0000	2.774E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.137E-09	0.0001
Th-230	9.671E-09	0.0009	8.168E-10	0.0001	0.000E+00	0.0000	1.325E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.467E-09	0.0002
Total	8.330E-06	0.7492	1.171E-08	0.0011	0.000E+00	0.0000	2.066E-06	0.1858	0.000E+00	0.0000	0.000E+00	0.0000	7.111E-07	0.0640

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.902E-06	0.1710
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.999E-06	0.8093
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.044E-07	0.0184
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.428E-08	0.0013
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.112E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.119E-02	2.227E+01	0.000E+00	0.000E+00	9.153E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.143E+01
Ra-226	4.693E-03	3.730E+01	0.000E+00	0.000E+00	3.837E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.113E+01
Th-228	8.297E-04	1.655E-01	0.000E+00	0.000E+00	6.784E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.440E-01
Th-230	7.948E-04	1.586E-01	0.000E+00	0.000E+00	6.500E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.085E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.739E-09	0.0008	7.034E-09	0.0006	1.559E-06	0.1436	0.000E+00	0.0000	0.000E+00	0.0000	6.423E-07	0.0592
Ra-226	7.988E-06	0.7358	3.148E-09	0.0003	4.553E-07	0.0419	0.000E+00	0.0000	0.000E+00	0.0000	4.697E-08	0.0043
Th-228	1.409E-07	0.0130	3.305E-10	0.0000	1.930E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.914E-10	0.0001
Th-230	1.797E-10	0.0000	8.121E-10	0.0001	5.646E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.321E-09	0.0002
Total	8.138E-06	0.7496	1.132E-08	0.0010	2.015E-06	0.1856	0.000E+00	0.0000	0.000E+00	0.0000	6.923E-07	0.0638

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.217E-06	0.2042
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.493E-06	0.7823
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.422E-07	0.0131
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.878E-09	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.086E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	7.190E-09	0.0007	5.787E-09	0.0005	0.000E+00	0.0000	1.281E-06	0.1180	0.000E+00	0.0000	0.000E+00	0.0000	5.284E-07	0.0487
Ra-226	7.980E-06	0.7350	4.389E-09	0.0004	0.000E+00	0.0000	7.326E-07	0.0675	0.000E+00	0.0000	0.000E+00	0.0000	1.606E-07	0.0148
Th-228	1.409E-07	0.0130	3.305E-10	0.0000	0.000E+00	0.0000	1.930E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.914E-10	0.0001
Th-230	1.025E-08	0.0009	8.171E-10	0.0001	0.000E+00	0.0000	1.377E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.479E-09	0.0002
Total	8.138E-06	0.7496	1.132E-08	0.0010	0.000E+00	0.0000	2.015E-06	0.1856	0.000E+00	0.0000	0.000E+00	0.0000	6.923E-07	0.0638

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.823E-06	0.1679
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.877E-06	0.8177
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.422E-07	0.0131
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.492E-08	0.0014
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.086E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.056E-02	2.101E+01	0.000E+00	0.000E+00	8.636E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.965E+01
Ra-226	4.543E-03	3.609E+01	0.000E+00	0.000E+00	3.715E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.981E+01
Th-228	4.017E-04	8.011E-02	0.000E+00	0.000E+00	3.285E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.086E-01
Th-230	7.948E-04	1.585E-01	0.000E+00	0.000E+00	6.499E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.084E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.282E-09	0.0008	6.666E-09	0.0006	1.477E-06	0.1421	0.000E+00	0.0000	0.000E+00	0.0000	6.086E-07	0.0585
Ra-226	7.734E-06	0.7439	3.048E-09	0.0003	4.406E-07	0.0424	0.000E+00	0.0000	0.000E+00	0.0000	4.548E-08	0.0044
Th-228	6.822E-08	0.0066	1.600E-10	0.0000	9.340E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.832E-10	0.0000
Th-230	1.797E-10	0.0000	8.120E-10	0.0001	5.644E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.321E-09	0.0002
Total	7.810E-06	0.7513	1.069E-08	0.0010	1.918E-06	0.1845	0.000E+00	0.0000	0.000E+00	0.0000	6.568E-07	0.0632

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.101E-06	0.2021
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.223E-06	0.7909
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.886E-08	0.0066
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.877E-09	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.040E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	6.607E-09	0.0006	5.318E-09	0.0005	0.000E+00	0.0000	1.177E-06	0.1132	0.000E+00	0.0000	0.000E+00	0.0000	4.855E-07	0.0467
Ra-226	7.724E-06	0.7430	4.390E-09	0.0004	0.000E+00	0.0000	7.401E-07	0.0712	0.000E+00	0.0000	0.000E+00	0.0000	1.684E-07	0.0162
Th-228	6.822E-08	0.0066	1.600E-10	0.0000	0.000E+00	0.0000	9.340E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.832E-10	0.0000
Th-230	1.138E-08	0.0011	8.177E-10	0.0001	0.000E+00	0.0000	1.483E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.502E-09	0.0002
Total	7.810E-06	0.7513	1.069E-08	0.0010	0.000E+00	0.0000	1.918E-06	0.1845	0.000E+00	0.0000	0.000E+00	0.0000	6.568E-07	0.0632

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.674E-06	0.1610
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.637E-06	0.8308
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.886E-08	0.0066
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.619E-08	0.0016
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.040E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	8.664E-03	1.721E+01	0.000E+00	0.000E+00	7.085E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.430E+01
Ra-226	4.057E-03	3.219E+01	0.000E+00	0.000E+00	3.317E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.550E+01
Th-228	3.174E-05	6.320E-03	0.000E+00	0.000E+00	2.595E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.227E-02
Th-230	7.947E-04	1.582E-01	0.000E+00	0.000E+00	6.498E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.080E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	6.896E-09	0.0008	5.551E-09	0.0006	1.228E-06	0.1350	0.000E+00	0.0000	0.000E+00	0.0000	5.068E-07	0.0557
Ra-226	6.906E-06	0.7590	2.722E-09	0.0003	3.929E-07	0.0432	0.000E+00	0.0000	0.000E+00	0.0000	4.061E-08	0.0045
Th-228	5.389E-09	0.0006	1.264E-11	0.0000	7.368E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.027E-11	0.0000
Th-230	1.797E-10	0.0000	8.119E-10	0.0001	5.635E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.321E-09	0.0003
Total	6.918E-06	0.7603	9.097E-09	0.0010	1.622E-06	0.1783	0.000E+00	0.0000	0.000E+00	0.0000	5.498E-07	0.0604

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.748E-06	0.1921
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.342E-06	0.8069
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.439E-09	0.0006
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.876E-09	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.099E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	4.913E-09	0.0005	3.954E-09	0.0004	0.000E+00	0.0000	8.739E-07	0.0960	0.000E+00	0.0000	0.000E+00	0.0000	3.611E-07	0.0397
Ra-226	6.893E-06	0.7575	4.310E-09	0.0005	0.000E+00	0.0000	7.462E-07	0.0820	0.000E+00	0.0000	0.000E+00	0.0000	1.861E-07	0.0205
Th-228	5.389E-09	0.0006	1.264E-11	0.0000	0.000E+00	0.0000	7.368E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.027E-11	0.0000
Th-230	1.507E-08	0.0017	8.198E-10	0.0001	0.000E+00	0.0000	1.857E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	2.592E-09	0.0003
Total	6.918E-06	0.7603	9.097E-09	0.0010	0.000E+00	0.0000	1.622E-06	0.1783	0.000E+00	0.0000	0.000E+00	0.0000	5.498E-07	0.0604

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.244E-06	0.1367
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.830E-06	0.8605
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.439E-09	0.0006
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.034E-08	0.0022
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.099E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.145E-03	1.018E+01	0.000E+00	0.000E+00	4.207E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.439E+01
Ra-226	2.937E-03	2.320E+01	0.000E+00	0.000E+00	2.401E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.561E+01
Th-228	2.248E-08	4.459E-06	0.000E+00	0.000E+00	1.839E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.285E-05
Th-230	7.942E-04	1.575E-01	0.000E+00	0.000E+00	6.495E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.070E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.259E-09	0.0007	3.428E-09	0.0005	7.559E-07	0.1182	0.000E+00	0.0000	0.000E+00	0.0000	3.130E-07	0.0489
Ra-226	5.000E-06	0.7818	1.971E-09	0.0003	2.834E-07	0.0443	0.000E+00	0.0000	0.000E+00	0.0000	2.941E-08	0.0046
Th-228	3.816E-12	0.0000	8.957E-15	0.0000	5.199E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.145E-14	0.0000
Th-230	1.796E-10	0.0000	8.114E-10	0.0001	5.609E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.320E-09	0.0004
Total	5.004E-06	0.7825	6.211E-09	0.0010	1.040E-06	0.1626	0.000E+00	0.0000	0.000E+00	0.0000	3.448E-07	0.0539

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.077E-06	0.1683
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.314E-06	0.8310
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.851E-12	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.871E-09	0.0006
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.395E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	2.108E-09	0.0003	1.697E-09	0.0003	0.000E+00	0.0000	3.734E-07	0.0584	0.000E+00	0.0000	0.000E+00	0.0000	1.549E-07	0.0242
Ra-226	4.978E-06	0.7785	3.689E-09	0.0006	0.000E+00	0.0000	6.636E-07	0.1038	0.000E+00	0.0000	0.000E+00	0.0000	1.870E-07	0.0292
Th-228	3.816E-12	0.0000	8.957E-15	0.0000	0.000E+00	0.0000	5.199E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.145E-14	0.0000
Th-230	2.355E-08	0.0037	8.251E-10	0.0001	0.000E+00	0.0000	2.876E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	2.866E-09	0.0004
Total	5.004E-06	0.7825	6.211E-09	0.0010	0.000E+00	0.0000	1.040E-06	0.1626	0.000E+00	0.0000	0.000E+00	0.0000	3.448E-07	0.0539

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.321E-07	0.0832
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.833E-06	0.9121
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.851E-12	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.012E-08	0.0047
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.395E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.220E-03	2.382E+00	0.000E+00	0.000E+00	9.975E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.380E+00
Ra-226	9.554E-04	7.443E+00	0.000E+00	0.000E+00	7.812E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.224E+00
Th-228	2.128E-19	4.162E-17	0.000E+00	0.000E+00	1.740E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.157E-16
Th-230	7.927E-04	1.550E-01	0.000E+00	0.000E+00	6.482E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.032E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.091E-09	0.0005	8.781E-10	0.0004	1.910E-07	0.0950	0.000E+00	0.0000	0.000E+00	0.0000	8.018E-08	0.0399
Ra-226	1.631E-06	0.8116	6.438E-10	0.0003	9.126E-08	0.0454	0.000E+00	0.0000	0.000E+00	0.0000	9.607E-09	0.0048
Th-228	3.605E-23	0.0000	8.478E-26	0.0000	4.852E-26	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.030E-25	0.0000
Th-230	1.792E-10	0.0001	8.099E-10	0.0004	5.519E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	2.315E-09	0.0012
Total	1.632E-06	0.8123	2.332E-09	0.0012	2.828E-07	0.1407	0.000E+00	0.0000	0.000E+00	0.0000	9.210E-08	0.0458

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.731E-07	0.1359
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.732E-06	0.8621
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.639E-23	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.856E-09	0.0019
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.009E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	1.091E-10	0.0001	8.777E-11	0.0000	0.000E+00	0.0000	1.904E-08	0.0095	0.000E+00	0.0000	0.000E+00	0.0000	8.014E-09	0.0040
Ra-226	1.593E-06	0.7931	1.408E-09	0.0007	0.000E+00	0.0000	2.587E-07	0.1288	0.000E+00	0.0000	0.000E+00	0.0000	8.056E-08	0.0401
Th-228	3.605E-23	0.0000	8.478E-26	0.0000	0.000E+00	0.0000	4.852E-26	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.030E-25	0.0000
Th-230	3.846E-08	0.0191	8.358E-10	0.0004	0.000E+00	0.0000	5.057E-09	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	3.532E-09	0.0018
Total	1.632E-06	0.8123	2.332E-09	0.0012	0.000E+00	0.0000	2.828E-07	0.1407	0.000E+00	0.0000	0.000E+00	0.0000	9.210E-08	0.0458

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.726E-08	0.0136
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.934E-06	0.9626
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.639E-23	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.788E-08	0.0238
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.009E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.890E-05	1.104E-01	0.000E+00	0.000E+00	4.816E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.586E-01
Ra-226	5.721E-05	4.274E-01	0.000E+00	0.000E+00	4.678E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.742E-01
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	7.883E-04	1.479E-01	0.000E+00	0.000E+00	6.446E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.925E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.728E-11	0.0004	4.609E-11	0.0004	9.619E-09	0.0739	0.000E+00	0.0000	0.000E+00	0.0000	4.209E-09	0.0323
Ra-226	1.060E-07	0.8146	4.204E-11	0.0003	5.713E-09	0.0439	0.000E+00	0.0000	0.000E+00	0.0000	6.273E-10	0.0048
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.782E-10	0.0014	8.054E-10	0.0062	5.265E-10	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	2.302E-09	0.0177
Total	1.063E-07	0.8164	8.935E-10	0.0069	1.586E-08	0.1219	0.000E+00	0.0000	0.000E+00	0.0000	7.138E-09	0.0548

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.393E-08	0.1070
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.124E-07	0.8637
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.812E-09	0.0293
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.301E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	2.305E-14	0.0000	1.855E-14	0.0000	0.000E+00	0.0000	3.861E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.694E-12	0.0000
Ra-226	6.142E-08	0.4720	5.619E-11	0.0004	0.000E+00	0.0000	9.954E-09	0.0765	0.000E+00	0.0000	0.000E+00	0.0000	3.272E-09	0.0251
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	4.483E-08	0.3445	8.373E-10	0.0064	0.000E+00	0.0000	5.901E-09	0.0453	0.000E+00	0.0000	0.000E+00	0.0000	3.865E-09	0.0297
Total	1.063E-07	0.8164	8.935E-10	0.0069	0.000E+00	0.0000	1.586E-08	0.1219	0.000E+00	0.0000	0.000E+00	0.0000	7.138E-09	0.0548

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.596E-12	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.471E-08	0.5740
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.543E-08	0.4259
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.301E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.524E-05	2.434E-02	0.000E+00	0.000E+00	1.246E-02	0.000E+00	0.000E+00	5.405E-01	0.000E+00	0.000E+00	5.773E-01
Ra-226	2.064E-05	1.312E-01	0.000E+00	0.000E+00	1.688E-02	0.000E+00	0.000E+00	7.667E-01	0.000E+00	0.000E+00	9.147E-01
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	7.731E-04	1.236E-01	0.000E+00	0.000E+00	6.322E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.558E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.750E-11	0.0001	1.409E-11	0.0001	2.503E-09	0.0208	0.000E+00	0.0000	0.000E+00	0.0000	1.286E-09	0.0107
Ra-226	4.311E-08	0.3587	1.746E-11	0.0001	2.018E-09	0.0168	0.000E+00	0.0000	0.000E+00	0.0000	2.606E-10	0.0022
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.748E-10	0.0015	7.899E-10	0.0066	4.396E-10	0.0037	0.000E+00	0.0000	0.000E+00	0.0000	2.258E-09	0.0188
Total	4.330E-08	0.3603	8.215E-10	0.0068	4.961E-09	0.0413	0.000E+00	0.0000	0.000E+00	0.0000	3.805E-09	0.0317

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	5.551E-08	0.4619	0.000E+00	0.0000	0.000E+00	0.0000	5.933E-08	0.4937
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	1.178E-08	0.0980	0.000E+00	0.0000	0.000E+00	0.0000	5.718E-08	0.4758
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.662E-09	0.0305
Total	0.000E+00	0.0000	0.000E+00	0.0000	6.729E-08	0.5599	0.000E+00	0.0000	0.000E+00	0.0000	1.202E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	3.162E-27	0.0000	2.545E-27	0.0000	0.000E+00	0.0000	4.507E-25	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.324E-25	0.0000
Ra-226	6.863E-13	0.0000	6.416E-16	0.0000	0.000E+00	0.0000	9.668E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.736E-14	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	4.330E-08	0.3603	8.215E-10	0.0068	0.000E+00	0.0000	4.961E-09	0.0413	0.000E+00	0.0000	0.000E+00	0.0000	3.805E-09	0.0317
Total	4.330E-08	0.3603	8.215E-10	0.0068	0.000E+00	0.0000	4.961E-09	0.0413	0.000E+00	0.0000	0.000E+00	0.0000	3.805E-09	0.0317

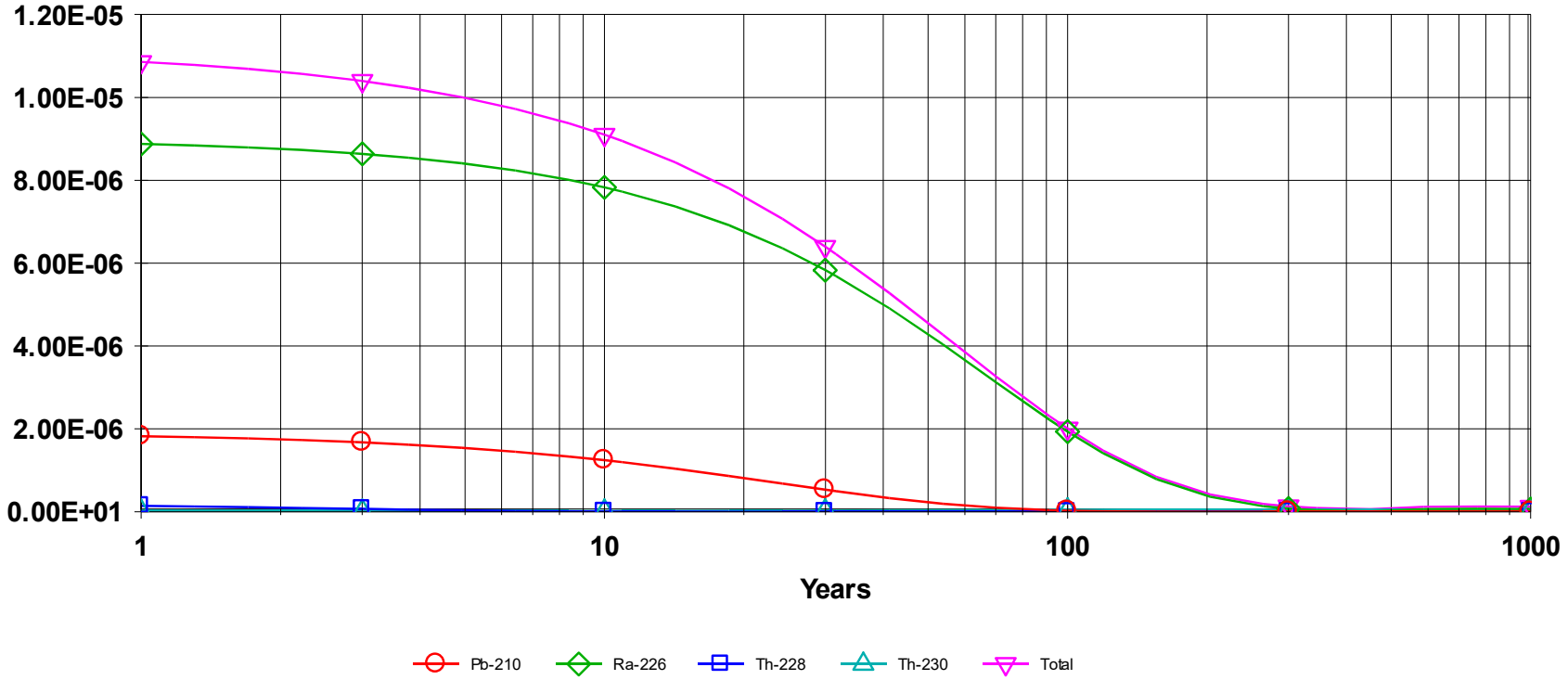
Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.352E-21	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.353E-21	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.524E-08	0.5429	0.000E+00	0.0000	0.000E+00	0.0000	6.524E-08	0.5429
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.052E-09	0.0171	0.000E+00	0.0000	0.000E+00	0.0000	5.494E-08	0.4571
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.729E-08	0.5599	0.000E+00	0.0000	0.000E+00	0.0000	1.202E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

EXCESS CANCER RISK: All Nuclides Summed, All Pathways Summed



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA PARCELS - RES GARDENER.RAD 05/11/2023 09:13 GRAPHICS.ASC Includes All Pathways

Note: The data line for each radionuclide includes risk contributions from that radionuclide's decay chain isotopes (e.g., the Th-230 data line includes the risk contribution from Ra-226 that results from the radioactive decay of Th-230; the Ra-226 data line does not include the Ra-226 resulting from Th-230 decay).

CWC-365 and CWC-386 Recreational User
RESRAD Dose Summary

Summary : CWC-365, 386 (Partial) Jana Parcels - Recreational User Receptor
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA PARCELS REC USER.RAD

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Dose Conversion Factor (and Related) Parameter Summary
Dose Library: DCFPAK3.02 (Age 10)

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: DCFPAK3.02)	5.567E-05	5.567E-05	DCF1(1)
A-1	Bi-210 (Source: DCFPAK3.02)	5.473E-03	5.473E-03	DCF1(2)
A-1	Bi-212 (Source: DCFPAK3.02)	6.258E-01	6.258E-01	DCF1(3)
A-1	Bi-214 (Source: DCFPAK3.02)	9.135E+00	9.135E+00	DCF1(4)
A-1	Hg-206 (Source: DCFPAK3.02)	6.127E-01	6.127E-01	DCF1(5)
A-1	Pb-210 (Source: DCFPAK3.02)	2.092E-03	2.092E-03	DCF1(6)
A-1	Pb-212 (Source: DCFPAK3.02)	6.314E-01	6.314E-01	DCF1(7)
A-1	Pb-214 (Source: DCFPAK3.02)	1.257E+00	1.257E+00	DCF1(8)
A-1	Po-210 (Source: DCFPAK3.02)	5.641E-05	5.641E-05	DCF1(9)
A-1	Po-212 (Source: DCFPAK3.02)	0.000E+00	0.000E+00	DCF1(10)
A-1	Po-214 (Source: DCFPAK3.02)	4.801E-04	4.801E-04	DCF1(11)
A-1	Po-216 (Source: DCFPAK3.02)	8.873E-05	8.873E-05	DCF1(12)
A-1	Po-218 (Source: DCFPAK3.02)	9.228E-09	9.228E-09	DCF1(13)
A-1	Ra-224 (Source: DCFPAK3.02)	4.950E-02	4.950E-02	DCF1(14)
A-1	Ra-226 (Source: DCFPAK3.02)	3.176E-02	3.176E-02	DCF1(15)
A-1	Rn-218 (Source: DCFPAK3.02)	4.259E-03	4.259E-03	DCF1(16)
A-1	Rn-220 (Source: DCFPAK3.02)	3.474E-03	3.474E-03	DCF1(17)
A-1	Rn-222 (Source: DCFPAK3.02)	2.130E-03	2.130E-03	DCF1(18)
A-1	Th-228 (Source: DCFPAK3.02)	7.248E-03	7.248E-03	DCF1(19)
A-1	Th-230 (Source: DCFPAK3.02)	1.106E-03	1.106E-03	DCF1(20)
A-1	Tl-206 (Source: DCFPAK3.02)	1.278E-02	1.278E-02	DCF1(21)
A-1	Tl-208 (Source: DCFPAK3.02)	2.167E+01	2.167E+01	DCF1(22)
A-1	Tl-210 (Source: DCFPAK3.02)	1.677E+01	1.677E+01	DCF1(23)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	4.899E-02	2.641E-02	DCF2(1)
B-1	Ra-226+D	4.570E-02	4.554E-02	DCF2(2)
B-1	Th-228+D	2.217E-01	2.042E-01	DCF2(3)
B-1	Th-230	4.177E-01	4.177E-01	DCF2(4)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	1.681E-02	7.215E-03	DCF3(1)
D-1	Ra-226+D	2.969E-03	2.967E-03	DCF3(2)
D-1	Th-228+D	1.531E-03	5.069E-04	DCF3(3)
D-1	Th-230	9.102E-04	9.102E-04	DCF3(4)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(3,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)
D-34				

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: DCFPAK3.02 (Age 10)

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(3,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(3,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	6.670E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.000E-01	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.900E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	9.000E+00	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Pb-210	2.900E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.200E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Th-228	3.000E-02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Th-230	2.000E-02	0.000E+00	---	S1(4)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(4)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.109E-02	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.582E-02	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.852E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.852E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R017	Inhalation rate (m**3/yr)	4.891E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	9.000E+00	3.000E+01	---	ED
R017	Shielding factor, inhalation	1.000E+00	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	5.940E-03	2.500E-01	---	FOTD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	6.080E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Summary : CWC-365, 386 (Partial) Jana Parcels - Recreational User Receptor
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA PARCELS REC USER.RAD

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	66701.00 square meters	Pb-210	2.900E-01
Thickness:	0.30 meters	Ra-226	1.200E-01
Cover Depth:	0.00 meters	Th-228	3.000E-02
		Th-230	2.000E-02

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.900E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	9.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.018E-02	9.628E-03	8.847E-03	7.583E-03	5.186E-03	1.625E-03	1.059E-04	4.400E-05
M(t):	5.360E-04	5.067E-04	4.656E-04	3.991E-04	2.730E-04	8.551E-05	5.575E-06	2.316E-06

0Maximum TDOSE(t): 1.018E-02 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.269E-05	0.0012	8.291E-06	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.724E-03	0.1693
Ra-226	7.000E-03	0.6874	3.296E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.388E-04	0.0136
Th-228	1.268E-03	0.1245	3.325E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.392E-05	0.0014
Th-230	3.833E-07	0.0000	4.979E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.579E-06	0.0006
Total	8.281E-03	0.8131	1.989E-05	0.0020	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.883E-03	0.1849

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.745E-03	0.1713
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.142E-03	0.7013
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.285E-03	0.1262
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.194E-05	0.0012
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.018E-02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.216E-05	0.0013	7.948E-06	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.652E-03	0.1716
Ra-226	6.887E-03	0.7154	3.347E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.582E-04	0.0164
Th-228	8.821E-04	0.0916	2.314E-06	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.684E-06	0.0010
Th-230	8.847E-07	0.0001	4.980E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.590E-06	0.0007
Total	7.783E-03	0.8083	1.859E-05	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.827E-03	0.1897

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.672E-03	0.1737
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.049E-03	0.7321
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.941E-04	0.0929
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.245E-05	0.0013
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.628E-03	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.118E-05	0.0013	7.303E-06	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.518E-03	0.1716
Ra-226	6.667E-03	0.7536	3.434E-06	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.934E-04	0.0219
Th-228	4.271E-04	0.0483	1.120E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.689E-06	0.0005
Th-230	1.863E-06	0.0002	4.980E-06	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.615E-06	0.0007
Total	7.107E-03	0.8034	1.684E-05	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.723E-03	0.1947

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.537E-03	0.1737
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.864E-03	0.7758
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.329E-04	0.0489
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.346E-05	0.0015
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.847E-03	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 9.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	8.670E-06	0.0011	5.665E-06	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.178E-03	0.1553
Ra-226	6.048E-03	0.7975	3.590E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.743E-04	0.0362
Th-228	4.848E-05	0.0064	1.272E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.324E-07	0.0001
Th-230	4.614E-06	0.0006	4.981E-06	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.716E-06	0.0009
Total	6.109E-03	0.8057	1.436E-05	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.459E-03	0.1924

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 9.000E+00 years
0 Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.192E-03	0.1572
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.325E-03	0.8342
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.914E-05	0.0065
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.631E-05	0.0022
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.583E-03	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.566E-06	0.0007	2.330E-06	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.844E-04	0.0934
Ra-226	4.298E-03	0.8287	3.393E-06	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.699E-04	0.0713
Th-228	2.389E-08	0.0000	6.270E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.625E-10	0.0000
Th-230	1.237E-05	0.0024	4.983E-06	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.228E-06	0.0014
Total	4.314E-03	0.8318	1.071E-05	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.615E-04	0.1661

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.903E-04	0.0945
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.671E-03	0.9007
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.421E-08	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.458E-05	0.0047
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.186E-03	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.845E-07	0.0001	1.205E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.506E-05	0.0154
Ra-226	1.376E-03	0.8469	1.398E-06	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.831E-04	0.1127
Th-228	2.257E-19	0.0000	5.935E-22	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.484E-21	0.0000
Th-230	2.528E-05	0.0156	4.985E-06	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.665E-06	0.0053
Total	1.401E-03	0.8626	6.503E-06	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.168E-04	0.1334

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.536E-05	0.0156
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.560E-03	0.9604
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.288E-19	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.893E-05	0.0240
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.625E-03	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.899E-11	0.0000	2.547E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.296E-09	0.0000
Ra-226	5.304E-05	0.5008	5.641E-08	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.566E-06	0.0714
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	3.086E-05	0.2913	4.964E-06	0.0469	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.427E-06	0.0890
Total	8.390E-05	0.7921	5.020E-06	0.0474	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.700E-05	0.1605

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
0 Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.360E-09	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.067E-05	0.5728
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.525E-05	0.4272
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.059E-04	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.349E-24	0.0000	3.495E-24	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.267E-22	0.0000
Ra-226	5.928E-10	0.0000	6.442E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.640E-11	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	2.986E-05	0.6785	4.869E-06	0.1106	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.279E-06	0.2109
Total	2.986E-05	0.6785	4.869E-06	0.1106	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.279E-06	0.2109

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.356E-22	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.799E-10	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.400E-05	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.400E-05	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	9.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	6.016E-03	5.767E-03	5.299E-03	4.111E-03	1.691E-03	8.746E-05	1.848E-08	2.536E-21
0Ra-226+D	Ra-226+D	1.000E+00	5.943E-02	5.847E-02	5.659E-02	5.133E-02	3.647E-02	1.167E-02	4.499E-04	5.030E-09
Ra-226+D	Pb-210+D	1.000E+00	9.407E-05	2.750E-04	6.059E-04	1.383E-03	2.459E-03	1.332E-03	5.562E-05	6.351E-10
Ra-226+D	ΣDSR(j)		5.952E-02	5.874E-02	5.720E-02	5.271E-02	3.893E-02	1.300E-02	5.056E-04	5.665E-09
0Th-228+D	Th-228+D	1.000E+00	4.283E-02	2.980E-02	1.443E-02	1.638E-03	8.071E-07	7.626E-18	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	5.842E-04	5.842E-04	5.841E-04	5.840E-04	5.837E-04	5.826E-04	5.793E-04	5.682E-04
Th-230	Ra-226+D	1.000E+00	1.291E-05	3.844E-05	8.828E-05	2.284E-04	6.235E-04	1.280E-03	1.564E-03	1.514E-03
Th-230	Pb-210+D	1.000E+00	1.365E-08	9.398E-08	4.784E-07	3.128E-06	2.205E-05	8.348E-05	1.186E-04	1.178E-04
Th-230	ΣDSR(j)		5.971E-04	6.227E-04	6.729E-04	8.155E-04	1.229E-03	1.946E-03	2.262E-03	2.200E-03

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.
0

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 1.900E+01 mrem/yr

0Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	9.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	3.158E+03	3.295E+03	3.586E+03	4.622E+03	1.124E+04	2.172E+05	1.028E+09	*7.632E+13
Ra-226	3.192E+02	3.235E+02	3.322E+02	3.605E+02	4.881E+02	1.461E+03	3.758E+04	3.354E+09
Th-228	4.436E+02	6.375E+02	1.317E+03	1.160E+04	2.354E+07	*8.201E+14	*8.201E+14	*8.201E+14
Th-230	3.182E+04	3.051E+04	2.824E+04	2.330E+04	1.546E+04	9.762E+03	8.399E+03	8.636E+03

*At specific activity limit
0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	2.900E-01	0.000E+00	6.016E-03	3.158E+03	6.016E-03	3.158E+03
Ra-226	1.200E-01	0.000E+00	5.952E-02	3.192E+02	5.952E-02	3.192E+02
Th-228	3.000E-02	0.000E+00	4.283E-02	4.436E+02	4.283E-02	4.436E+02
Th-230	2.000E-02	348.3 ± 0.7	2.265E-03	8.389E+03	5.971E-04	3.182E+04

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

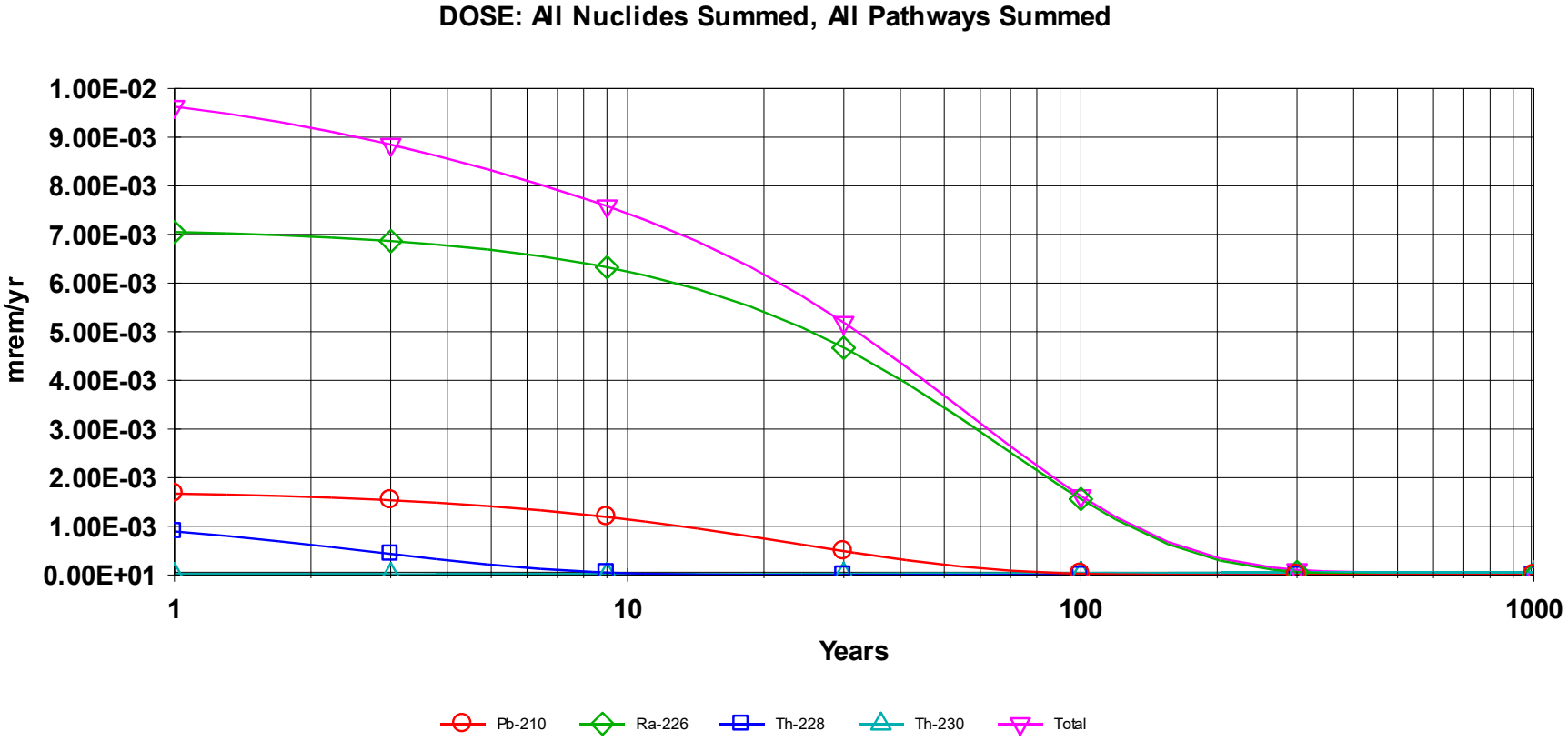
0Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	9.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	1.745E-03	1.672E-03	1.537E-03	1.192E-03	4.903E-04	2.536E-05	5.360E-09	7.356E-22
Pb-210	Ra-226	1.000E+00	1.129E-05	3.300E-05	7.270E-05	1.660E-04	2.950E-04	1.599E-04	6.674E-06	7.622E-11
Pb-210	Th-230	1.000E+00	2.730E-10	1.880E-09	9.569E-09	6.255E-08	4.411E-07	1.670E-06	2.372E-06	2.356E-06
Pb-210	ΣDOSE(j)		1.756E-03	1.705E-03	1.609E-03	1.358E-03	7.858E-04	1.869E-04	9.052E-06	2.356E-06
0Ra-226	Ra-226	1.000E+00	7.131E-03	7.016E-03	6.791E-03	6.159E-03	4.376E-03	1.400E-03	5.399E-05	6.036E-10
Ra-226	Th-230	1.000E+00	2.581E-07	7.688E-07	1.766E-06	4.568E-06	1.247E-05	2.560E-05	3.129E-05	3.028E-05
Ra-226	ΣDOSE(j)		7.131E-03	7.017E-03	6.793E-03	6.164E-03	4.389E-03	1.426E-03	8.528E-05	3.028E-05
0Th-228	Th-228	1.000E+00	1.285E-03	8.941E-04	4.329E-04	4.914E-05	2.421E-08	2.288E-19	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	1.168E-05	1.168E-05	1.168E-05	1.168E-05	1.167E-05	1.165E-05	1.159E-05	1.136E-05

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	9.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	2.900E-01	2.780E-01	2.554E-01	1.982E-01	8.150E-02	4.216E-03	8.910E-07	1.223E-19
Pb-210	Ra-226	1.000E+00	0.000E+00	3.639E-03	1.030E-02	2.597E-02	4.789E-02	2.621E-02	1.095E-03	1.251E-08
Pb-210	Th-230	1.000E+00	0.000E+00	1.327E-07	1.148E-06	9.218E-06	7.005E-05	2.708E-04	3.861E-04	3.834E-04
Pb-210	ΣS(j):		2.900E-01	2.816E-01	2.657E-01	2.241E-01	1.295E-01	3.069E-02	1.482E-03	3.834E-04
0Ra-226	Ra-226	1.000E+00	1.200E-01	1.181E-01	1.143E-01	1.037E-01	7.368E-02	2.361E-02	9.141E-04	1.043E-08
Ra-226	Th-230	1.000E+00	0.000E+00	8.594E-06	2.537E-05	7.253E-05	2.056E-04	4.273E-04	5.254E-04	5.193E-04
Ra-226	ΣS(j):		1.200E-01	1.181E-01	1.143E-01	1.037E-01	7.389E-02	2.404E-02	1.439E-03	5.193E-04
0Th-228	Th-228	1.000E+00	3.000E-02	2.088E-02	1.011E-02	1.148E-03	5.657E-07	5.355E-18	0.000E+00	0.000E+00
0Th-230	Th-230	1.000E+00	2.000E-02	2.000E-02	2.000E-02	2.000E-02	1.998E-02	1.994E-02	1.983E-02	1.945E-02

THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 4.99 seconds



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Note: The data line for each radionuclide includes dose contributions from that radionuclide's decay chain isotopes (e.g., the Th-230 data line includes the dose contribution from Ra-226 that results from the radioactive decay of Th-230; the Ra-226 data line does not include the Ra-226 resulting from Th-230 decay).

CWC-365 and CWC-386 Recreational User
RESRAD Risk Summary

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Part III: Intake Quantities and Health Risk Factors

Cancer Risk Slope Factors 2
Risk Slope and ETFG for the Ground Pathway 3
Amount of Intake Quantities and Excess Cancer Risks
Time= 0.000E+00 4
Time= 1.000E+00 7
Time= 3.000E+00 10
Time= 9.000E+00 13
Time= 3.000E+01 16
Time= 1.000E+02 19
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Time= 1.000E+03 25

Cancer Risk Slope Factors Summary Table
Risk Library: DCFPAK3.02 Morbidity

0 Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Pb-210+D	4.30E-09	1.48E-09	SLPF(1,1)
Sf-1	Ra-226+D	8.37E-06	2.50E-08	SLPF(2,1)
Sf-1	Th-228+D	7.33E-06	5.64E-09	SLPF(3,1)
Sf-1	Th-230	8.45E-10	8.45E-10	SLPF(4,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Pb-210+D	3.08E-08	1.59E-08	SLPF(1,2)
Sf-2	Ra-226+D	2.82E-08	2.81E-08	SLPF(2,2)
Sf-2	Th-228+D	1.44E-07	1.32E-07	SLPF(3,2)
Sf-2	Th-230	3.41E-08	3.41E-08	SLPF(4,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,3)
Sf-3	Th-228+D	4.23E-10	1.48E-10	SLPF(3,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(4,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	2.67E-09	8.84E-10	SLPF(1,4)
Sf-3	Ra-226+D	3.85E-10	3.85E-10	SLPF(2,4)
Sf-3	Th-228+D	3.00E-10	1.08E-10	SLPF(3,4)
Sf-3	Th-230	9.14E-11	9.14E-11	SLPF(4,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(1,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(2,5)
Sf-3	Th-228+D	4.23E-10	1.48E-10	SLPF(3,5)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(4,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Rn-220	1.90E-13	1.90E-13	SLPFRN(2,1)
Sf-Rn	Po-216	3.00E-15	3.00E-15	SLPFRN(2,2)
Sf-Rn	Pb-212	3.90E-11	3.90E-11	SLPFRN(2,3)
Sf-Rn	Bi-212	3.70E-11	3.70E-11	SLPFRN(2,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	3.88E+02	3.88E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	3.88E+02	3.88E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.88E+02	1.88E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	1.88E+02	1.88E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

0Nuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless)							
	t=	0.000E+00	1.000E+00	3.000E+00	9.000E+00	3.000E+01	1.000E+02	3.000E+02	1.000E+03
At-218	2.740E-11	5.802E-03	5.802E-03	5.802E-03	5.802E-03	5.802E-03	5.802E-03	5.801E-03	5.789E-03
Bi-210	2.770E-09	5.835E-03	5.835E-03	5.835E-03	5.835E-03	5.836E-03	5.836E-03	5.837E-03	5.836E-03
Bi-212	4.960E-07	5.698E-03	5.698E-03	5.698E-03	5.697E-03	5.696E-03	5.690E-03	5.672E-03	5.578E-03
Bi-214	7.340E-06	5.614E-03	5.613E-03	5.613E-03	5.613E-03	5.610E-03	5.602E-03	5.575E-03	5.446E-03
Hg-206	4.830E-07	5.819E-03	5.819E-03	5.819E-03	5.819E-03	5.819E-03	5.817E-03	5.811E-03	5.774E-03
Pb-210	1.480E-09	5.940E-03	5.940E-03	5.940E-03	5.940E-03	5.940E-03	5.940E-03	5.940E-03	5.940E-03
Pb-212	4.960E-07	5.838E-03	5.838E-03	5.838E-03	5.838E-03	5.838E-03	5.837E-03	5.834E-03	5.813E-03
Pb-214	9.940E-07	5.817E-03	5.817E-03	5.817E-03	5.817E-03	5.817E-03	5.815E-03	5.809E-03	5.769E-03
Po-210	4.510E-11	5.705E-03	5.705E-03	5.705E-03	5.704E-03	5.703E-03	5.698E-03	5.681E-03	5.591E-03
Po-212	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-214	3.850E-10	5.707E-03	5.706E-03	5.706E-03	5.706E-03	5.705E-03	5.700E-03	5.684E-03	5.599E-03
Po-216	7.100E-11	5.708E-03	5.708E-03	5.708E-03	5.707E-03	5.706E-03	5.701E-03	5.684E-03	5.596E-03
Po-218	6.840E-15	5.876E-03	5.876E-03	5.876E-03	5.876E-03	5.876E-03	5.876E-03	5.876E-03	5.876E-03
Ra-224	3.910E-08	5.832E-03	5.832E-03	5.832E-03	5.832E-03	5.832E-03	5.831E-03	5.828E-03	5.804E-03
Ra-226	2.500E-08	5.843E-03	5.843E-03	5.843E-03	5.843E-03	5.843E-03	5.842E-03	5.841E-03	5.826E-03
Rn-218	3.390E-09	5.733E-03	5.733E-03	5.733E-03	5.733E-03	5.732E-03	5.728E-03	5.716E-03	5.646E-03
Rn-220	2.770E-09	5.756E-03	5.756E-03	5.756E-03	5.755E-03	5.754E-03	5.751E-03	5.741E-03	5.679E-03
Rn-222	1.690E-09	5.765E-03	5.765E-03	5.765E-03	5.765E-03	5.764E-03	5.761E-03	5.752E-03	5.696E-03
Th-228	5.640E-09	5.862E-03	5.862E-03	5.862E-03	5.862E-03	5.862E-03	5.862E-03	5.862E-03	5.856E-03
Th-230	8.450E-10	5.874E-03	5.874E-03	5.874E-03	5.874E-03	5.874E-03	5.874E-03	5.874E-03	5.872E-03
Tl-206	6.110E-09	5.818E-03	5.818E-03	5.818E-03	5.818E-03	5.818E-03	5.818E-03	5.820E-03	5.819E-03
Tl-208	1.750E-05	5.492E-03	5.492E-03	5.492E-03	5.491E-03	5.488E-03	5.476E-03	5.440E-03	5.273E-03
Tl-210	1.340E-05	5.636E-03	5.636E-03	5.636E-03	5.635E-03	5.633E-03	5.626E-03	5.601E-03	5.481E-03

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.729E-04	0.000E+00	0.000E+00	0.000E+00	1.047E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.047E-01
Ra-226	7.153E-05	0.000E+00	0.000E+00	0.000E+00	4.334E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.334E-02
Th-228	1.788E-05	0.000E+00	0.000E+00	0.000E+00	1.083E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.083E-02
Th-230	1.192E-05	0.000E+00	0.000E+00	0.000E+00	7.223E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.223E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.795E-11	0.0011	4.223E-11	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.857E-09	0.0531
Ra-226	4.739E-08	0.8807	1.691E-11	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.869E-10	0.0035
Th-228	3.226E-09	0.0600	6.851E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.216E-11	0.0002
Th-230	8.933E-13	0.0000	3.655E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.741E-12	0.0001
Total	5.068E-08	0.9418	6.964E-11	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.064E-09	0.0569

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.957E-09	0.0550
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.760E-08	0.8845
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.245E-09	0.0603
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.229E-11	0.0002
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.381E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.473E-11	0.0010	3.988E-11	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.698E-09	0.0501
Ra-226	4.738E-08	0.8805	1.925E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.456E-10	0.0064
Th-228	3.226E-09	0.0600	6.851E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.216E-11	0.0002
Th-230	1.666E-11	0.0003	3.661E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.839E-12	0.0001
Total	5.068E-08	0.9418	6.964E-11	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.064E-09	0.0569

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.793E-09	0.0519
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.774E-08	0.8873
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.245E-09	0.0603
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.816E-11	0.0005
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.381E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.679E-04	0.000E+00	0.000E+00	0.000E+00	1.017E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.017E-01
Ra-226	7.038E-05	0.000E+00	0.000E+00	0.000E+00	4.264E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.264E-02
Th-228	1.244E-05	0.000E+00	0.000E+00	0.000E+00	7.539E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.539E-03
Th-230	1.192E-05	0.000E+00	0.000E+00	0.000E+00	7.223E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.223E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.631E-11	0.0011	4.104E-11	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.776E-09	0.0534
Ra-226	4.663E-08	0.8972	1.663E-11	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.839E-10	0.0035
Th-228	2.245E-09	0.0432	4.768E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.459E-12	0.0002
Th-230	8.933E-13	0.0000	3.655E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.741E-12	0.0001
Total	4.893E-08	0.9415	6.609E-11	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.977E-09	0.0573

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.874E-09	0.0553
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.683E-08	0.9010
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.258E-09	0.0434
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.229E-11	0.0002
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.198E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.246E-11	0.0010	3.823E-11	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.586E-09	0.0498
Ra-226	4.662E-08	0.8969	1.944E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.739E-10	0.0072
Th-228	2.245E-09	0.0432	4.768E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.459E-12	0.0002
Th-230	2.005E-11	0.0004	3.662E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.865E-12	0.0002
Total	4.893E-08	0.9415	6.609E-11	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.977E-09	0.0573

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.677E-09	0.0515
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.701E-08	0.9044
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.258E-09	0.0434
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.158E-11	0.0006
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.198E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.584E-04	0.000E+00	0.000E+00	0.000E+00	9.597E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.597E-02
Ra-226	6.814E-05	0.000E+00	0.000E+00	0.000E+00	4.128E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.128E-02
Th-228	6.025E-06	0.000E+00	0.000E+00	0.000E+00	3.651E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.651E-03
Th-230	1.192E-05	0.000E+00	0.000E+00	0.000E+00	7.222E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.222E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.321E-11	0.0011	3.878E-11	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.624E-09	0.0534
Ra-226	4.514E-08	0.9183	1.611E-11	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.781E-10	0.0036
Th-228	1.087E-09	0.0221	2.309E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.096E-12	0.0001
Th-230	8.933E-13	0.0000	3.655E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.741E-12	0.0002
Total	4.629E-08	0.9415	6.085E-11	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.814E-09	0.0572

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.716E-09	0.0552
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.534E-08	0.9223
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.093E-09	0.0222
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.229E-11	0.0002
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.916E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	4.820E-11	0.0010	3.513E-11	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.377E-09	0.0483
Ra-226	4.512E-08	0.9179	1.975E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.249E-10	0.0086
Th-228	1.087E-09	0.0221	2.309E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.096E-12	0.0001
Th-230	2.667E-11	0.0005	3.665E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.923E-12	0.0002
Total	4.629E-08	0.9415	6.085E-11	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.814E-09	0.0572

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.460E-09	0.0500
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.557E-08	0.9269
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.093E-09	0.0222
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.826E-11	0.0008
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.916E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 9.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.336E-04	0.000E+00	0.000E+00	0.000E+00	8.095E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.095E-02
Ra-226	6.183E-05	0.000E+00	0.000E+00	0.000E+00	3.747E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.747E-02
Th-228	6.840E-07	0.000E+00	0.000E+00	0.000E+00	4.144E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.144E-04
Th-230	1.192E-05	0.000E+00	0.000E+00	0.000E+00	7.221E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.221E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 9.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 9.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	4.508E-11	0.0010	3.285E-11	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.223E-09	0.0510
Ra-226	4.097E-08	0.9400	1.462E-11	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.616E-10	0.0037
Th-228	1.234E-10	0.0028	2.621E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.650E-13	0.0000
Th-230	8.931E-13	0.0000	3.654E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.739E-12	0.0002
Total	4.113E-08	0.9439	5.138E-11	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.392E-09	0.0549

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 9.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.301E-09	0.0528
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.114E-08	0.9441
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.241E-10	0.0028
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.229E-11	0.0003
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.358E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 9.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 9.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	3.740E-11	0.0009	2.725E-11	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.844E-09	0.0423
Ra-226	4.093E-08	0.9392	2.020E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.401E-10	0.0124
Th-228	1.234E-10	0.0028	2.621E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.650E-13	0.0000
Th-230	4.529E-11	0.0010	3.673E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.132E-12	0.0002
Total	4.113E-08	0.9439	5.138E-11	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.392E-09	0.0549

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 9.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.908E-09	0.0438
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.149E-08	0.9521
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.241E-10	0.0028
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.709E-11	0.0013
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.358E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	7.716E-05	0.000E+00	0.000E+00	0.000E+00	4.675E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.675E-02
Ra-226	4.404E-05	0.000E+00	0.000E+00	0.000E+00	2.668E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.668E-02
Th-228	3.372E-10	0.000E+00	0.000E+00	0.000E+00	2.043E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.043E-07
Th-230	1.191E-05	0.000E+00	0.000E+00	0.000E+00	7.217E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.217E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.641E-11	0.0009	1.925E-11	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.302E-09	0.0425
Ra-226	2.917E-08	0.9515	1.041E-11	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.151E-10	0.0038
Th-228	6.079E-14	0.0000	1.292E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.292E-16	0.0000
Th-230	8.926E-13	0.0000	3.652E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.735E-12	0.0003
Total	2.920E-08	0.9524	3.331E-11	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.425E-09	0.0465

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.348E-09	0.0440
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.930E-08	0.9556
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.115E-14	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.228E-11	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.066E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	1.538E-11	0.0005	1.121E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.583E-10	0.0247
Ra-226	2.908E-08	0.9487	1.840E-11	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.578E-10	0.0215
Th-228	6.079E-14	0.0000	1.292E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.292E-16	0.0000
Th-230	9.779E-11	0.0032	3.701E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.077E-12	0.0003
Total	2.920E-08	0.9524	3.331E-11	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.425E-09	0.0465

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.849E-10	0.0256
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.976E-08	0.9708
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.115E-14	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.106E-10	0.0036
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.066E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.829E-05	0.000E+00	0.000E+00	0.000E+00	1.108E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.108E-02
Ra-226	1.433E-05	0.000E+00	0.000E+00	0.000E+00	8.681E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.681E-03
Th-228	3.192E-21	0.000E+00	0.000E+00	0.000E+00	1.934E-18	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.934E-18
Th-230	1.189E-05	0.000E+00	0.000E+00	0.000E+00	7.203E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.203E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	6.438E-12	0.0007	4.691E-12	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.174E-10	0.0322
Ra-226	9.488E-09	0.9613	3.391E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.749E-11	0.0038
Th-228	5.744E-25	0.0000	1.223E-27	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.170E-27	0.0000
Th-230	8.909E-13	0.0001	3.645E-12	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.720E-12	0.0008
Total	9.495E-09	0.9621	1.173E-11	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.626E-10	0.0367

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.285E-10	0.0333
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.529E-09	0.9655
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.778E-25	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.226E-11	0.0012
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.870E-09	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	7.956E-13	0.0001	5.798E-13	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.923E-11	0.0040
Ra-226	9.310E-09	0.9432	7.391E-12	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.118E-10	0.0316
Th-228	5.744E-25	0.0000	1.223E-27	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.170E-27	0.0000
Th-230	1.850E-10	0.0187	3.757E-12	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.157E-11	0.0012
Total	9.495E-09	0.9621	1.173E-11	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.626E-10	0.0367

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.060E-11	0.0041
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.629E-09	0.9756
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.778E-25	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.004E-10	0.0203
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.870E-09	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	8.833E-07	0.000E+00	0.000E+00	0.000E+00	5.352E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.352E-04
Ra-226	8.580E-07	0.000E+00	0.000E+00	0.000E+00	5.198E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.198E-04
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	1.182E-05	0.000E+00	0.000E+00	0.000E+00	7.163E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.163E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.191E-13	0.0005	2.325E-13	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.573E-11	0.0257
Ra-226	5.803E-10	0.9493	2.083E-13	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.303E-12	0.0038
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	8.860E-13	0.0014	3.625E-12	0.0059	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.677E-12	0.0126
Total	5.815E-10	0.9513	4.065E-12	0.0067	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.571E-11	0.0421

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.628E-11	0.0266
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.828E-10	0.9534
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.219E-11	0.0199
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.113E-10	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.682E-16	0.0000	1.225E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.290E-15	0.0000
Ra-226	3.589E-10	0.5871	2.972E-13	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.282E-11	0.0210
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	2.227E-10	0.3642	3.768E-12	0.0062	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.288E-11	0.0211
Total	5.815E-10	0.9513	4.065E-12	0.0067	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.571E-11	0.0421

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.581E-15	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.720E-10	0.6085
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.393E-10	0.3915
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.113E-10	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.286E-07	0.000E+00	0.000E+00	0.000E+00	1.385E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.385E-04
Ra-226	3.095E-07	0.000E+00	0.000E+00	0.000E+00	1.875E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.875E-04
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	1.160E-05	0.000E+00	0.000E+00	0.000E+00	7.026E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.026E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.699E-14	0.0004	6.340E-14	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.289E-12	0.0185
Ra-226	2.144E-10	0.9252	7.860E-14	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.690E-13	0.0038
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	8.687E-13	0.0037	3.555E-12	0.0153	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.530E-12	0.0325
Total	2.153E-10	0.9293	3.697E-12	0.0160	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.269E-11	0.0548

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.440E-12	0.0192
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.153E-10	0.9292
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.195E-11	0.0516
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.317E-10	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Pb-210	2.307E-29	0.0000	1.681E-29	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.138E-27	0.0000
Ra-226	4.010E-15	0.0000	3.393E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.464E-16	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	2.153E-10	0.9293	3.697E-12	0.0160	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.269E-11	0.0548
Total	2.153E-10	0.9293	3.697E-12	0.0160	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.269E-11	0.0548

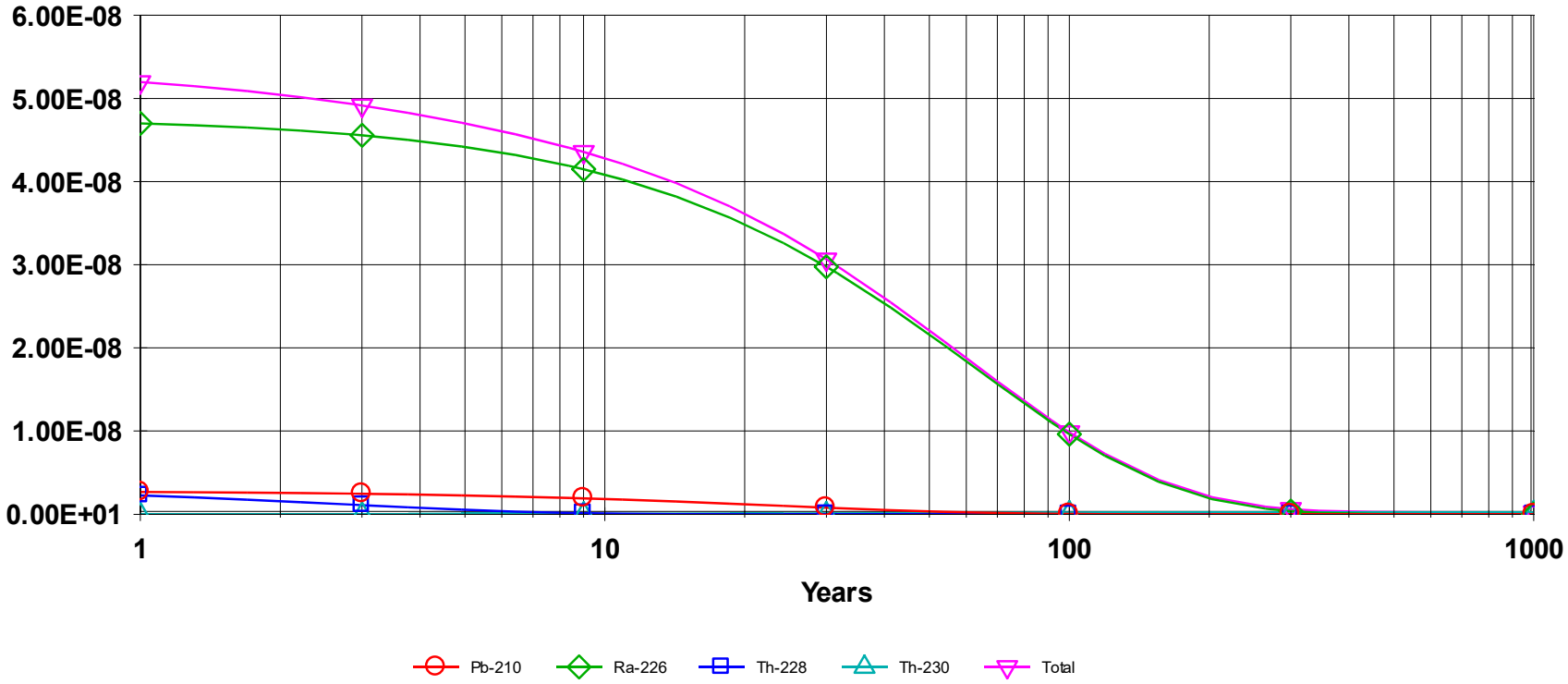
Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.177E-27	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.160E-15	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.317E-10	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.317E-10	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

EXCESS CANCER RISK: All Nuclides Summed, All Pathways Summed



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\CWC-365 386 JANA PARCELS REC USER.RAD 05/11/2023 09:04 GRAPHICS.ASC Includes All Pathways

Note: The data line for each radionuclide includes risk contributions from that radionuclide's decay chain isotopes (e.g., the Th-230 data line includes the risk contribution from Ra-226 that results from the radioactive decay of Th-230; the Ra-226 data line does not include the Ra-226 resulting from Th-230 decay).

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APPENDIX K

QUALITY CONTROL SUMMARY REPORT

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

This QCSR contains the examination of the quality of the analytical data for CWC-365 and CWC-386.

1.2 PROJECT OBJECTIVES

The intent of the QCSR is to document the usability of the data based on project DQOs for accuracy, precision, sensitivity, representativeness, comparability, and completeness.

1.3 PROJECT IMPLEMENTATION

The soil sampling was conducted from August 2018 to November 2022. Radiological analyses were conducted by the FUSRAP St. Louis Radioanalytical Laboratory, with QA split soil samples analyzed by Eurofins St. Louis.

1.4 REPORT PURPOSE

The primary intent of this QCSR is to evaluate whether data generated from these soil samples can withstand scientific scrutiny; are appropriate for their intended purpose; are technically defensible; and are of known and acceptable accuracy, precision, and sensitivity.

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2.0 QUALITY ASSURANCE PROGRAM

A quality assurance project plan (QAPP) was developed for this project and is part of the SAG. The QAPP established requirements for both field and laboratory QC procedures. An analytical laboratory QC duplicate sample, a laboratory control sample (LCS), and a method blank were required for approximately every 20 field samples of each matrix.

A primary goal of the QA program is to ensure that the quality of measurements is appropriate for the intended use of the results. To this end, a QAPP and standardized field procedures were used to guide the investigation. Through the process of readiness review, training, equipment calibration, QC implementation, and detailed documentation, the project has successfully accomplished the goals set by the QA program.

The resulting "definitive" data, as described by the USEPA, have been reported, including the following basic information:

- Laboratory case narratives,
- Soil sample results,
- Laboratory method blank results,
- Laboratory control standard results,
- Laboratory duplicate soil sample results,
- Tracer recoveries,
- Soil sample extraction dates, and
- Soil sample analysis dates.

This information provides the basis for an independent data evaluation relative to accuracy, precision, sensitivity, representativeness, comparability, and completeness, as described in the following sections.

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3.0 DATA VALIDATION

This project implemented the use of data validation checklists to facilitate laboratory data validation. These checklists were completed by the project-designated validation staff and were reviewed by the project laboratory coordinator. Data validation checklists or verification summaries for each laboratory sample delivery group have been retained with laboratory data deliverables by Leidos.

3.1 LABORATORY DATA VALIDATION

Analytical data generated for this project have been subjected to a process of data verification, validation, and review. The SAG and the following documents establish the criteria against which the data are compared and from which a judgment is rendered regarding the acceptance and qualification of the data:

- *Department of Defense (DoD)/Department of Energy (DOE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories* (DoD and DOE 2017) and/or prior revisions,
- *USACE Kansas City and St. Louis District Radionuclide Data Quality Evaluation Guidance for Alpha and Gamma Spectroscopy* (USACE 2002), and
- *Data Verification and Validation* (Leidos 2015) and/or prior revisions.

Upon receipt of field and analytical data, verification staff performed a systematic examination of the reports to ensure the content, presentation, and administrative validity of the data. In conjunction with data package verification, laboratory electronic data deliverables were available. These data deliverables were subjected to review and verification against the hardcopy deliverable. Both a structural and technical assessment of the laboratory-delivered electronic reports were performed. The structural evaluation verified that required data were reported and contract-specified requirements (i.e., analytical holding times, contractual turnaround times, etc.) were met.

During the validation phase of the review and evaluation process, data were subjected to a systematic technical review by examining the field results, analytical QC results, and laboratory documentation, following appropriate guidelines provided in the previously referenced documents. These data validation guidelines define the technical review criteria, methods for evaluation of the criteria, and actions to be taken resulting from the review of these criteria. The primary objective of this phase was to assess and summarize the quality and reliability of the data for the intended use and to document factors that may have affected the usability of the data. Data verification/validation included, but was not necessarily limited to, the following parameters for radiological methods, as appropriate:

- Holding time information and methods requested;
- Discussion of laboratory analysis, including any laboratory problems;
- Soil sample results;
- Initial calibration;
- Efficiency check;
- Background determinations;
- Spike recovery results;
- Internal standard results (tracers or carriers);

- Duplicate soil sample results;
- Self-absorption factor (for alpha and beta radioactivity);
- Cross-talk factor (during simultaneous detection of alpha and beta radioactivity);
- LCSs; and
- Run log.

As an end result of this phase of the review, the data were qualified based on the technical assessment of the validation criteria. Validation qualifiers (VQs) were applied to each analytical result to indicate the usability of the data for the intended purpose, with a reason code to explain the retention or the VQ.

3.2 DEFINITIONS OF DATA VALIDATION QUALIFIERS

During the data validation process, all laboratory data were assigned appropriate VQs and reason codes, as follows:

"=" Positive result was obtained.

"U" The analyte was analyzed for but was not detected above the reported sample quantitation limit.

"J" The associated value is an estimated quantity, indicating a decreased knowledge of the accuracy or precision of the reported value.

"UJ" The analyte was analyzed for but was not detected above the minimum detectable value, and the reported value is an estimate, indicating a decreased knowledge of the accuracy or precision of the reported value.

"R" The analyte value reported is unusable. The integrity of the analyte's identification, accuracy, precision, or sensitivity has raised significant question(s) as to the reliability of the information presented.

A positive result is flagged with a "J" qualifier, and a non-detect result is flagged "UJ" when data quality is suspect due to QC issues, either blank contamination or analytical interference. Leidos VQs, reason codes, copies of validation checklists, and qualified data forms are filed with the analytical hardcopy deliverable.

4.0 DATA EVALUATION

The data evaluation process considers accuracy, precision, sensitivity, representativeness, comparability, and completeness. The following subsections provide details of the particular parameters and how the data were evaluated for each, with discussion and tables to present the associated data.

Accuracy and precision can be measured by the relative percent difference (RPD) for radiological analyses or the normalized absolute difference (NAD) for radiological analyses, using the following equations:

$$RPD = \left(\frac{|S - D|}{\frac{S + D}{2}} \right) * 100$$

$$NAD = \frac{|S - D|}{\sqrt{U_S^2 + U_D^2}}$$

where:

S = parent soil sample result
D = field split/duplicate parent soil sample result
U_S = parent soil sample uncertainty
U_D = field split/duplicate parent soil sample uncertainty
RPD has units of percent (%); NAD is unitless

The RPD is calculated for all radiological soil sample-duplicate/split pairs if a detectable result is reported for both the parent and the QA field split or field duplicate. When the RPD is greater than 50 percent for radiological soil samples, the NAD is used to determine the precision of the method. NAD accounts for uncertainty in the results; RPD does not. The NAD should be equal to or less than a value of 1.96. Neither equation is used when the analyte in one or both of the soil samples is not detected. If neither equation can be used, the comparison is counted as acceptable in the overall number of comparisons.

The SAG (USACE 2000) requires that QA field split and duplicate soil samples be collected and analyzed at a frequency of approximately 1 in every 20 soil samples (5 percent). The USACE Memorandum for the Record, *SAG Implementation Guidance for Interpretation of QA Split Program* (USACE 2005b), provides clarification to the guidance contained within the SAG by stating that this requirement is applicable only to definitive sample results (i.e., samples used for MARSSIM FSS). For radiological analyses, 24 split soil samples and 24 field duplicate soil samples were analyzed using both gamma and alpha spectroscopy. The quantity of each of these QC checks represent 4.7 percent of the 507 systematic and biased soil samples and their associated subsurface soil samples.

4.1 ACCURACY

Accuracy provides a gauge or measure of the agreement between an observed result and the true value for an analysis. For this report, accuracy is measured through the use of the field split soil

samples utilizing a comparison of the prime laboratory results versus the results of an independent laboratory.

4.1.1 Radiological Parameters

Individual soil sample chemical yields and LCS recoveries were within the 25 percent criterion for the verification soil samples, as stated in the SAG. Therefore, the data can be used for their intended purpose.

4.1.2 Inter-Laboratory Accuracy

As previously described, RPD and NAD were used to measure the analytical accuracy of split soil sample pairs for two radiological analytical groups (i.e., alpha spectroscopy and gamma spectroscopy). The split soil sample pairs were analyzed by the FUSRAP St. Louis Radioanalytical Laboratory and by an independent contract laboratory, Eurofins St. Louis. The ability to compare the results from the laboratories is subject to several factors, such as sample homogeneity, analytical methods, volume of sample, and, for radiological samples, the size of the uncertainty (reported as error) relative to the result (e.g., a low result near the detection limit may have an uncertainty close to or even higher than the result itself). Accuracy is affected by the size of the relative uncertainty in the result. Typically, as the result approaches the MDC, the relative uncertainty increases. Many of the soil sample results described in this report are close to the MDC.

The analytical accuracy between laboratories met the FSS goal of ensuring that 90 percent of the verification soil samples met the DQOs. To meet the DQOs for radiological analyses, the soil sample results comparison must be less than the 50 percent criteria for RPD; or, if the RPD is greater than 50 percent, the NAD must be less than or equal to 1.96. The soil sample result comparisons are shown in Tables K-1 and K-2. For radiological analyses, 24 soil sample pairs were compared for 3 analytes for alpha spectroscopy, and 24 soil sample pairs were compared for 9 analytes for gamma spectroscopy, for a total of 288 comparisons. Four comparisons, or 1.4 percent of the radiological soil sample comparisons exceeded the criteria, as demonstrated in bold in Tables K-1 and K-2, yielding 98.6 percent acceptance. This meets the SAG goal of 90 percent acceptance. The data are acceptable.

Table K-1. Split Soil Sample Accuracy Among Alpha Spectroscopy Analyses

Soil Sample Name	Th-228		Th-230		Th-232	
	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD
SVP190153 / SVP190153-2	69.53	1.37	42.19	NA	24.54	NA
SVP190159 / SVP190159-2	58.34	1.08	11.15	NA	3.75	NA
SVP190183 / SVP190183-2	44.78	NA	83.16	1.63	74.04	1.20
SVP190267 / SVP190267-2	74.84	1.55	77.95	1.73	22.62	NA
SVP207127 / SVP207127-2	45.32	NA	**98.91**	**1.98**	25.38	NA
SVP263662 / SVP263662-2	59.91	1.41	45.31	NA	12.48	NA
SVP263693 / SVP263693-2	58.90	1.38	45.01	NA	23.95	NA
SVP263708 / SVP263708-2	43.39	NA	**86.03**	**2.13**	34.30	NA
SVP263726 / SVP263726-2	22.81	NA	73.99	1.87	10.03	NA
SVP263817 / SVP263817-2	2.10	NA	8.00	NA	4.69	NA
SVP263826 / SVP263826-2	80.04	1.84	69.13	1.81	11.68	NA

Table K-1. Split Soil Sample Accuracy Among Alpha Spectroscopy Analyses (Continued)

Soil Sample Name	Th-228		Th-230		Th-232	
	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD
SVP263844 / SVP263844-2	15.51	NA	64.93	1.61	15.38	NA
SVP263862 / SVP263862-2	14.29	NA	44.36	NA	32.99	NA
SVP263871 / SVP263871-2	11.82	NA	25.56	NA	4.47	NA
SVP263889 / SVP263889-2	51.51	1.10	79.03	1.96	4.73	NA
SVP263902 / SVP263902-2	36.03	NA	25.41	NA	6.30	NA
SVP264007 / SVP264007-2	35.18	NA	67.83	1.64	37.81	NA
SVP264028 / SVP264028-2	21.31	NA	30.77	NA	4.92	NA
SVP264045 / SVP264045-2	79.40	1.85	74.56	1.95	33.61	NA
SVP264063 / SVP264063-2	14.78	NA	47.02	NA	22.80	NA
SVP264080 / SVP264080-2	36.09	NA	69.65	1.73	44.62	NA
SVP264104 / SVP264104-2	11.84	NA	36.99	NA	16.61	NA
SVP264149 / SVP264149-2	NC	NA	55.80	1.00	14.58	NA
SVP264289 / SVP264289-2	34.19	NA	63.87	1.11	9.89	NA

Notes:

Soil samples ending in "-2" are split soil samples.

Bold values for RPD/NAD pairs exceed the control limits. Non-bold values for RPD/NAD pairs meet the acceptance criteria.

NA - not applicable (see RPD)

NAD - calculated for additional information when the RPD is greater than 50 percent

Table K-2. Split Soil Sample Accuracy Among Gamma Spectroscopy Analyses

Soil Sample Name	Ac-227		Am-241		Cs-137		K-40		Pa-231		Ra-226		Ra-228		U-235		U-238	
	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD
SVP190153 / SVP190153-2	NC	NA	NC	NA	NC	NA	13.41	NA	NC	NA	5.00	NA	36.02	NA	NC	NA	NC	NA
SVP190159 / SVP190159-2	NC	NA	NC	NA	NC	NA	13.99	NA	NC	NA	10.14	NA	52.55	0.88	NC	NA	NC	NA
SVP190183 / SVP190183-2	NC	NA	NC	NA	NC	NA	4.81	NA	NC	NA	7.29	NA	46.09	NA	NC	NA	NC	NA
SVP190267 / SVP190267-2	NC	NA	NC	NA	NC	NA	7.51	NA	NC	NA	6.15	NA	39.23	NA	NC	NA	NC	NA
SVP207127 / SVP207127-2	NC	NA	NC	NA	NC	NA	11.69	NA	NC	NA	16.45	NA	34.28	NA	NC	NA	NC	NA
SVP263662 / SVP263662-2	NC	NA	NC	NA	NC	NA	20.88	NA	NC	NA	31.30	NA	46.83	NA	NC	NA	NC	NA
SVP263693 / SVP263693-2	NC	NA	NC	NA	NC	NA	12.38	NA	NC	NA	3.92	NA	25.69	NA	NC	NA	NC	NA
SVP263708 / SVP263708-2	NC	NA	NC	NA	NC	NA	2.35	NA	NC	NA	24.00	NA	30.89	NA	NC	NA	NC	NA
SVP263726 / SVP263726-2	NC	NA	NC	NA	NC	NA	2.21	NA	NC	NA	15.91	NA	**53.24**	**2.03**	NC	NA	NC	NA
SVP263817 / SVP263817-2	NC	NA	NC	NA	NC	NA	19.35	NA	NC	NA	20.69	NA	47.59	NA	NC	NA	NC	NA
SVP263826 / SVP263826-2	NC	NA	NC	NA	NC	NA	17.72	NA	NC	NA	12.62	NA	0.55	NA	NC	NA	44.31	NA
SVP263844 / SVP263844-2	NC	NA	NC	NA	NC	NA	7.64	NA	NC	NA	12.71	NA	49.66	NA	NC	NA	71.45	1.26
SVP263862 / SVP263862-2	NC	NA	NC	NA	NC	NA	21.98	NA	NC	NA	37.26	NA	47.71	NA	NC	NA	NC	NA
SVP263871 / SVP263871-2	NC	NA	NC	NA	NC	NA	7.50	NA	NC	NA	16.95	NA	29.59	NA	NC	NA	NC	NA
SVP263889 / SVP263889-2	NC	NA	NC	NA	NC	NA	9.97	NA	NC	NA	26.38	NA	70.29	1.73	NC	NA	NC	NA
SVP263902 / SVP263902-2	NC	NA	NC	NA	NC	NA	3.17	NA	NC	NA	1.89	NA	38.11	NA	NC	NA	NC	NA
SVP264007 / SVP264007-2	NC	NA	NC	NA	NC	NA	4.73	NA	NC	NA	6.06	NA	42.53	NA	NC	NA	48.94	NA
SVP264028 / SVP264028-2	NC	NA	NC	NA	NC	NA	8.11	NA	NC	NA	13.33	NA	44.36	NA	NC	NA	NC	NA
SVP264045 / SVP264045-2	NC	NA	NC	NA	74.22	1.29	33.80	NA	NC	NA	32.68	NA	39.49	NA	NC	NA	NC	NA
SVP264063 / SVP264063-2	NC	NA	NC	NA	NC	NA	6.77	NA	NC	NA	0.86	NA	36.85	NA	NC	NA	NC	NA
SVP264080 / SVP264080-2	NC	NA	NC	NA	NC	NA	7.51	NA	NC	NA	28.33	NA	67.22	1.89	NC	NA	NC	NA
SVP264104 / SVP264104-2	NC	NA	NC	NA	NC	NA	15.07	NA	NC	NA	15.87	NA	**60.79**	**2.08**	NC	NA	NC	NA

Table K-2. Split Soil Sample Accuracy Among Gamma Spectroscopy Analyses (Continued)

Soil Sample Name	Ac-227		Am-241		Cs-137		K-40		Pa-231		Ra-226		Ra-228		U-235		U-238	
	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD
SVP264149 / SVP264149-2	NC	NA	NC	NA	NC	NA	13.13	NA	NC	NA	13.19	NA	NC	NA	NC	NA	NC	NA
SVP264289 / SVP264289-2	NC	NA	NC	NA	NC	NA	7.58	NA	NC	NA	44.97	NA	54.87	0.64	NC	NA	128.45	1.11

Notes:

Soil samples ending in "-2" are split soil samples.

Am - americium, K - potassium

Bold values for RPD/NAD pairs exceed the control limits. Non-bold values for RPD/NAD pairs meet the acceptance criteria.

NA - not applicable (see RPD)

NAD - calculated for additional information when the RPD is greater than 50 percent

NC - not calculated (because the radionuclide was not detected in one or both of the soil samples)

4.2 PRECISION

4.2.1 Analytical Precision

Precision is a measure of mutual agreement among individual measurements performed under the same laboratory controls. To evaluate precision, a field duplicate soil sample is submitted to the FUSRAP St. Louis Radioanalytical Laboratory along with the original soil sample. Both soil samples are analyzed under the same laboratory conditions. If any bias was introduced at the laboratory, that bias would affect both soil samples equally.

Field duplicate soil samples were collected at a frequency of approximately 1 duplicate soil sample per 20 soil samples. As a measure of analytical precision, the RPDs for these field duplicate soil sample pairs for the two radiological analytical groups (i.e., alpha spectroscopy and gamma spectroscopy) were calculated at the time of verification and validation. The RPD (and/or NAD) values for all analytes reported in the following tables were within the 50 percent window (or less than or equal to 1.96) of acceptance for the verification soil samples, except as noted.

4.2.2 System Precision

Field duplicate soil samples were collected to ascertain the contribution to variability (i.e., precision) due to the combination of environmental media, sampling consistency, and analytical precision that contribute to the precision for the entire system of collecting and analyzing soil samples. The field duplicate soil samples were collected from the same spatial and temporal conditions as the primary environmental soil samples. Soil samples were collected from the same sampling device after homogenization for all analytes.

For the 24 duplicate soil samples collected for the FSS, the NAD and RPD values indicated acceptable precision for the data. For radiological analyses, the soil sample results comparison must be less than the 50 percent criteria for RPD; or, if the RPD is greater than 50 percent, the NAD must be less than or equal to 1.96 to meet the DQOs. The soil sample result comparisons are shown in Tables K-3 and K-4. For radiological analyses, 24 soil sample pairs were compared for 3 analytes for alpha spectroscopy, and 24 soil sample pairs were compared for 9 analytes for gamma spectroscopy, for a total of 288 comparisons. All comparisons were within the criteria, as demonstrated in Tables K-3 and K-4, yielding 100 percent acceptance. This meets the SAG goal of 90 percent acceptance. The data are acceptable.

Table K-3. Duplicate Precision Among Alpha Spectroscopy Analyses

Soil Sample Name	Th-228		Th-230		Th-232	
	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD
SVP190153 / SVP190153-1	17.93	NA	3.41	NA	44.32	NA
SVP190159 / SVP190159-1	26.03	NA	33.69	NA	20.34	NA
SVP190183 / SVP190183-1	14.47	NA	3.21	NA	25.96	NA
SVP190267 / SVP190267-1	41.54	NA	26.44	NA	29.59	NA
SVP207127 / SVP207127-1	39.96	NA	54.89	1.12	20.38	NA
SVP263662 / SVP263662-1	33.06	NA	17.69	NA	35.22	NA
SVP263693 / SVP263693-1	7.41	NA	29.65	NA	16.57	NA
SVP263708 / SVP263708-1	26.02	NA	9.80	NA	3.56	NA

Table K-3. Duplicate Precision Among Alpha Spectroscopy Analyses (Continued)

Soil Sample Name	Th-228		Th-230		Th-232	
	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD
SVP263726 / SVP263726-1	14.35	NA	13.90	NA	7.07	NA
SVP263817 / SVP263817-1	14.19	NA	6.45	NA	8.77	NA
SVP263826 / SVP263826-1	16.09	NA	43.48	NA	10.97	NA
SVP263844 / SVP263844-1	2.84	NA	14.24	NA	5.58	NA
SVP263862 / SVP263862-1	25.00	NA	12.54	NA	5.17	NA
SVP263871 / SVP263871-1	13.33	NA	25.07	NA	42.98	NA
SVP263889 / SVP263889-1	3.77	NA	27.10	NA	8.94	NA
SVP263902 / SVP263902-1	16.39	NA	25.29	NA	27.27	NA
SVP264007 / SVP264007-1	18.83	NA	11.04	NA	17.16	NA
SVP264028 / SVP264028-1	4.35	NA	15.07	NA	41.38	NA
SVP264045 / SVP264045-1	41.22	NA	19.35	NA	6.39	NA
SVP264063 / SVP264063-1	29.69	NA	5.37	NA	6.28	NA
SVP264080 / SVP264080-1	36.98	NA	26.52	NA	36.43	NA
SVP264104 / SVP264104-1	72.38	1.61	57.59	1.41	23.53	NA
SVP264149 / SVP264149-1	16.83	NA	12.91	NA	NC	NA
SVP264289 / SVP264289-1	9.52	NA	11.51	NA	17.77	NA

Notes:

Soil samples ending in "-1" are duplicate soil samples.

Bold values for RPD/NAD pairs exceed the control limits. Non-bold values for RPD/NAD pairs meet the acceptance criteria.

NA - not applicable (see RPD)

NAD - calculated for additional information when the RPD is greater than 50 percent

NC - not calculated (because the radionuclide was not detected in one or both of the soil samples)

Table K-4. Duplicate Precision Among Gamma Spectroscopy Analyses

Soil Sample Name	Ac-227		Am-241		Cs-137		K-40		Pa-231		Ra-226		Ra-228		U-235		U-238	
	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD	RPD (%)	NAD
SVP190153 / SVP190153-1	NC	NA	NC	NA	NC	NA	5.10	NA	NC	NA	5.53	NA	8.58	NA	NC	NA	12.39	NA
SVP190159 / SVP190159-1	NC	NA	NC	NA	16.67	NA	8.63	NA	NC	NA	1.52	NA	5.10	NA	NC	NA	3.85	NA
SVP190183 / SVP190183-1	NC	NA	NC	NA	32.78	NA	6.49	NA	NC	NA	6.06	NA	0.42	NA	NC	NA	16.78	NA
SVP190267 / SVP190267-1	NC	NA	NC	NA	59.64	1.92	1.95	NA	NC	NA	7.19	NA	4.38	NA	NC	NA	0.80	NA
SVP207127 / SVP207127-1	NC	NA	NC	NA	11.50	NA	5.37	NA	NC	NA	1.61	NA	3.82	NA	NC	NA	5.36	NA
SVP263662 / SVP263662-1	NC	NA	NC	NA	17.70	NA	7.94	NA	NC	NA	7.92	NA	12.29	NA	NC	NA	5.56	NA
SVP263693 / SVP263693-1	NC	NA	NC	NA	6.66	NA	1.40	NA	NC	NA	5.83	NA	1.98	NA	NC	NA	20.75	NA
SVP263708 / SVP263708-1	NC	NA	NC	NA	15.53	NA	4.26	NA	NC	NA	1.67	NA	4.72	NA	NC	NA	5.45	NA
SVP263726 / SVP263726-1	NC	NA	NC	NA	NC	NA	6.15	NA	NC	NA	6.38	NA	3.22	NA	NC	NA	20.06	NA
SVP263817 / SVP263817-1	NC	NA	NC	NA	17.08	NA	19.61	NA	NC	NA	5.77	NA	17.37	NA	NC	NA	26.15	NA
SVP263826 / SVP263826-1	NC	NA	NC	NA	NC	NA	2.06	NA	NC	NA	3.23	NA	6.75	NA	NC	NA	15.01	NA
SVP263844 / SVP263844-1	NC	NA	NC	NA	20.53	NA	4.75	NA	NC	NA	3.06	NA	4.40	NA	NC	NA	7.27	NA
SVP263862 / SVP263862-1	NC	NA	NC	NA	NC	NA	8.36	NA	NC	NA	0.94	NA	4.01	NA	NC	NA	10.43	NA
SVP263871 / SVP263871-1	NC	NA	NC	NA	NC	NA	16.14	NA	NC	NA	4.74	NA	6.23	NA	NC	NA	1.90	NA
SVP263889 / SVP263889-1	NC	NA	NC	NA	NC	NA	1.92	NA	NC	NA	4.78	NA	2.46	NA	NC	NA	2.76	NA
SVP263902 / SVP263902-1	NC	NA	NC	NA	NC	NA	6.25	NA	NC	NA	0.94	NA	5.08	NA	NC	NA	26.38	NA
SVP264007 / SVP264007-1	NC	NA	NC	NA	NC	NA	1.15	NA	NC	NA	6.45	NA	9.11	NA	NC	NA	3.69	NA
SVP264028 / SVP264028-1	NC	NA	NC	NA	NC	NA	4.14	NA	NC	NA	4.92	NA	11.82	NA	NC	NA	16.26	NA
SVP264045 / SVP264045-1	NC	NA	NC	NA	16.12	NA	0.84	NA	NC	NA	0.53	NA	8.07	NA	NC	NA	19.55	NA
SVP264063 / SVP264063-1	NC	NA	NC	NA	NC	NA	1.80	NA	NC	NA	6.17	NA	5.96	NA	NC	NA	9.92	NA
SVP264080 / SVP264080-1	NC	NA	NC	NA	NC	NA	4.84	NA	NC	NA	8.61	NA	12.54	NA	NC	NA	6.39	NA
SVP264104 / SVP264104-1	NC	NA	NC	NA	NC	NA	16.33	NA	NC	NA	9.84	NA	15.42	NA	NC	NA	3.81	NA
SVP264149 / SVP264149-1	NC	NA	NC	NA	75.73	1.40	13.29	NA	NC	NA	3.75	NA	10.68	NA	NC	NA	16.41	NA
SVP264289 / SVP264289-1	NC	NA	NC	NA	24.20	NA	14.41	NA	NC	NA	10.53	NA	3.77	NA	NC	NA	NC	NA

Notes:

Soil samples ending in "-1" are duplicate soil samples.

Bold values for RPD/NAD pairs exceed the control limits. Non-bold values for RPD/NAD pairs meet the acceptance criteria.

NA - not applicable (see RPD)

NAD - calculated for additional information when the RPD is greater than 50 percent

NC - not calculated (because the radionuclide was not detected in one or both of the soil samples)

4.3 SENSITIVITY

Determination of MDC values allows the data user to assess the relative confidence that can be placed in a value in comparison to the magnitude or level of analyte concentration observed. The closer a measured value is to the MDC, the lower the established confidence and the greater the variation in the measured value. Project sensitivity goals were expressed as quantitation level goals in the FSSP and in MARSSIM guidance. These levels were achieved or exceeded throughout the analytical process.

The MDC is reported for each result obtained by laboratory analysis. These very low MDCs are achieved through the use of gamma spectroscopy for all radiological COCs, with additional analyses by alpha spectroscopy for thorium. Variations in MDCs for the same radiological analyte reflect variability in the detection efficiencies and conversion factors due to details such as individual sample aliquot, sample density, and variations in analyte background radioactivity for gamma and alpha spectroscopy at the laboratory. To complete the data evaluation (i.e., accuracy, precision, representativeness, and comparability), analytical results that exceed the MDC of the analyte are desired.

4.4 REPRESENTATIVENESS AND COMPARABILITY

Representativeness expresses the degree to which data accurately reflect the analyte or parameter of interest for an environmental site, and is the qualitative term most concerned with the proper design of a sampling program. Factors that affect the representativeness of analytical data include proper preservation, holding times, use of standard sampling and analytical methods, and determination of matrix or analyte interferences. Soil sample preservation, analytical methodologies, and soil sampling methodologies were documented to be adequate and consistently applied.

Comparability, like representativeness, is a qualitative term relative to a project dataset as an individual. These investigations employed appropriate sampling methodologies, site surveillance, use of standard sampling devices, uniform training, documentation of sampling, standard analytical protocols/procedures, QC checks with standard control limits, and universally accepted data reporting units to ensure comparability to other datasets. Through the proper implementation and documentation of these standard practices, the project has established the confidence that the data will be comparable to other project and programmatic information.

Tables K-5 and K-6 present the duplicate and split results used in comparison with associated parent soil sample results for alpha spectroscopy and gamma spectroscopy, respectively. In Table K-6, the Ra-226 results reported by the FUSRAP St. Louis Radioanalytical Laboratory automatically include an upward adjustment factor of 1.5 for all samples analyzed after February 20, 2002. The adjustment is necessary to conservatively account for Ra-226 in-growth and to provide proper comparability with the independent laboratory.

Table K-5. Alpha Spectroscopy Results for Parent Soil Samples and Associated Split and Duplicate Soil Samples

Soil Sample Name	Th-228				Th-230				Th-232			
	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ
	(pCi/g)				(pCi/g)				(pCi/g)			
SVP190153	1.32	0.47	0.24	=	1.44	0.49	0.16	J	1.13	0.42	0.14	=
SVP190153-1	1.58	0.49	0.18	=	1.49	0.47	0.10	J	0.72	0.30	0.19	=
SVP190153-2	0.64	0.17	0.10	=	2.21	0.35	0.13	=	0.88	0.19	0.07	=
SVP190159	1.22	0.48	0.20	=	0.98	0.42	0.14	=	0.68	0.34	0.17	J
SVP190159-1	0.94	0.38	0.20	=	1.37	0.48	0.15	=	0.83	0.35	0.13	=
SVP190159-2	0.67	0.17	0.11	=	0.87	0.20	0.12	=	0.71	0.17	0.07	=
SVP190183	0.89	0.42	0.29	=	1.90	0.66	0.17	=	1.04	0.45	0.17	=
SVP190183-1	1.03	0.42	0.16	=	1.84	0.61	0.13	=	0.80	0.37	0.25	=
SVP190183-2	0.57	0.15	0.10	=	0.78	0.19	0.11	=	0.48	0.13	0.06	=
SVP190267	1.57	0.52	0.18	=	1.97	0.60	0.14	=	0.86	0.36	0.14	=
SVP190267-1	1.03	0.39	0.21	=	1.51	0.49	0.11	=	1.16	0.42	0.15	=
SVP190267-2	0.72	0.18	0.10	=	0.87	0.21	0.13	=	0.69	0.17	0.08	=
SVP207127	1.18	0.51	0.19	=	2.67	0.87	0.19	=	0.97	0.45	0.19	=
SVP207127-1	0.79	0.37	0.17	=	1.52	0.55	0.14	=	0.79	0.37	0.16	=
SVP207127-2	0.74	0.18	0.12	=	0.90	0.21	0.12	J	0.75	0.17	0.06	=
SVP263662	1.41	0.42	0.18	J	1.34	0.40	0.19	J	0.95	0.33	0.12	=
SVP263662-1	1.01	0.35	0.14	J	1.60	0.45	0.12	J	0.66	0.28	0.19	=
SVP263662-2	0.76	0.20	0.12	=	0.85	0.22	0.14	=	0.83	0.20	0.07	=
SVP263693	1.40	0.42	0.16	=	1.35	0.41	0.12	J	1.15	0.38	0.19	=
SVP263693-1	1.30	0.41	0.17	=	1.82	0.50	0.19	=	0.97	0.35	0.19	=
SVP263693-2	0.76	0.20	0.13	=	0.85	0.22	0.14	=	0.90	0.21	0.07	=
SVP263708	1.52	0.44	0.19	=	1.94	0.51	0.16	J	1.38	0.41	0.14	=
SVP263708-1	1.17	0.38	0.12	=	2.14	0.54	0.15	=	1.43	0.43	0.15	=
SVP263708-2	0.98	0.23	0.13	=	0.77	0.22	0.16	=	0.98	0.22	0.07	=
SVP263726	1.27	0.38	0.17	=	1.77	0.46	0.13	J	0.90	0.31	0.15	=
SVP263726-1	1.10	0.35	0.17	=	1.54	0.42	0.11	J	0.97	0.32	0.17	=
SVP263726-2	1.01	0.23	0.13	=	0.81	0.22	0.14	=	1.00	0.22	0.06	=
SVP263817	0.99	0.32	0.18	J	1.20	0.35	0.13	J	1.09	0.33	0.14	=
SVP263817-1	1.14	0.35	0.18	J	1.28	0.37	0.11	J	1.19	0.36	0.11	=
SVP263817-2	1.01	0.24	0.14	=	1.30	0.28	0.14	=	1.04	0.23	0.08	=
SVP263826	1.41	0.40	0.15	=	1.82	0.47	0.17	=	0.87	0.31	0.11	=
SVP263826-1	1.20	0.36	0.16	=	1.17	0.36	0.17	=	0.97	0.32	0.13	=
SVP263826-2	0.60	0.18	0.14	=	0.89	0.22	0.13	=	0.77	0.19	0.06	=
SVP263844	1.07	0.36	0.15	=	1.73	0.48	0.19	J	1.05	0.36	0.15	=
SVP263844-1	1.04	0.35	0.18	=	1.50	0.43	0.18	J	0.99	0.34	0.18	=
SVP263844-2	0.92	0.22	0.11	=	0.88	0.22	0.14	=	0.90	0.21	0.07	=
SVP263862	1.05	0.35	0.18	=	1.57	0.44	0.18	J	1.19	0.38	0.12	=
SVP263862-1	1.35	0.40	0.14	=	1.78	0.48	0.18	J	1.13	0.37	0.18	=
SVP263862-2	0.91	0.21	0.13	=	1.00	0.23	0.13	=	0.85	0.20	0.06	=

Table K-5. Alpha Spectroscopy Results for Parent Soil Samples and Associated Split and Duplicate Soil Samples (Continued)

Soil Sample Name	Th-228				Th-230				Th-232			
	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ
	(pCi/g)				(pCi/g)				(pCi/g)			
SVP263871	1.12	0.32	0.13	=	1.50	0.38	0.14	=	0.85	0.27	0.14	=
SVP263871-1	1.28	0.39	0.18	=	1.93	0.50	0.18	=	1.32	0.40	0.18	=
SVP263871-2	1.00	0.23	0.13	=	1.16	0.26	0.14	=	0.89	0.21	0.07	=
SVP263889	1.04	0.34	0.17	=	1.76	0.47	0.18	J	0.87	0.31	0.18	=
SVP263889-1	1.08	0.32	0.16	=	1.34	0.37	0.15	J	0.95	0.30	0.12	=
SVP263889-2	0.61	0.18	0.13	=	0.76	0.20	0.13	=	0.83	0.19	0.07	=
SVP263902	1.32	0.39	0.14	=	1.14	0.36	0.18	=	0.95	0.32	0.18	=
SVP263902-1	1.12	0.35	0.13	=	1.47	0.41	0.17	=	1.25	0.37	0.13	=
SVP263902-2	0.92	0.23	0.13	=	0.88	0.23	0.14	=	0.89	0.21	0.07	=
SVP264007	1.22	0.37	0.11	=	1.54	0.43	0.15	J	0.68	0.27	0.17	=
SVP264007-1	1.01	0.31	0.16	=	1.72	0.42	0.11	J	0.81	0.27	0.09	=
SVP264007-2	0.86	0.21	0.13	=	0.76	0.21	0.14	=	1.00	0.22	0.07	=
SVP264028	1.35	0.40	0.11	=	1.35	0.40	0.11	J	1.19	0.37	0.18	=
SVP264028-1	1.41	0.40	0.17	=	1.57	0.43	0.17	J	0.78	0.29	0.11	=
SVP264028-2	1.09	0.23	0.11	=	0.99	0.22	0.12	=	1.25	0.24	0.06	=
SVP264045	1.58	0.45	0.19	=	2.04	0.52	0.19	=	1.06	0.36	0.19	=
SVP264045-1	1.04	0.36	0.19	=	1.68	0.48	0.15	J	1.13	0.38	0.19	=
SVP264045-2	0.68	0.18	0.13	=	0.93	0.22	0.13	=	0.76	0.18	0.05	=
SVP264063	1.09	0.33	0.15	=	1.45	0.39	0.16	J	1.08	0.33	0.16	=
SVP264063-1	1.47	0.44	0.19	=	1.53	0.45	0.19	J	1.15	0.38	0.19	=
SVP264063-2	0.94	0.22	0.13	=	0.90	0.22	0.14	=	0.86	0.20	0.07	=
SVP264080	1.57	0.49	0.33	=	2.05	0.57	0.17	J	1.59	0.49	0.21	=
SVP264080-1	1.08	0.33	0.13	=	1.57	0.42	0.16	J	1.10	0.34	0.13	=
SVP264080-2	1.09	0.24	0.13	=	0.99	0.24	0.13	=	1.01	0.22	0.06	=
SVP264104	0.83	0.30	0.18	=	1.15	0.36	0.18	J	1.05	0.34	0.18	=
SVP264104-1	1.78	0.50	0.20	=	2.08	0.55	0.16	=	1.33	0.43	0.20	=
SVP264104-2	0.94	0.23	0.13	=	0.79	0.22	0.14	=	0.89	0.21	0.07	=
SVP264149	0.48	0.26	0.24	J	0.95	0.37	0.19	J	0.29	0.21	0.24	J
SVP264149-1	0.57	0.39	0.46	J	1.08	0.54	0.42	J	0.23	0.26	0.42	UJ
SVP264149-2	0.09	0.09	0.12	UJ	0.54	0.18	0.13	=	0.25	0.11	0.07	=
SVP264289	0.57	0.27	0.20	=	0.82	0.32	0.20	J	0.44	0.23	0.20	J
SVP264289-1	0.52	0.25	0.19	=	0.73	0.30	0.19	J	0.36	0.21	0.19	J
SVP264289-2	0.41	0.14	0.10	=	0.42	0.15	0.13	=	0.39	0.12	0.06	=

Notes:

Soil samples ending in "-1" are duplicate soil samples.

Soil samples ending in "-2" are split soil samples.

VQ symbols indicate: "=" for positive results, "J" for estimated quantity, and "UJ" for not detected above estimated value.

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Table K-6. Gamma Spectroscopy Results for Parent Soil Samples and Associated Split and Duplicate Soil Samples

Soil Sample Name	Ac-227				Am-241				Cs-137				K-40				Pa-231				Ra-226				Ra-228				U-235				U-238			
	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ
	(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)			
SVP190153	-1.19	0.23	0.15	UJ	0.03	0.03	0.06	UJ	0.02	0.01	0.01	=	15.30	1.99	0.21	=	-0.49	0.54	0.87	UJ	1.23	0.31	0.05	=	0.79	0.10	0.06	=	-0.06	0.18	0.30	UJ	1.06	0.19	0.30	=
SVP190153-1	-1.24	0.23	0.15	UJ	-0.04	0.03	0.06	UJ	0.01	0.01	0.01	UJ	16.10	2.09	0.21	=	-0.26	0.52	0.85	UJ	1.30	0.33	0.06	=	0.86	0.10	0.05	=	-0.04	0.19	0.31	UJ	1.20	0.21	0.34	=
SVP190153-2	-0.46	1.23	1.59	UJ	-0.13	0.33	0.55	UJ	-0.03	0.12	0.20	UJ	17.50	2.97	0.60	=	-1.42	5.36	9.00	UJ	1.17	0.28	0.20	=	1.14	0.39	0.27	=	0.22	0.58	1.12	UJ	1.32	1.11	1.84	UJ
SVP190159	-0.84	0.17	0.12	UJ	0.01	0.03	0.04	UJ	0.02	0.01	0.01	=	13.30	1.73	0.21	=	-0.24	0.46	0.76	UJ	1.31	0.33	0.05	=	0.72	0.09	0.05	=	0.07	0.16	0.27	UJ	0.89	0.16	0.29	=
SVP190159-1	-0.57	0.13	0.12	UJ	0.02	0.02	0.04	UJ	0.02	0.01	0.01	=	12.20	1.60	0.20	=	0.12	0.47	0.80	UJ	1.33	0.33	0.05	=	0.69	0.08	0.05	=	0.12	0.15	0.26	UJ	0.93	0.16	0.28	=
SVP190159-2	-0.69	1.29	1.66	UJ	-0.13	0.29	0.48	UJ	0.06	0.12	0.21	UJ	15.30	2.87	0.70	=	0.00	0.54	8.42	UJ	1.45	0.37	0.27	=	1.24	0.58	0.55	=	-0.10	0.31	1.75	UJ	1.53	1.13	1.56	UJ
SVP190183	-0.66	0.14	0.18	UJ	-0.03	0.04	0.06	UJ	0.05	0.01	0.02	=	14.90	1.95	0.23	=	0.23	0.54	0.94	UJ	1.28	0.33	0.06	=	0.71	0.09	0.06	=	0.22	0.19	0.33	UJ	1.04	0.19	0.35	=
SVP190183-1	-0.85	0.18	0.19	UJ	-0.04	0.04	0.06	UJ	0.06	0.01	0.02	=	15.90	2.08	0.24	=	-0.73	0.63	0.99	UJ	1.36	0.34	0.06	=	0.72	0.09	0.06	=	0.17	0.20	0.34	UJ	0.88	0.18	0.36	=
SVP190183-2	0.09	0.30	1.39	UJ	-0.14	0.18	0.36	UJ	0.04	0.13	0.22	UJ	14.20	2.89	1.15	=	1.13	3.55	6.02	UJ	1.19	0.32	0.23	=	1.14	0.36	0.53	=	0.35	0.31	0.43	UJ	0.54	0.83	1.37	UJ
SVP190267	-1.13	0.23	0.15	UJ	0.02	0.03	0.05	UJ	0.05	0.02	0.02	=	15.20	2.01	0.26	=	0.20	0.59	1.02	UJ	1.34	0.34	0.07	=	0.84	0.10	0.06	=	-0.02	0.18	0.30	UJ	1.25	0.21	0.33	=
SVP190267-1	-0.72	0.16	0.17	UJ	0.02	0.04	0.06	UJ	0.10	0.02	0.02	=	15.50	2.03	0.24	=	-0.19	0.57	0.95	UJ	1.44	0.37	0.06	=	0.80	0.12	0.06	=	0.05	0.20	0.33	UJ	1.24	0.22	0.37	=
SVP190267-2	0.09	0.37	1.26	UJ	-0.11	0.11	0.37	UJ	-0.11	0.16	0.30	UJ	14.10	2.87	1.15	=	0.72	3.10	8.06	UJ	1.26	0.31	0.20	=	1.25	0.34	0.45	=	0.26	0.49	0.88	UJ	1.22	0.93	1.36	UJ
SVP207127	-0.91	0.18	0.18	UJ	0.00	0.03	0.06	UJ	0.10	0.02	0.02	=	14.50	1.89	0.25	=	-0.23	0.56	0.93	UJ	1.25	0.31	0.06	=	0.77	0.10	0.06	=	0.16	0.19	0.32	UJ	1.09	0.19	0.34	=
SVP207127-1	-0.69	0.14	0.17	UJ	0.00	0.03	0.06	UJ	0.09	0.02	0.02	=	15.30	1.99	0.22	=	-0.17	0.53	0.88	UJ	1.23	0.31	0.05	=	0.80	0.10	0.05	=	-0.01	0.18	0.30	UJ	1.15	0.20	0.34	=
SVP207127-2	0.14	0.58	1.10	UJ	-0.02	0.22	0.31	UJ	0.05	0.11	0.18	UJ	16.30	3.08	0.96	J	0.00	1.39	7.53	UJ	1.06	0.27	0.19	J	1.09	0.31	0.42	J	-0.31	0.47	0.95	UJ	0.87	0.81	1.42	UJ
SVP263662	-0.05	0.17	0.29	UJ	0.02	0.04	0.06	UJ	0.05	0.02	0.02	=	13.30	1.84	0.32	=	0.02	0.65	1.12	UJ	0.97	0.26	0.08	=	0.70	0.10	0.07	=	0.08	0.22	0.38	UJ	1.05	0.21	0.38	=
SVP263662-1	0.08	0.20	0.36	UJ	0.01	0.04	0.06	UJ	0.06	0.02	0.02	=	14.40	1.97	0.37	=	0.36	0.68	1.19	UJ	1.05	0.28	0.08	=	0.79	0.12	0.07	=	-0.06	0.22	0.37	UJ	1.11	0.23	0.42	=
SVP263662-2	0.23	0.55	0.85	UJ	-0.11	0.26	0.43	UJ	0.00	0.08	0.14	UJ	16.40	2.50	0.39	=	1.01	2.73	6.13	UJ	1.33	0.27	0.13	=	1.12	0.26	0.17	=	0.00	0.28	1.08	UJ	0.60	0.73	1.19	UJ
SVP263693	0.22	0.19	0.35	UJ	-0.03	0.04	0.07	UJ	0.06	0.02	0.02	=	14.40	1.97	0.35	=	0.10	0.76	1.30	UJ	1.00	0.27	0.07	=	0.87	0.11	0.08	=	0.06	0.24	0.41	UJ	1.17	0.22	0.42	=
SVP263693-1	0.01	0.20	0.35	UJ	0.00	0.04	0.06	UJ	0.06	0.02	0.02	=	14.20	1.95	0.34	=	0.01	0.74	1.27	UJ	1.06	0.28	0.08	=	0.85	0.12	0.08	=	-0.06	0.24	0.40	UJ	0.95	0.20	0.39	=
SVP263693-2	0.23	0.64	0.93	UJ	0.10	0.24	0.40	UJ	0.00	0.09	0.15	UJ	16.30	2.67	1.12	=	-1.22	4.24	7.09	UJ	1.04	0.24	0.18	=	1.12	0.25	0.19	=	-0.04	0.07	1.25	UJ	-0.59	1.94	3.23	UJ
SVP263708	0.07	0.15	0.26	UJ	0.00	0.03	0.05	UJ	0.03	0.02	0.03	J	16.80	2.18	0.24	=	-0.17	0.56	0.94	UJ	1.21	0.31	0.06	=	1.04	0.12	0.06	=	0.12	0.19	0.32	UJ	1.32	0.23	0.31	=
SVP263708-1	0.04	0.13	0.23	UJ	0.02	0.03	0.05	UJ	0.04	0.02	0.03	=	16.10	2.08	0.20	=	0.00	0.50	0.84	UJ	1.19	0.30	0.05	=	0.99	0.12	0.06	=	-0.01	0.17	0.28	UJ	1.25	0.20	0.28	=
SVP263708-2	0.07	0.27	1.23	UJ	0.12	0.28	0.47	UJ	0.05	0.09	0.16	UJ	17.20	2.75	0.49	=	0.00	0.71	8.28	UJ	1.54	0.29	0.19	=	1.42	0.34	0.49	=	0.00	0.90	1.52	UJ	1.12	1.02	1.64	UJ
SVP263726	0.10	0.19	0.34	UJ	-0.01	0.04	0.06	UJ	-0.01	0.02	0.03	UJ	13.40	1.86	0.44	=	0.15	0.70	1.21	UJ	0.80	0.22	0.08	=	0.77	0.10	0.08	J	0.06	0.20	0.35	UJ	0.83	0.32	0.39	J
SVP263726-1	-0.06	0.19	0.32	UJ	-0.03	0.04	0.06	UJ	0.00	0.02	0.03	UJ	12.60	1.76	0.46	=	-0.05	0.65	1.10	UJ	0.86	0.23	0.08	=	0.79	0.11	0.08	=	0.23	0.22	0.38	UJ	1.02	0.21	0.41	=
SVP263726-2	-0.26	0.73	0.90	UJ	-0.10	0.22	0.36	UJ	-0.02	0.08	0.14	UJ	13.70	2.09	0.33	=	0.45	1.67	5.38	UJ	0.94	0.18	0.08	=	1.32	0.25	0.08	=	-0.02	0.03	1.02	UJ	0.60	0.77	2.40	UJ
SVP263817	-0.10	0.20	0.33	UJ	-0.03	0.04	0.06	UJ	0.03	0.02	0.02	=	14.00	1.93	0.45	=	-0.15	0.72	1.21	UJ	0.91	0.24	0.07	=	0.75	0.11	0.08	=	-0.06	0.22	0.36	UJ	0.93	0.19	0.39	=
SVP263817-1	-0.07	0.20	0.33	UJ	0.01	0.03	0.06	UJ	0.04	0.02	0.02	=	11.50	1.62	0.46	=	-0.97	0.68	1.01	UJ	0.86	0.24	0.08	=	0.63	0.09	0.08	=	0.14	0.22	0.38	UJ	0.72	0.17	0.39	=
SVP263817-2	0.19	0.60	0.98	UJ	-0.12	0.27	0.45	UJ	0.03	0.08	0.14	UJ	17.00	2.61	0.41	=	-1.29	4.24	7.10	UJ	1.12	0.24	0.14	=	1.22	0.28	0.16	=	-0.26	0.66	1.11	UJ	-0.45	1.91	3.19	UJ
SVP263826	0.22	0.19	0.36	UJ	0.00	0.03	0.06	UJ	0.00	0.02	0.03	UJ	14.40	1.96	0.32	=	-0.06	0.70	1.18	UJ	0.94	0.25	0.08	=	0.74	0.11	0.07	=	0.05	0.23	0.38	UJ	0.92	0.18	0.37	=
SVP263826-1	-0.18	0.20	0.32	UJ	0.01	0.03	0.06	UJ	0.00	0.02	0.03	UJ	14.70	2.01	0.33	=	-0.01	0.67	1.14	UJ	0.97	0.26	0.08	=	0.69	0.10	0.07	=	0.05	0.23	0.39	UJ	0.80	0.28	0.40	=
SVP263826-2	0.08	0.28	1.11	UJ	-0.12	0.17	0.43	UJ	0.05	0.09	0.15	UJ	17.20	2.72	0.93	=	-1.28	4.31	7.22	UJ	1.07	0.22	0.13	=	0.73	0.30	0.26	=	0.07	0.45	0.76	UJ	1.45	0.66	0.89	=
SVP263844	-0.02	0.20	0.34	UJ	0.00	0.04	0.06	UJ	0.04	0.02	0.02	=	15.10	2.06	0.32	=	0.23	0.69	1.19	UJ	1.00	0.27	0.08	=	0.84	0.12	0.08	=	0.01	0.23	0.39	UJ	0.91	0.20	0.40	=
SVP263844-1	0.03	0.18	0.32	UJ	0.00	0.04	0.06	UJ	0.04	0.02	0.02	=	14.40	1.97	0.32	=	-0.07	0.64	1.09	UJ	0.97	0.26	0.08	=	0.80	0.11	0.07	=	-0.03	0.22	0.37	UJ	0.98	0.30	0.39	=
SVP263844-2	0.15	0.29	1.27	UJ	-0.02	0.17	0.40	UJ	-0.04	0.04	0.19	UJ	16.30	2.65	0.98	=	-1.24	4.38	7.34	UJ	1.13	0.24	0.13	=	1.39	0.32	0.12	=	-0.28	0.77	1.29	UJ	1.93	0.78	1.23	=
SVP263862	-0.07	0.20	0.34	UJ	0.01	0.04	0.06	UJ	0.03	0.01	0.02	J	16.20	2.20	0.33	=	-0.13	0.71	1.21	UJ	1.07	0.29	0.08	=	0.83	0.11	0.08	=	0.21	0.23	0.40	UJ	1.00	0.21	0.42	=
SVP263862-1	0.18	0.14	0.19	UJ	-0.03	0.04	0.06	UJ	0.03	0.02	0.04	UJ	14.90	2.03	0.33	=	-0.10	0.68	1.16	UJ	1.06	0.28	0.08	=	0.86	0.13	0.08	=	0.10	0.24	0.41	UJ	1.11	0.23	0.42	=
SVP263862-2	0.44	0.98	1.27	UJ	0.12	0.30	0.51	UJ	0.05	0.09	0.15	UJ	20.20	3.20	0.56	=	1.19	3.64	8.18	UJ	1.56	0.29	0.13	=	1.35	0.29	0.34	=	0.40	0.78	1.73	UJ	0.97	1.04	1.88	UJ

Table K-6. Gamma Spectroscopy Results for Parent Soil Samples and Associated Split and Duplicate Soil Samples (Continued)

Soil Sample Name	Ac-227				Am-241				Cs-137				K-40				Pa-231				Ra-226				Ra-228				U-235				U-238			
	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ
	(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)				(pCi/g)			
SVP263871	0.18	0.22	0.40	UJ	0.01	0.04	0.07	UJ	0.01	0.02	0.04	UJ	15.40	2.10	0.28	=	0.52	0.49	0.78	UJ	1.08	0.29	0.09	=	0.86	0.12	0.10	=	-0.02	0.24	0.41	UJ	1.06	0.23	0.44	=
SVP263871-1	-0.01	0.20	0.34	UJ	-0.03	0.04	0.06	UJ	-0.01	0.02	0.03	UJ	13.10	1.82	0.37	=	0.35	0.78	1.36	UJ	1.03	0.28	0.09	=	0.81	0.11	0.09	=	0.06	0.24	0.40	UJ	1.04	0.23	0.43	=
SVP263871-2	0.15	0.32	1.01	UJ	-0.12	0.24	0.31	UJ	-0.03	0.10	0.17	UJ	16.60	2.51	0.38	=	0.53	1.99	6.39	UJ	1.28	0.23	0.09	=	1.16	0.31	0.17	=	-0.30	0.79	1.32	UJ	0.81	0.80	1.10	UJ
SVP263889	-0.07	0.21	0.35	UJ	-0.02	0.04	0.06	UJ	0.00	0.02	0.04	UJ	15.80	2.15	0.34	=	-0.79	0.72	1.12	UJ	1.02	0.27	0.09	=	0.76	0.11	0.09	=	-0.01	0.24	0.41	UJ	1.10	0.23	0.40	=
SVP263889-1	0.14	0.22	0.40	UJ	0.01	0.04	0.07	UJ	-0.01	0.02	0.04	UJ	15.50	2.11	0.33	=	-0.40	0.78	1.29	UJ	1.07	0.29	0.09	=	0.78	0.11	0.09	=	-0.04	0.24	0.40	UJ	1.07	0.23	0.42	=
SVP263889-2	0.15	0.36	1.18	UJ	0.03	0.19	0.27	UJ	0.06	0.11	0.18	UJ	14.30	2.68	0.75	=	0.00	2.24	13.70	UJ	1.33	0.30	0.16	=	1.59	0.47	0.38	=	0.27	0.47	0.74	UJ	-2.29	2.04	5.61	UJ
SVP263902	-0.01	0.14	0.24	UJ	-0.04	0.03	0.05	UJ	-0.01	0.01	0.02	UJ	15.50	2.02	0.20	=	-0.11	0.54	0.89	UJ	1.07	0.27	0.06	=	0.98	0.12	0.05	=	0.12	0.19	0.31	UJ	1.33	0.21	0.33	=
SVP263902-1	-0.07	0.15	0.24	UJ	-0.05	0.04	0.06	UJ	-0.01	0.01	0.02	UJ	16.50	2.14	0.20	=	0.46	0.29	0.68	UJ	1.06	0.27	0.06	=	1.03	0.12	0.06	=	0.19	0.20	0.34	UJ	1.02	0.19	0.32	=
SVP263902-2	-0.03	0.61	1.07	UJ	-0.09	0.21	0.29	UJ	-0.03	0.08	0.14	UJ	16.00	2.69	0.79	=	-1.73	6.39	10.70	UJ	1.05	0.26	0.19	=	1.44	0.33	0.13	=	0.10	0.25	1.04	UJ	-0.98	1.86	4.93	UJ
SVP264007	0.09	0.15	0.26	UJ	0.00	0.03	0.05	UJ	-0.01	0.01	0.02	UJ	17.30	2.25	0.22	=	-0.05	0.55	0.92	UJ	1.12	0.29	0.06	=	0.94	0.12	0.06	=	-0.01	0.19	0.32	UJ	0.98	0.21	0.36	=
SVP264007-1	0.08	0.20	0.36	UJ	0.03	0.04	0.07	UJ	-0.02	0.02	0.03	UJ	17.50	2.35	0.33	=	0.06	0.68	1.17	UJ	1.05	0.28	0.08	=	0.86	0.12	0.08	=	0.14	0.22	0.39	UJ	1.02	0.21	0.41	=
SVP264007-2	-0.45	0.95	1.23	UJ	0.00	0.27	0.45	UJ	0.05	0.11	0.19	UJ	16.50	2.63	0.47	=	0.00	0.41	7.47	UJ	1.19	0.26	0.15	=	0.61	0.25	0.53	=	0.14	0.38	1.44	UJ	1.62	0.83	1.45	J
SVP264028	0.09	0.20	0.35	UJ	-0.02	0.04	0.07	UJ	-0.03	0.02	0.03	UJ	14.20	1.95	0.37	=	0.25	0.76	1.32	UJ	1.19	0.31	0.09	=	0.83	0.12	0.09	=	0.11	0.24	0.42	UJ	1.13	0.24	0.42	=
SVP264028-1	-0.09	0.23	0.38	UJ	-0.01	0.04	0.07	UJ	0.00	0.02	0.03	UJ	14.80	2.03	0.39	=	0.18	0.80	1.38	UJ	1.25	0.33	0.10	=	0.93	0.12	0.09	=	0.07	0.26	0.44	UJ	1.33	0.26	0.45	=
SVP264028-2	-0.08	0.76	0.95	UJ	0.01	0.23	0.38	UJ	0.04	0.08	0.13	UJ	15.40	2.29	0.34	=	0.80	2.51	5.61	UJ	1.36	0.25	0.12	=	1.30	0.25	0.08	=	-0.21	0.59	0.99	UJ	-0.53	1.72	2.86	UJ
SVP264045	0.02	0.19	0.33	UJ	-0.02	0.04	0.06	UJ	0.06	0.02	0.02	=	11.80	1.66	0.41	=	-0.16	0.68	1.15	UJ	0.94	0.26	0.08	=	0.63	0.09	0.08	=	0.04	0.22	0.37	UJ	1.14	0.22	0.41	=
SVP264045-1	0.06	0.20	0.35	UJ	0.00	0.04	0.06	UJ	0.07	0.02	0.02	=	11.90	1.67	0.44	=	0.23	0.69	1.19	UJ	0.94	0.26	0.08	=	0.68	0.10	0.08	=	0.12	0.22	0.38	UJ	0.94	0.20	0.38	=
SVP264045-2	0.19	0.40	1.14	UJ	0.07	0.22	0.36	UJ	0.14	0.06	0.04	=	16.60	2.65	0.94	=	0.94	2.95	6.55	UJ	1.31	0.24	0.10	=	0.94	0.26	0.11	=	0.04	0.07	1.29	UJ	-0.02	0.03	2.20	UJ
SVP264063	0.51	0.21	0.41	UJ	0.01	0.04	0.07	UJ	0.01	0.02	0.04	UJ	16.80	2.27	0.31	=	0.33	0.77	1.34	UJ	1.17	0.31	0.09	=	0.99	0.14	0.08	=	0.01	0.25	0.42	UJ	1.15	0.27	0.43	=
SVP264063-1	-0.10	0.20	0.33	UJ	0.03	0.04	0.07	UJ	0.00	0.02	0.04	UJ	16.50	2.23	0.33	=	-0.35	0.81	1.33	UJ	1.10	0.30	0.08	=	0.93	0.13	0.08	=	0.23	0.26	0.45	UJ	1.27	0.23	0.41	=
SVP264063-2	0.31	0.68	0.88	UJ	-0.04	0.20	0.29	UJ	-0.03	0.11	0.13	UJ	15.70	2.58	0.72	=	1.46	5.84	9.81	UJ	1.16	0.25	0.16	=	1.43	0.32	0.12	=	0.02	0.03	1.05	UJ	1.31	1.06	2.47	UJ
SVP264080	0.15	0.20	0.37	UJ	-0.02	0.04	0.07	UJ	-0.01	0.02	0.03	UJ	14.10	1.94	0.31	=	-0.17	0.75	1.26	UJ	1.00	0.28	0.09	=	0.80	0.11	0.09	=	-0.18	0.24	0.39	UJ	1.13	0.23	0.41	=
SVP264080-1	-0.12	0.22	0.36	UJ	-0.02	0.04	0.07	UJ	0.01	0.02	0.04	UJ	14.80	2.03	0.39	=	0.13	0.75	1.29	UJ	1.09	0.29	0.09	=	0.91	0.12	0.08	=	0.17	0.24	0.42	UJ	1.06	0.23	0.44	=
SVP264080-2	0.25	0.56	0.99	UJ	0.03	0.21	0.29	UJ	0.04	0.09	0.16	UJ	15.20	2.74	0.71	=	0.00	1.21	12.90	UJ	1.33	0.29	0.16	=	1.61	0.41	0.15	=	0.14	0.50	1.00	UJ	0.92	1.18	2.84	UJ
SVP264104	0.08	0.20	0.35	UJ	0.01	0.04	0.06	UJ	0.01	0.02	0.03	UJ	13.50	1.87	0.44	=	-0.49	0.68	1.10	UJ	1.16	0.30	0.08	=	0.74	0.10	0.08	J	-0.11	0.23	0.38	UJ	1.03	0.21	0.40	=
SVP264104-1	-0.11	0.15	0.25	UJ	-0.01	0.03	0.05	UJ	0.00	0.01	0.03	UJ	15.90	2.07	0.29	=	-0.27	0.55	0.90	UJ	1.28	0.33	0.06	=	0.87	0.12	0.06	=	0.09	0.17	0.30	UJ	1.07	0.18	0.31	=
SVP264104-2	0.09	0.33	1.09	UJ	0.06	0.21	0.29	UJ	0.05	0.08	0.14	UJ	15.70	2.84	0.73	=	0.68	3.02	12.70	UJ	1.36	0.29	0.16	=	1.39	0.29	0.16	=	-0.03	0.49	1.07	UJ	2.45	1.49	2.54	UJ
SVP264149	0.13	0.15	0.27	UJ	-0.05	0.03	0.04	UJ	0.02	0.01	0.02	=	3.13	0.56	0.28	=	-0.61	0.59	0.93	UJ	0.82	0.22	0.06	=	0.13	0.03	0.05	J	0.00	0.18	0.31	UJ	0.44	0.13	0.26	=
SVP264149-1	0.03	0.17	0.30	UJ	-0.02	0.03	0.04	UJ	0.05	0.02	0.02	=	2.74	0.55	0.33	=	0.35	0.57	1.03	UJ	0.79	0.22	0.07	=	0.15	0.04	0.05	J	-0.03	0.20	0.34	UJ	0.52	0.13	0.27	=
SVP264149-2	0.06	0.54	0.75	UJ	-0.07	0.16	0.24	UJ	0.05	0.09	0.15	UJ	3.57	1.20	0.81	=	-1.67	6.42	10.80	UJ	0.72	0.22	0.17	=	0.14	0.24	0.32	UJ	0.08	0.46	0.79	UJ	-0.49	2.40	4.11	UJ
SVP264289	-0.21	0.43	0.72	UJ	-0.04	0.07	0.12	UJ	0.08	0.04	0.05	J	4.38	1.09	0.85	J	-0.56	1.50	2.52	UJ	0.62	0.22	0.16	J	0.32	0.09	0.14	J	0.16	0.42	0.76	UJ	0.53	0.32	0.46	J
SVP264289-1	-0.32	0.37	0.58	UJ	0.02	0.07	0.12	UJ	0.11	0.04	0.05	J	5.06	1.20	0.94	J	0.77	1.50	2.76	UJ	0.69	0.24	0.16	J	0.31	0.11	0.29	J	0.05	0.44	0.78	UJ	0.13	0.66	1.13	UJ
SVP264289-2	0.14	0.52	1.03	UJ	0.03	0.11	0.16	UJ	0.05	0.10	0.17	UJ	4.06	1.35	1.30	=	-2.19	6.59	11.10	UJ	0.39	0.25	0.30	J	0.57	0.37	0.39	J	0.11	0.48	0.94	UJ	2.41	1.67	2.10	J

Notes:

Negative results are less than the laboratory system's background level.

Soil samples ending in "-1" are duplicate soil samples.

Soil samples ending in "-2" are split soil samples.

VQ symbols indicate: "=" for positive results, "J" for estimated quantity, and "UJ" for not detected above estimated value.

4.5 COMPLETENESS

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained. Acceptable results are defined as those data that pass individual scrutiny during the verification and validation process and are accepted for unrestricted use. The DQO of achieving 90 percent completeness was met as presented in this QCSR. One hundred (100) percent of the data are within acceptance limits.

A total of 57 systematic, 21 biased, and 429 subsurface soil samples were collected, with approximately 6,084 discrete analyses obtained, reviewed, and integrated into the assessment with 9 rejected results. Thus, 99.9 percent of the data are within acceptance limits.

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5.0 DATA QUALITY ASSESSMENT SUMMARY

The overall quality of these data meets or exceeds the established DQOs. Through proper implementation of the project data verification, validation, and assessment process, the data have been determined to be acceptable for use.

Some data, as presented, have been qualified as usable, but estimated when necessary. Data that have been estimated are those that have concentrations/activities that are below the quantitation limit or are indicative of accuracy, precision, or sensitivity being less than desired but adequate for interpretation. Comparisons that have exceeded the requirements have bolded type in associated tables. Numerous possible explanations for these anomalies include, but are not limited to, the following:

- Excessive dilution for sample turbidity or other matrix issues that was deemed necessary for a laboratory analysis;
- Incomplete soil sample homogenization, either at the laboratory or during the field sampling;
- Matrix interferences within the soil sample itself that caused inadequate analytical quantitation;
- Different preparation methods for associated split soil samples at different laboratories;
- Different analytical methods for associated split soil samples at different laboratories; and
- Concentration of an analyte being below the calibration range, or near the method detection limit (MDL) for that analyte.

Further analysis of the data can display trends or even randomness within the dataset that could be explained with one or more of the previously mentioned contributors to anomalies. For instance, a single split soil sample pair analyzed at two different laboratories, for which the RPD was not met for any analyte, could be an indicator of incomplete homogenization in the field, matrix effects in the soil sample, use of different preparation methods, dilutions that were required to overcome soil sample concentration, or analyte concentrations approaching the MDL. Accuracy and/or precision anomalies occurring for some analytes, but not for others, could be the result of a simple matrix effect causing poor quantitation of a soil sample, or perhaps low concentrations of those analytes. When considering split soil sample data, if a laboratory has numerous “out of specification” data for a certain analyte(s) versus the corresponding data produced by another laboratory, differences in sample preparation by the laboratories in question, or perhaps differences in instrument calibrations, could be considered as potential causes for differences in data quality for the specific analyte(s) in question. Exceedance by one laboratory of the RPD acceptance criterion for an analyte measured in a duplicate soil sample pair, for which the same duplicate analysis at another laboratory produced results for which the RPD was within the same acceptance limit, could be attributed to randomness of quantitation within the analysis.

The combined analyses for accuracy and precision included 576 total comparisons with four exceedances, resulting in a 0.7 percent exceedance rate. These results were well within the 90 percent completeness DQO, with more than 90 percent of the data being within acceptance limits for accuracy and precision. With respect to completeness, the project produced valid results for 99.9 percent of the soil sample analyses performed, achieving the DQO of 90 percent completeness.

This QCSR demonstrates that the evaluated data can withstand scientific scrutiny; are appropriate for their intended purpose; are technically defensible; and are of known and acceptable accuracy, precision, and sensitivity. Data integrity has been documented through proper implementation of QA/QC measures. Confidence in the presented environmental information has been established, allowing the information to be utilized for the project objectives and providing data for future needs.

APPENDIX L

RESPONSIVENESS SUMMARY

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RESPONSIVENESS SUMMARY

This Responsiveness Summary has been prepared to provide the USACE responses to agency comments received on a draft of this PDIR-FSSE.

USEPA Comments and USACE Responses

1. **Abstract, Regulatory Requirements/Remediation Goals, General Comment.** This portion of the abstract does not reference the 2005 Record of Decision for the North St. Louis County FUSRAP Sites. The EPA also provided this feedback in comment 2 to the Jana Elementary Structures Survey. As noted in that comment, other Final Status Survey Reports previously completed for portions of the site near Coldwater Creek state the following in this portion of the abstract, "*See the ROD for regulatory requirements and remediation goals (RGs).*" The EPA requests that a similar statement be added to clarify that the remediation goals for the site have been established in the 2005 Record of Decision (ROD) for the North St. Louis County FUSRAP sites.

   Response 1: The subject block in the Abstract is revised to include, "See the ROD for regulatory requirements and RGs that provide protectiveness."

2. **Abstract, Regulatory Requirements/Remediation Goals, page ii, first paragraph.** The first sentence states, "*Per the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations [CFR] 300.430), protectiveness is achieved when the additional lifetime risk to an individual is generally less than 1 x* 10^{-4}." The EPA provided comments on this language for the Jana Elementary Structures Survey and the Lead-210 Report (see comment 3 from the March 13, 2023, comment letter and comment 4 from the April 3, 2023, comment letter). Please revise the sentence for consistency with the NCP.

   Response 2: The portion of the NCP quoted by the USEPA in the comment does not contain all the relevant text necessary for context and understanding of the regulation regarding CERCLA protectiveness. The USACE writes documents to be focused on the information unique to that document. The USACE does not copy large of amounts of referenced material into its documents and does not consider repeating all this regulatory text to be necessary for the documents. For this stage of the project, summarizing that the effect of the NCP is to restrict risk to generally 10^{-4} is appropriate.

3. **Abstract, Regulatory Requirements/Remediation Goals, page ii, bullets in the box.** The summarization of certain Remediation Goals in this box, presumably from those established in the 2005 ROD, is not clear. The EPA acknowledges that both the Wilcoxon Rank Sum test and limiting the average net sum of ratios (SOR_N) to less than 1.0 for an area of 100 m^2 are two tools utilized to ensure the actual remediation goals established for each radiological contaminant of concern listed in the ROD have been achieved, as well as to demonstrate compliance with regulations which are listed as relevant and appropriate in the ROD. If USACE feels it is important to provide additional specific information in the abstract on remediation goals, the EPA strongly suggests these bullets be replaced with language from the ROD. For example:

   Soil in the surface 6-inch layer will be removed if the radionuclide concentrations averaged over any area of 100 m^2 exceed:

   - 5 pCi/g of Ra-226 above background, or

- 14 pCi/g of Th-230 above background, or
- 50 pCi/g of U-238 above background.

Subsurface soil (soil deeper than 6 inches) will be removed where the subsurface radionuclide concentrations averaged over any area of 100 m^2 and averaged over a 6-inch thick layer of soil exceed:

- 15 pCi/g of Ra-226 above background, or
- 15 pCi/g of Th-230 above background, or
- 50 pCi/g of U-238 above background.

The Sum of Ratios (SOR) approach will be used when more than one radionuclide is present. The sum of ratios approach is summarized in Section 2.3 of Appendix B of this report. Additional information on the selected remediation goals for soil can be found in Sections 2.8.2 and 2.12.2 of the 2005 ROD.

Response 3: The USACE is writing the Abstract to be a summary that is more owner- and public-facing. The USACE does not copy large of amounts of referenced material into its PDIR-FSSEs or the Abstract. Thus, the summary of the RGs is removed from the subject block.

4. **Abstract, Results, page ii, first three bullets.** The language in these bullets appears to have been altered from typical language in prior final status survey reports for Coldwater Creek Floodplain properties. Typically, the results portion of the abstract includes the highest residual risk and dose results along with a description of the type of exposure scenario evaluated, e.g., suburban resident and hypothetical residential gardener. For transparency and clarity, the EPA recommends these results be included in the abstract for the Jana Elementary School soil report. At minimum and to ensure consistency with the ROD and CERCLA, the EPA recommends USACE replace the first sentence of the first bullet with the following language that has been included in many final status survey evaluations for Coldwater Creek Floodplain properties: "These results do not exceed the upper bound of the ROD target risk range of 10^{-6} to 10^{-4}."

   Response 4: Inclusion of this response in this report is sufficient change to the report for this comment. MDNR comment 2 on the *Final Status Survey Evaluation for Surfaces of Structures Associated with the Jana Elementary School, Hazelwood School District* identified that these documents "need to accommodate more to a layman's level of understanding." The USACE is continuing to honor the response to that comment, which states, "The USACE recognizes the difficulty of addressing multiple audiences in the same document and recognizes differing viewpoints exist on how that might be best accomplished. The audiences for this FSSE are the property owners, regulators, public, and technical experts. The USACE has worked to improve its documents for both reader-friendliness for owners and public and the quality and rigor expected by regulators and technical experts. For this document, the USACE has revised the Abstract to be more property owner- and public-facing. While the scope of the FSSE does not include tutorials to bridge a different level of understanding, additional explanations have been added to the discussions of [structure survey unit] STSU classification, DCGL, and risk assessment. In addition, the USACE has made a substantial amount of information available on its St. Louis FUSRAP website, including fact sheets about MARSSIM and CERCLA concepts." Also, please see the response to USEPA comment 2.

5. **Page 1, Introduction, second paragraph, lines 14 through 20.** The EPA acknowledges that listing each of the radionuclide contaminants of concern that pertain to this report is

informative. However, the paragraph does not specify that the primary COCs are radium (Ra)-226, thorium (Th)-230, and uranium (U)-238. The EPA notes that this language is typically included in the introduction section of final status survey reports for Coldwater Creek Floodplain properties. In addition, the language in the second sentence of this paragraph that states, *"… COCs listed in Table 2-2 of the ROD (USACE 2005) for CWC sediment that are applied to soil on the banks and floodplain*" is not clear. The EPA notes that Table 2-2 in the 2005 ROD lists the same radiological COCs for surface soils, subsurface soils, and sediment. It does not appear to be necessary to apply sediment contaminants of concern to surface and/or subsurface soils present on the banks of Coldwater Creek or its floodplain. Because specific remediation goals for each of these media, which are not identical, have been established in Table 2-14 in the 2005 ROD, the EPA recommends the paragraph be revised to prevent any confusion about what media and associated remediation goals are being applied to the property being evaluated in this report.

Response 5: The last sentence of the subject paragraph is revised to state, "The primary COCs for soil are radium (Ra)-226, thorium (Th)-230, and uranium (U)-238; the complete list of COCs is included in the Abstract of this pre-design investigation report (PDIR) and final status survey evaluation (FSSE)."

6. **Page 3, Property Description, second paragraph, lines 23 through 26.** The second paragraph of this section states, "*While the PDI data from the 10-year floodplain area of the school property and soil sample data in the Brustowicz, Thompson, and Kaltofen report support a MARSSIM scoping survey for the upgradient soil, the previous PDI activities were fully extended to the upgradient soil.*" First, the EPA notes that section 1.0 at page 1 on lines 27 and 28 states, "*this final status survey evaluation (FSSE) will not specifically discuss the Brustowicz, Thompson, and Kaltofen report…*" The EPA recommends USACE consider whether the two statements are consistent. Second, the intent of the statement in section 2 is not clear. The EPA recommends that USACE clarify what is meant by "*upgradient soil*" in this sentence and whether that is referring to soil within the 10-year floodplain but outside the banks of Coldwater Creek or soils between the 10-year floodplain and the Jana Elementary. The EPA acknowledges that this paragraph also states that USACE determined the initial PDI activities did not require expanding the investigation area beyond the 10-year floodplain to upgradient portions of the school property. It goes on to state that USACE expanded the investigation area beyond the 10-year floodplain after publication of the Brustowicz, Thompson, and Kaltofen report. In addition, please clarify whether, and if so how, the data from the Brustowicz, Thompson, and Kaltofen report was considered for any of the investigation activities presented in this report.

   Response 6: The sentence starting with "While the PDI…" on page 3 is deleted. The sentence about the cause of the expanded investigation area is corrected to "Based on community concerns about the Brustowicz, Thompson, and Kaltofen report, the USACE expanded the PDI activities…." Data from the Brustowicz, Thompson, and Kaltofen report were not used in this PDIR-FSSE.

7. **Page 3, Section 2.0, second paragraph, line 29.** The EPA recommends USACE consider whether the last statement in this paragraph is necessary to provide a description of the property, which is the stated purpose of this section. The EPA notes that the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) which is utilized for this investigation defines contamination as "*The presence of residual radioactivity in excess of levels which are acceptable for release of a site or facility for unrestricted use.*" The EPA

further acknowledges that this definition is consistent with footnote 2 on page one of this report which states, "*For the purposes of this report, the term 'contamination' refers to the presence of contaminants of concern in concentrations that exceed the ROD remediation goals (RGs).*" If USACE decides the sentence on line 29 will remain in this report, the EPA recommends USACE explain the difference between residual radioactivity and contamination to prevent confusion and increase the understanding of the sampling results presented in this report and other reports for Coldwater Creek Floodplain properties. MARSSIM has a definition for residual radioactivity that may be useful to consider. The regulations in 40 C.F.R. Part 192 include a definition for residual radioactive material that may also be useful to consider.

Response 7: Inclusion of this response in this report is sufficient change to the report for this comment. The reason for inclusion of this land area in this PDIR-FSSE is relevant to the description of the property. Because the reasoning involves community concerns about allegations, a brief response from the SRNL report is quoted. The subject sentence is needed to connect the SRNL quote to the content of the allegations. With respect to the term "residual radioactivity," additional analysis added to this PDIR-FSSE based on MDNR comment 1 demonstrates that the sample results for CWC-365 and CWC-386 are less than or equal to the reference area background data. Thus, using the MARSSIM term "residual radioactivity" would be inaccurate.

8. **Page 6, Section 3.1.1, lines 11-12.** The text states, "*Based on count rates that were higher than normal background, 3 other stations (3 samples) were sampled.*" The EPA requests that USACE provide some additional clarity on the count rates that were "*higher than normal background*" and how those three biased sample locations were selected.

   Response 8: The following sentence is added after the subject sentence, "Appendix C contains additional information on the investigation of higher GWS count rates."

9. **Figure 4.** The EPA suggests USACE consider whether the legend heading "Elevation Change" should be changed to "Elevation" given that the values listed next to the various colored boxes appear to be elevations (presumably in feet above mean sea level) rather than changes in elevation.

   Response 9: The figure is revised as suggested.

10. **Appendix A, General Comment.** The EPA previously provided comments to this appendix, which were included in the Jana Elementary Structures Final Status Survey Evaluation Report. Those comments are incorporated by reference into this letter.

    Response 10: Those comments were provided to SRNL, who issued Revision 1 of their review.

11. **Page B-7, lines 30-31.** The text states "*Sample locations generally increased in depth with proximity to the wooded parcels southeast of the school and CWC to surpass the elevation of known contamination with the northwest bank of CWC.*" Use of the term "*surpass*" in this sentence is unclear. The EPA recommends USACE consider whether an alternative term such as "*include*" or "*within or below*" would be more accurate.

    Response 11: Concur. The word "surpass" in the phrase "…and CWC to surpass the elevation of known contamination…" on lines 30-31 of Page B-7 has been changed to "include and exceed." Additionally, the word "with" from the same sentence has been changed to "within."

12. **Page B-7, line 7, and page B-9, line 9.** These sentences use the term *"standard conceptual model"*. The EPA recommends that this term be defined, or an additional sentence be added to clarify whether this is meant in this context to refer to the ten-year floodplain of Coldwater Creek.

    Response 12: Concur. The sentence on line 6 of page B-7 that begins "The remaining 42 sample locations…" has been modified to read as follows: "The remaining 42 sample locations were added in 2022 (HGL, 2022) to evaluate the subject area beyond the standard 10-year floodplain conceptual model due to allegations that radiological contamination associated with MED/AEC activities was deposited in areas beyond the estimated 10-year floodplain of CWC (Brustowicz, et al., 2022)."

    Additionally, the sentence on line 9 of page B-9 that begins "Soil sampling beyond the standard conceptual model…" has been modified to read as follows: "Soil sampling beyond the standard 10-year floodplain conceptual model of radiological contamination for properties along CWC was completed due to allegations of MED/AEC-related radiological contamination outside of the estimated 10-year floodplain model area (Brustowicz, et al., 2022)."

MDNR Comments and USACE Responses

1. **General/Abstract: Conclusion and Results.** We provided feedback on previous Jana documents that it would be useful to highlight that the levels of radiation addressed in this report are consistent with background. There is a brief description to this affect in Appendix I (Risk and Dose Assessment) [now Appendix J], but such information should also appear in the abstract and/or main body of FSSE.

   Response 1: The soil sample results for this PDIR-FSSE were compared to the background dataset for the North St. Louis County Sites using the WMW Comparison Test in ProUCL. The test results for Ac-227, Pa-231, Ra-226, Ra-228, Th-228, Th-230, Th-232, U-235, and U-238 indicated these CWC-365 and CWC-386 soil sample results are less than or equal to with background reference area sample results. This information is added as new Section 4.1.2 and new Appendix I. The Abstract and Conclusion sections are revised to include the results of these comparisons showing these CWC-365 and CWC-386 soil sample results are less than or equal to the background reference area sample results.

2. **Abstract, Page ii: Data Collection Method and Dates.** Since sampling on the property has covered a span of four years, please provide a brief discussion to explain how the use of data from this entire range is appropriate.

   Response 2: To address this comment, two mechanisms related to time are considered: COC migration through soil and fresh CWC deposits of contaminated sediment. The Abstract is revised by adding this sentence before the last sentence of the subject box in the Abstract, "Changes in conditions are not expected over extended time periods because the COCs are impeded from migration by attachment to the clayey soil and data show no evidence of fresh deposits of contaminated sediment."

   The following text is added at the end of Section 3.0, "The PDI samples were collected in August through October 2018, June 2019, July 2021, and October and November 2022. In 2022, many new locations were added and existing locations sampled deeper to provide extra assuredness that the soil data would be definitive and comprehensive relative to the concerns being addressed. Changes in conditions are not expected over extended time periods because of the following information.

- "As identified in the *Feasibility Study for the St. Louis North County Site* (FS) (USACE 2003) and the *Site Suitability Study for the St. Louis Airport Site* (DOE 1994), COC migration is naturally impeded by the clayey soil present in North St. Louis County. Experience with investigating and remediating ditches along haul roads has shown that the COCs had remained in soil near the surface for decades.
- "The potential for newer CWC deposits of contaminated sediment is investigated as part of the environmental monitoring program, documented in *Annual Environmental Monitoring Data and Analysis Reports*. In addition, the USACE conducted comprehensive sampling of CWC and its floodplain for deposits following the July 26, 2022, flooding event in the St. Louis area. A separate report has been issued with those results, and no evidence of fresh deposits of contaminated sediment were identified (HGL 2023b)."

In addition, please see the response to MDNR comment 5 for more information on the effort to ensure the subsurface soil sample data were comprehensive.

3. **Abstract, Page iii: Summary for Each Address.** The current formatting of the rightmost column lacks clarity. The "survey unit (SU) ID" and the average of all samples as a fraction of the limit" should be their own distinct columns. It is also unclear what "fraction of the limit" is referring to when referencing the table. Please clarify this columns information presentation.

   Response 3: The rightmost column is separated into two columns. The heading of the rightmost column is revised to state, "Average of SU Samples as a Fraction of the Net Sum of Ratios (SOR_N) RG." The existing footnote 'c' is removed and a new row is added to the table that states, "The SOR_N equations are provided in a footnote to Appendix F of this report. The SOR_N equations are applied to analytical results for each soil sample. The average of the SOR_N calculations for all samples for the SU are presented in the right table column. As a conservative measure, any net value within the SOR_N equation that is less than zero is set to zero. The average SOR_N value for all the CWC-365 and CWC-386 samples using this conservatism is 0.02. However, allowing negative net values yields an average SOR_N value of -0.01 for all these samples, which indicates the dataset is consistent with the reference area background data."

4. **Section 3.1, Page 5, Lines 14-15: PDI Characterization Data Reasoning.** PDI data was used to generate MARSSISM survey units rather than the MARSSIM procedure. Please add information clarifying whether PDI data is of the same nature and provide enough detail to warrant this approach.

   Response 4: The sentence, "Instead of using MARSSIM scoping and characterization surveys to classify the SUs (i.e., MARSSIM Figure 2.4), PDI data are used" was intended to convey a change in terminology, not a change in process. As a long-standing efficiency measure, the USACE has conducted PDIs to serve MARSSIM purposes for scoping surveys and characterization surveys (and remedial designs when contamination is identified). This sentence is revised to state, "The USACE combines MARSSIM scoping surveys and characterization surveys with gathering data to design an excavation when contamination is identified. A design includes layback or sidewall shoring, water management, excavation and transport methods, hazard controls, and restoration. Because the PDI is based on MARSSIM guidelines for scoping surveys and characterization surveys, PDI results are used in classifying the survey units (SUs) (i.e., MARSSIM Figure 2.4)."

5. **Section 3.1.5, Page 7: Clarifying Subsurface Soils and Depth.** Are the depths evaluated adequate to ensure that possible historical fill and deposited soils were reached? The PDIR discusses the historical surveying done which might answer this question. Please include a reference or brief discussion in the main FSSE to explain that the USACE finds the surveying depths sufficient to assess possible historical MED/AEC contamination.

   Response 5: Section 3.1.5 is revised to state, "Subsurface soil was investigated for possible subsurface contamination, including extensions of the investigated depth to more than twice the normal depths for PDI and FSS. Of the systematic stations, 84 percent reached at least 6 ft below ground surface (bgs), with 43 percent reaching at least 16 ft bgs. At biased locations involving historical low-lying areas, the depth reached 24 ft bgs to sample the targeted soil.

   "At least one sample from a 0.5-ft-thick layer of soil was collected from each 2-ft subsurface interval. The 0.5-ft-thick layer of soil with the greatest radiological count rate was selected unless all count rates were relatively uniform. In that case, the deepest 0.5-ft-thick layer of soil was selected. A total of 429 subsurface samples were collected.

   "As discussed in Section 3 of Appendix B, these sampled depths were deeper than any historical ground surface level. No evidence of fill was identified in the soil on the hill plateau where the structures are built. Fill material with a maximum thickness of 5 ft was identified in the southeastern area of the athletic fields and presumably added to level the fields."

6. **Section 4.2, Page 10: Risk Calculations.** Are these risks associated to levels consistent with background radiation on the property? If so, please mention this in the main text discussion of risk and dose.

   Response 6: The following is added before the last sentence of the fourth paragraph of Section 4.2, "As discussed in Section 4.1.2 of this report, the conclusions of the WMW Comparison Tests for the COCs are that the soil sample results from CWC-365 and CWC-386 are less than or equal to the reference area background data. Thus, the risk and dose estimates are essentially estimates for variation in natural background radioactivity."

7. **Appendix C, Page C-2: NUREG-1507 Reference.** The report states that "equations from NUREG-1507" were used to account for count rate variability but provides no direct reference. Please cite the specific equations from NUREG-1507 used within this report.

   Response 7: The subject sentence is revised to state, "…equations 6.2, 6.11, and 6.16 from NUREG-1507…."

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