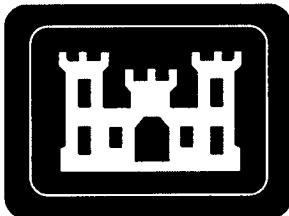

REVISION 0

**POST-REMEDIATION ACTION REPORT
AND FINAL STATUS SURVEY
EVALUATION FOR THE ACCESSIBLE
SOILS WITHIN THE ST. LOUIS
DOWNTOWN SITE VICINITY
PROPERTY THOMAS AND PROETZ
LUMBER COMPANY (DT-10)**

ST. LOUIS, MISSOURI

JULY 12, 2010



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

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ACRONYMS AND 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.

σ	standard deviation
σ_{eff}	effective standard deviation
Δ/σ	relative shift
Ac	actinium
AEC	U.S. Atomic Energy Commission
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ARAR	applicable or relevant and appropriate requirement
bcm	below cover material
bgs	below ground surface
BNI	Bechtel National, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
cpm	counts per minute
CQCP	Contractor Quality Control Plan
DCGL	derived concentration guideline level
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
dpm/100 cm ²	disintegrations per minute per 100 square centimeters
DT-10	Thomas and Proetz Lumber Company
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
FFA	Federal Facilities Agreement
FS	Feasibility Study
FSS	Final Status Survey
FSSE	Final Status Survey Evaluation
FSSP	Final Status Survey Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
GIS	geographic information system
GPS	global positioning system
GWS	gamma walkover survey
HEAST	Health Effects Assessment Summary Tables
HI	hazard index
HISS	Hazelwood Interim Storage Site
HR	hazard ratio
HQ	hazard quotient
LBGR	lower bound of the gray region
Mallinckrodt	Mallinckrodt Chemical Works
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDC	minimum detectable concentration
MDL	method detection limit
MDNR	Missouri Department of Natural Resources
MED	Manhattan Engineer District (U.S. Army Corps of Engineers)

ACRONYMS AND ABBREVIATIONS (Continued)

mg/kg	milligram per kilogram
mrem/yr	millirem per year
NAD	normalized absolute difference
NRC	Nuclear Regulatory Commission
NUREG	Nuclear Regulatory Commission Regulation
OSHA	Occupational Safety and Health Administration
OU	operable unit
pCi/g	picocurie per gram
Pa	protactinium
Pb	lead
PDI	Pre-Design Investigation
PP	Proposed Plan
PPE	personal protective equipment
QA	quality assurance
QA/QC	quality assurance/quality control
QC	quality control
QCSR	Quality Control Summary Report
Ra	radium
RAO	remedial action objective
RAWD	Remediation Activity Work Description
RESRAD	Residual Radioactivity (computer model)
RG	remediation goal
RI	remedial investigation
ROD	Record of Decision
RPD	relative percent difference
SAG	Sampling and Analysis Guide
SAIC	Science Applications International Corporation
SLDS	St. Louis Downtown Site
SOR	sum-of-the-ratio
SOR _G	gross sum-of-the-ratio
SOR _N	net sum-of-the-ratio (background levels subtracted)
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
VP	vicinity property
VQ	validation qualifier
WASD	Work Area-Specific Description
WRS	Wilcoxon Rank Sum

PROJECT ABSTRACT

Site Name	St. Louis Downtown Site Vicinity Property: Thomas and Proetz Lumber Company (DT-10)
Operable Unit	Accessible soil and ground water
Location	St. Louis, Missouri
Regulatory Oversight	U.S. Environmental Protection Agency, Region 7 Missouri Department of Natural Resources
Contractor Oversight	U.S. Army Corps of Engineers, St. Louis District
Remedial Action Contractor	Shaw Environmental, Inc.
Verification Contractor	Science Applications International Corporation
Waste Source	Manhattan Engineer District and the Atomic Energy Commission uranium ore processing and uranium metal production in the 1940s and 1950s.
Contaminants	Radionuclides from the Uranium-238, Thorium-232, and Uranium-235 decay series. Non-radiological metals arsenic and cadmium.
Remediation Method, Quantity, and Dates	Accessible Soil: Approximately 1,995 bank cubic yards of soil were excavated from the property and shipped via rail to properly permitted, out-of-state disposal facility (i.e., EnviroSafe [now US Ecology in Idaho]) from September through October 2003, November 2004 through February 2005, and June 2006. Consolidated Material Surfaces: Consolidated materials (concrete building footers and railroad ties) were encountered during excavation. Remediation of consolidated materials was not required.
Regulatory Requirements/ Remediation Goals (RGs)	See Section 2.1 for Record of Decision requirements.
Results	The remaining accessible soil on DT-10 is releasable for unrestricted use based on a comparison of the soil sampling results, radiological surveys, and risk and dose assessment to the Record of Decision RGs. The highest residual radiological risk calculated for DT-10 is 1×10^{-4} , which met the target risk ¹ range of 10^{-6} to 10^{-4} . The highest residual radiological dose calculated for DT-10 is 6 millirem per year, which is compliant with the dose limit of 25 millirem per year. This potential risk and dose is the highest resulting risk and dose while evaluating each year over the next 1,000 years based on a residential use scenario and does not account for cover material over the remaining excavation surfaces. For non-radiological contaminants of concern, all site concentrations were less than corresponding RGs; therefore, DT-10 meets the <i>Record of Decision for the St. Louis Downtown Sites</i> criteria for toxicity.
Remediation Cost	When all of the projects within the program have been completed, the programmatic costs will be presented in a final closeout report.
Description	DT-10 is a 2.7 acre property owned by the Thomas and Proetz Lumber Company. DT-10 is bordered on the south by Angelrodt Street, on the east by Mallinckrodt Chemical Works Plant 7 South, on the north by Mallinckrodt Chemical Works Plant 7 West, and on the west by Hall Street/Terminal Railroad Association vicinity property (DT-9). The rectangular-shaped property has a frontage of approximately 525 ft east-west along Angelrodt Street and approximately 226 ft north-south along Hall Street. DT-10 is the location of an active lumber milling and distribution facility. Currently, several large lumber storage sheds, a drying kiln, a saw building, a planer building, and a brick office building occupy the property (Shaw 2004a).

¹ When estimating cancer risk, 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) are predicted. These are cancers that may or may not occur, but if they were to occur, they would be in addition to cancers from other causes, such as smoking tobacco. For non-cancer toxicity, a daily exposure level that is likely to be of little risk to people is estimated.

1.0 INTRODUCTION

The *Record of Decision (ROD) for the St. Louis Downtown Sites (SLDS)* (U.S. Army Corps of Engineers [USACE] 1998a) provides the final remedial action for the accessible soil and ground water contaminated as the result of Manhattan Engineer District (MED) and U.S. Atomic Energy Commission (AEC) uranium (U) manufacturing and processing activities at the SLDS. Thomas and Proetz Lumber Company property is defined in the ROD as a SLDS vicinity property (VP) and is designated as DT-10. DT-10 has been subjected to appropriate response actions to address MED/AEC-related contamination.

The response actions described in this report were performed under the Formerly Utilized Sites Remedial Action Program (FUSRAP). FUSRAP was initiated by the AEC in 1974 to identify, remediate, or otherwise control sites where residual radioactivity remains from operations conducted for MED and AEC during the early years of the nation's atomic energy program (USACE 1998a). FUSRAP was continued by the follow-on agencies to the AEC until 1997 when the U.S. Congress transferred responsibility for the execution aspect of FUSRAP from the U.S. Department of Energy (DOE) to the USACE. The DOE will assume a stewardship responsibility beginning two years after completion of the remedial action (RA) at the SLDS.

In June 1990, U.S. Environmental Protection Agency (EPA) Region 7, and the DOE entered into a *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)* Section 120 Federal Facilities Agreement (FFA) (USEPA 1990). In the FFA, the DOE agreed to conduct response actions for the following materials:

- All wastes, including but not limited to radiologically-contaminated wastes, resulting from or associated with MED/AEC uranium manufacturing or processing activities conducted at the SLDS.
- Other chemicals or radiological wastes that have been mixed or commingled with wastes resulting from or associated with MED/AEC uranium manufacturing or processing activities conducted at the SLDS.

The USACE was authorized by Congress as the lead agency for implementation of the Selected Remedy. The remedy was selected by the USACE in consultation with the EPA and with the concurrence of the Missouri Department of Natural Resources (MDNR). The response actions within the scope of this report were managed by the USACE St. Louis District FUSRAP Project Office. These response actions were conducted in accordance with the CERCLA and the FFA. CERCLA response actions include removal actions and remedial actions. Removal actions address environmental contamination that requires remediation prior to a ROD and address environmental contamination that requires short-term planning with relatively immediate risks or threats. Remedial actions address contamination after the ROD is issued and are for larger projects that require more planning. Only remedial actions were conducted on DT-10.

This report specifically documents the series of response actions performed for accessible soil (and consolidated materials uncovered during excavation of accessible soil) at the property described in Section 1.1. Prior to implementing remedial actions, environmental investigations were conducted at this property to aid in characterizing and delineating areas of radiological and non-radiological contamination. When it was determined that remedial actions were complete, a Final Status Survey Evaluation (FSSE) was conducted using procedures compatible with *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)* (Department of Defense [DoD] 2000) guidance to ensure that any residual radioactivity does not exceed the criteria specified in the

ROD. Non-radiological contaminants of concern (COCs) were evaluated against risk-based remediation goals (RGs) specified in the ROD.

Inaccessible soils that contain MED/AEC contamination and the surfaces of buildings and other permanent structures are excluded from the scope of the ROD and will be addressed in a subsequent CERCLA action; therefore, these are not addressed in this report. For DT-10, the soil under four of the permanent building structures was considered accessible for sampling because they had dirt or gravel floors. The soil under the rail spur on DT-10 was also considered accessible for surveys and sampling. The soil under the two remaining building structures on DT-10 is considered inaccessible as shown on Figures A-1 and A-2 in Appendix A of this report.

1.1 PROPERTY DESCRIPTION

DT-10 is a 2.7 acre property owned and operated by the Thomas and Proetz Lumber Company. The general location of DT-10 is depicted in Figure 1. The property is located near the intersection of Hall Street and Angelrodt Street. It is bordered on the south by Angelrodt Street, on the east by Mallinckrodt Chemical Works (Mallinckrodt) Plant 7 South, on the north by Mallinckrodt Plant 7 West, and on the west by Hall Street/Terminal Railroad Association VP (DT-9). The rectangular-shaped property has a frontage of approximately 525 ft east-west along Angelrodt Street and approximately 226 ft north-south along Hall Street. DT-10 is the location of an active lumber milling and distribution facility. The surrounding area is largely a mixture of public, industrial, and commercial facilities with limited residential usage.

The local topography of DT-10 is relatively flat. The upper ground-water unit at the SLDS (the A Unit) consists of fill overlying naturally deposited clays and silts. This shallow unit is not a potential source of drinking water due to poor yield and poor quality (i.e., naturally-occurring high dissolved solids and metal content). The A Unit is underlain by the sandy silts and silty sands of the Mississippi Alluvial Aquifer (the R Unit).

The property is covered primarily with unconsolidated material (gravel). The subsurface soil at DT-10 was characterized to 6 ft deep as primarily sand, silt, gravel, or clay, with cinders, ash, brick fragments, and slag. A clay layer was identified at 3-4 ft below ground surface (bgs) throughout DT-10 per the *Pre-Design Investigation Data Summary Report, Thomas & Proetz Lumber Company Vicinity Property (DT-10)* (Shaw 2004a).

Table 1 contains the address of the property being addressed in this report, the parcel designation established by St. Louis City (STLCITY 2009), and whether the right-of-way (ROW) was included.

Table 1. Addresses, Parcels, and Designations

Address	Parcel	Designation for this Project	ROW Included
3400 N. Hall Street	25400000800	DT-10	No (ROW not included on Hall Street or Angelrodt Street)

1.2 SITE HISTORY AND BACKGROUND

Mallinckrodt, from 1942 until 1957, was contracted by MED and AEC to process uranium feed materials for the production of uranium metal. Residuals of the process, including spent pitchblende ore, process chemicals, and radium (Ra), thorium (Th), uranium and their radioactive decay products, were inadvertently released from the Mallinckrodt Property and into the

environment. From 1942 to 1945, Plants 1, 2, and 4 (now Plant 10) were involved in the development of uranium-processing techniques, uranium compounds and metal production, and uranium-metal recovery from residues and scrap. The DT-10 property became contaminated with radionuclides and metals due to its proximity to Mallinckrodt property used by MED/AEC in the 1940s and 1950s.

1.3 DT-10 INVESTIGATIONS AND RESPONSE ACTIONS

1.3.1 Previous Investigations and Response Actions

Numerous site characterization activities have been conducted at DT-10. These characterization activities were performed under CERCLA and included radiological surveys, radiological sampling, and analysis of environmental media.

A radiological survey conducted in 1977 at the SLDS found that alpha and beta-gamma contamination levels exceeded guidelines for release of the DT-10 property for use without radiological restrictions (ORNL 1981). Elevated gamma radiation levels were measured at some outdoor locations and in some of the Mallinckrodt buildings formerly used to process uranium ore. Ra-226 and U-238 concentrations were found to be significantly above background in subsurface soil. In response to this survey, it was determined that further investigation was necessary to characterize the nature and extent of contamination, and to evaluate potential remedial actions for mitigation of threats to human health and the environment.

Radiological surveys of six SLDS VPs were conducted by Bechtel National, Inc. (BNI) during 1988 and 1989. The VPs investigated included DT-10. The investigations at the VPs included gamma walkover surveys (GWSs) and shallow soil sampling at locations where elevated gamma radiation (twice background) was identified. Additionally, some systematic soil samples were collected (BNI 1989).

A limited radiological soil survey of DT-10 was conducted in 1988 to determine if radioactive materials had migrated onto the property from the Mallinckrodt area and if radioactivity existed in levels above DOE guidelines (BNI 1989). The survey included a GWS, collection and analysis of 33 surface soil samples, and downhole gamma logging. The results from the radiological investigation conducted at DT-10 by BNI indicated the presence of radiological contamination and were reported in the *Report on the Limited Radiological Survey of the Thomas and Proetz Lumber Company Property* (BNI 1989).

In 1998, additional characterization activities were performed at the property for the remedial investigation (RI) and RI Addendum, including analysis of the subsurface soil samples collected (BNI 1994; DOE 1995). During the RI, additional soil sample results indicated radiological contamination on DT-10.

Between March 2001 and December 2003, a Pre-Design Investigation (PDI) was conducted at DT-10 to more accurately delineate radiological soil contamination. The PDI included a GWS, drilling 107 soil borings, excavating three trenches, and collecting 330 soil samples for radiological analysis (Shaw 2004a). The PDI sampling indicated that remediation was required.

1.3.2 Subject Response Actions

Although four interim removal actions have been performed at the SLDS, these did not involve DT-10 and thus are not relevant to this report. The subject response action relevant to this report was the remedial action conducted in accordance with CERCLA and the FFA. A chronology of

significant events associated with the remedial action at DT-10 is summarized in Section 3.1. Remediation activities applicable to DT-10 are described in Section 4.2.

1.4 DESCRIPTION OF OPERABLE UNITS

SLDS has two operable units (OU). The SLDS OU addressed by the ROD and this report is accessible soil and ground water contaminated as the result of MED/AEC uranium manufacturing and processing activities at the SLDS. The second OU is for inaccessible soils and surfaces of buildings and other permanent structures which will be addressed in a subsequent CERCLA action. This report addresses the accessible soils associated with DT-10.

Characterization activities at the SLDS determined that contamination related to MED/AEC activities was present in the soils of Mallinckrodt and some VPs at levels that require remedial action. Much of the contamination resulted from MED/AEC activities while some of the contamination is the result of other industrial processes associated with Mallinckrodt operations and other nearby industries. In addition, other contaminants have leached from the coal slag and cinders used as fill in the area. As agreed to under the FFA, hazardous substances resulting from Mallinckrodt operations for the MED/AEC are the subject of this response action.

2.0 OPERABLE UNIT BACKGROUND

2.1 ROD REQUIREMENTS

The response actions conducted at DT-10 consisted of a single-phased remedial action. In accordance with the ROD, remedial action requirements are discussed below.

2.1.1 Remedial Action

The CERCLA Remedial Action process began with gathering existing information about the site and determining if there is a threat to human health and the environment. An RI was performed to characterize the extent and type of release, and to evaluate the baseline risk to human health and the environment. The results of the investigation were documented in the *Remedial Investigation Report for the St. Louis Site* (DOE 1994). The *Feasibility Study for the St. Louis Downtown Site* (SLDS Feasibility Study [FS]) (USACE 1998b) was developed to evaluate remedial actions.

The following information summarizes the remedial action objectives (RAOs), the selected remedy, the RGs, and applicable or relevant and appropriate requirements (ARARs) that are specified in the ROD.

2.1.1.1 Remedial Action Objectives

RAOs were established early in the CERCLA process for SLDS. The RAOs served as a basis for developing remedial action alternatives for the ROD. The RAOs describe what the remedial action needed to accomplish in order to be protective of human health and the environment. Section 7.1 of the ROD identifies the following RAOs for the SLDS.

- Prevent exposures from surface residual contamination in soil greater than the criteria prescribed in the Code of Federal Regulations (CFR), 40 CFR Part 192.
- Eliminate or minimize the potential for humans or biota to contact, ingest, or inhale soil containing COCs.
- Eliminate or minimize volume, toxicity, and mobility of impacted soil.
- Eliminate or minimize the potential for migration of radioactive materials offsite.
- Comply with ARARs.
- Eliminate or minimize potential exposure to external gamma radiation.
- Remove sources of COCs in the ground water A Unit.
- Continue to maintain low concentrations of COCs in the ground water B Unit.

2.1.1.2 Selected Remedy

The Selected Remedy for SLDS is Alternative 6 from the SLDS FS, Selective Excavation and Disposal. The Selected Remedy addresses accessible soil and ground water contaminated as a result of MED/AEC uranium manufacturing and processing activities at the SLDS. Pursuant to the FFA, response actions also include, "Other chemical or radiological wastes that have been mixed or commingled with wastes resulting from or associated with MED/AEC uranium manufacturing or processing activities conducted at SLDS" (USACE 1998b).

The main components of the Selected Remedy for SLDS consist of the following.

- Excavating all accessible contaminated soils to RGs that support release and dispose off-site at a permitted facility.
- Perimeter monitoring of the ground water in the B Unit will be performed and the need for ground-water remediation will be evaluated as part of the periodic reviews performed for the site. Ground-water monitoring is currently being conducted at the SLDS. The need for ground-water remediation will be investigated as part of Phase II of the Ground-water Remedial Action Alternative Assessment.

The following points were identified in the ROD in selecting this remedy.

- The current land use is generally commercial/industrial with some residences and a recreational bike trail adjacent to the Mississippi River. The closest residential dwelling is located approximately 200 ft southwest of the southwestern corner of SLDS. Zoning regulations prohibit new residences from being established in the area. No significant changes in land use are expected.
- Ground water is not used as a water-supply source. The contaminated shallow ground-water system (the A Unit) is not considered to be a potential source of drinking water due to its poor quality and very low yields. The Mississippi Alluvial Aquifer (the B Unit) is considered to be a potential source of drinking water. However, its use for a drinking water resource is highly unlikely for several reasons, including the industrial setting of the SLDS, the site's proximity to both the Mississippi River and the city's drinking water supply, and its poor water quality (i.e., naturally-occurring high dissolved solids and metal content).
- Approved borrow obtained from an offsite location will be used to backfill excavations.
- The Final Status Survey (FSS) will be compatible with MARSSIM (DoD 2000).

2.1.1.3 Remediation Goals

If the ROD RGs are met, then the property is released for unrestricted use. Table 2 lists the RGs, their applicability to DT-10, and the method for confirming that the applicable RGs are met.

2.1.1.4 Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and the National Contingency Plan §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations, which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121(d)(4).

Applicable requirements are cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a State in a timely manner and that are more stringent than Federal requirements may be applicable.

Relevant and appropriate requirements are cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that are well-suited to the particular site. Only those State standards that are identified in a timely

Table 2. Remediation Goals and Assessment Methods

Media	Specification		Methods
Soil Radionuclide (Results from a 0.5 ft soil interval averaged over 100 m ² .)	Ra-226 ^a	< 5 picocuries per gram (pCi/g) above background for soil less than 0.5 ft	Use sample results to calculate the net sum-of-the-ratio (SOR _N). Calculate area-weighted averages as necessary. Use MARSSIM to determine the required number of systematic samples. A minimum of one sample is obtained for every 100 m ² in Class 1 survey units (SUs). Use Wilcoxon Rank Sum (WRS) test to demonstrate that the SU achieves RGs (if required).
	Th-230 ^a	< 15 pCi/g above background for soil greater than 0.5 ft	
	Ra-228	< 5 pCi/g above background for soil less than 0.5 ft	
	Th-232	< 15 pCi/g above background for soil greater than 0.5 ft	
	U-238 ^a	< 50 pCi/g above background	
	SOR _N ^b	$SOR_N^{depth \leq 0.5 ft} = \frac{(\text{greater of } Th-230_N, Ra-226_N)}{5 \text{ pCi/g}} + \frac{(\text{greater of } Th-232_N, Ra-228_N)}{5 \text{ pCi/g}} + \frac{U-238_N}{50 \text{ pCi/g}}$ $SOR_N^{depth > 0.5 ft} = \frac{(\text{greater of } Th-230_N, Ra-226_N)}{15 \text{ pCi/g}} + \frac{(\text{greater of } Th-232_N, Ra-228_N)}{15 \text{ pCi/g}} + \frac{U-238_N}{50 \text{ pCi/g}}$ SOR _N < 1 when systematic sample results averaged over SU SOR _N < 1 over 100 m ² based on area-weighted average	
Soil Non-Radionuclide	Arsenic: < 60 milligrams per kilogram (mg/kg) in upper 6 feet of soil and < 2500 mg/kg below 6 feet.		Compare sample results to RGs.
	Cadmium: < 17 mg/kg in upper 6 feet of soil and < 400 mg/kg below 6 feet.		
Consolidated Material Surfaces (Results from one location are averaged over 1 m ² .)	Gross alpha	< 600 disintegrations per minute per 100 square centimeters (dpm/100 cm ²) ^c Pass MARSSIM WRS or Sign Test (as applicable)	Use fixed-point survey measurements and statistical (Sign or WRS) test. Use MARSSIM to determine the required number of measurements.
	Gross beta-gamma	< 6,000 dpm/100 cm ² Pass MARSSIM Statistical test (Sign or WRS)	
Dose	Total Effective Dose Equivalent (TEDE) < 25 millirem per year (mrem/yr)		Use sample results as inputs to the Residual Radioactivity (RESRAD) computer model to estimate dose.
Health Risk	10 ⁻⁶ to 10 ⁻⁴		For radionuclides, use RESRAD to estimate risk. For non-radionuclides, use ratios of the highest result to the risk values in Table 6-1 of the ROD.
Toxicity	Hazard Index (HI) < 1 ^d		For each non-radiological COC use exposure point concentrations (EPC), RG, and HI basis for RG to calculate the Hazard Quotient (HQ). Sum HQs over all COCs affecting similar target organ/system to calculate the HI for the target organ/system. Calculate HIs by target organ/system for other COCs.

^a On the portion of the Mallinckrodt property addressed in the OU, site specific target removal levels of 50 pCi/g above background for Ra-0226, 100 pCi/g above background for Th-230, and 150 pCi/g above background for U-238 may be used as the deep-soil cleanup guidelines below 4 feet in most areas with the plant boundaries and below 6 feet as described in Section 7.3.6 of the ROD.

^b In the SOR_N equations, the radioactivity (e.g., Ra-226) is measured as a concentration (i.e., pCi/g). The radioactivity concentration is divided by the RG for that specific radionuclide (e.g., 5 pCi/g for Ra-226). The subscript "N" represents net concentration above background. Background values were determined using 32 samples collected from non-impacted areas near SLDS. The background reference sample data is summarized in Attachment A-3.

^c No RG was specified in the ROD for Consolidated Materials; however, these screening levels were established in the *Final Status Survey Plan (FSSP) for Accessible Soil within Mallinckrodt Property and the Vicinity Properties, Excluding Plants 1, 2, and the City Property at the St. Louis Downtown Site* (USACE 2002a). ROD criteria for consolidated material is limited by the 25 mrem/yr ARAR standard specified in 10 CFR 20 Subpart E (NRC 2002). The stated screening levels are implemented to ensure that the sum of the doses from soil and consolidated materials (i.e., all pathways) does not exceed the 25 mrem/yr standard including the provision that doses must be "As Low as Reasonably Achievable" (ALARA). The specified screening levels were derived in American National Standards Institute (ANSI) 13.12 as contributing a dose of 1 mrem/yr.

^d In cases when the EPC is less than the RG (i.e., hazard ratio (HR) < 1.0, per Section 5.2), no calculation of an HI or HQ is necessary.

Notes:

The ROD lists RG components addressing ground-water monitoring of the Mississippi Alluvial Aquifer (B unit). This aquifer is addressed separately from this report on accessible soil.

The ROD lists an RG component addressing sewer and drain sediments. The sewer system used for MED/AEC processing operations are not located within the boundary of DT-10; therefore soils on DT-10 would not have been impacted by flow from areas with MED/AEC operations. In addition, contaminated surface runoff is unlikely to have significantly impacted any sewers that might be located on DT-10 based on the distribution and concentration of contaminants found in accessible soils on DT-10.

manner and are more stringent than Federal requirements may be relevant and appropriate. The key ARARs for the SLDS, as presented in the ROD, for the selected remedy are listed below.

40 CFR Part 192, Subpart A, Section 192.12(a) is relevant and appropriate: Residual radioactive material concentration of Ra-226 and Ra-228 in land averaged over any 100 m² area shall not exceed the background level by >5 picocuries per gram (pCi/g) averaged over the first 15 cm of soil (6 inches) and 15 pCi/g averaged over 15 cm thick layers of soil >15 cm below the surface.

40 CFR Part 192, Subpart B, Section 192.02(b)(1) is relevant and appropriate: Radon-222 releases will not exceed an average rate of 20 pCi/m³/s or increase the average annual concentration by more than 0.5 pCi/L in air outside the site.

40 CFR Part 192, Sections 192.40 and 192.41 are relevant and appropriate: This regulation was used in developing the thorium cleanup criteria for sites where thorium ores were processed.

40 CFR Parts 257-272 are relevant and appropriate: The selected remedy will comply with 40 CFR Parts 257-272, which establish accountability in handling hazardous waste from generation to disposal.

10 CFR Part 20, Subpart E is applicable: This rule provides consistent standards to Nuclear Regulatory Commission (NRC) licensees for determining the extent to which lands must be remediated before decommissioning of a site can be considered complete and the license terminated.

2.2 PLANNED FUTURE LAND USE

The current land use of DT-10 is commercial/industrial. The current land use of SLDS is generally commercial/industrial with some residences and a recreational bike trail adjacent to the Mississippi River. The closest residential dwelling is located approximately 200 ft southwest of the southwestern corner of SLDS. Zoning regulations prohibit new residences from being established in the area zoned as industrial. No significant changes in land use are expected.

Ground water is not currently used as a water-supply source. The contaminated shallow ground-water system is not considered to be a potential source of drinking water due to its poor quality and very low yields.

2.3 REMEDIAL DESIGN SUMMARY

2.3.1 General

The *Small Area Remediation Work Area-Specific Description* (WASD), *FUSRAP St. Louis Downtown Site* (Shaw 2005) describes the common aspects for all small area remediation activities at SLDS. In general, the remedial design involved excavation of several areas of shallow radiological contamination that had been previously identified, backfill with approved offsite borrow, and surface restoration.

2.3.2 Location-Specific Work Plans and Work Descriptions

The *DT-10 Remediation Activity Work Description* (RAWD) (Shaw 2004a) describes the specific elements of the planned remediation activities required for DT-10. In November 2004, remediation of the five areas of radiological contamination identified in the DT-10 PDI Report was initiated. The areas were located in the north central and northeastern portions of the property; the southwestern and central portions of the property; and the southeastern portion of

the property. Excavated areas were backfilled with clean, USACE-approved, off-site borrow and the asphalt surface replaced as necessary.

2.3.3 List of Documents

Detailed information that form the basis for the design of DT-10 response action activities is contained in the following documents, which are presented in chronological order.

- *Remedial Investigation Report for the St. Louis Site* (January 1994).
- *Remedial Investigation Addendum for the St. Louis Site* (September 1995).
- *Feasibility Study for the St. Louis Downtown Site* (April 1998).
- *Record of Decision for the St. Louis Downtown Site* (October 1998).
- *Small Area Remediation Work Area-Specific Description, FUSRAP St. Louis Downtown Site* (May 3, 2001).
- *Post-Remedial Action Report for the Accessible Soils within the St. Louis Downtown Site Plant 2 Property* (January 2002).
- *Contractor Quality Control Plan, FUSRAP St. Louis Airport/St. Louis Downtown Sites* (February 9, 2004).
- *Pre-Design Investigation Data Summary Report, Thomas & Proetz Lumber Company Vicinity Property (DT-10), Revision 0* (Appendix A.6.1 of the *Small Area Remediation Work Area-Specific Description, Revision 1*) (July 1, 2004).
- *DT-10 Remediation Activity Work Description, Revision 0* (September 28, 2004).

2.4 ROD AMENDMENTS, EXPLANATIONS OF SIGNIFICANT DIFFERENCES, OR TECHNICAL WAIVERS

There have not been any ROD amendments, significant differences, or technical waivers. There was a non-significant change to the ROD issued by the USACE via a Memorandum for Record subject *Non-significant Change to the Record of Decision for the St. Louis Downtown Site* (USACE 2005a). The non-significant change is best described as a clarification of the boundary of the SLDS remedial area. The boundaries were amended to increase the geographical area/scope of the SLDS site to include additional areas (i.e., VPs) to the north, south and west. The addition of the properties to the scope of the ROD represented a small increase in the physical area requiring remediation and a minor change to the estimated remediation volumes and the corresponding project costs. DT-10 was included in the original scope of the ROD.

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3.0 CHRONOLOGY OF EVENTS

3.1 SIGNIFICANT EVENTS

The chronology of events significant to the remedial action at DT-10 is summarized in Table 3. The construction start dates and backfill authorization dates are indicated by survey unit (SU) subsections (i.e., SU-1a, SU-1b-c, SU-1d, etc.), since the remediation was being conducted in parcels to accommodate the property owner. Figure 2 identifies the SUs.

Table 3. DT-10 Chronology of Significant Events

Date Complete	Event
August 27, 1998	Signed <i>Record of Decision for the St. Louis Downtown Site</i> , Final (dated October 1998)
May 3, 2001	Issued <i>Small Area Remediation Work Area-Specific Description</i> , Revision 0
June 19, 2003	Started Excavation, SU-1a
September 22, 2003	Started Excavation, SU-1b-c
July 1, 2004	Issued <i>Pre-Design Investigation Data Summary Report, Thomas and Proetz Lumber Company Vicinity Property (DT-10)</i> , Revision 0
September 28, 2004	Issued <i>DT-10 Remediation Activity Work Description</i> , Revision 0
November 9, 2004	Started Excavation, Area 3, SU-1d
November 15, 2004	Started Excavation, Area 1, SU-1e
November 22, 2004	Started Excavation, Area 5, SU-2a
November 23, 2004	Started Excavation, Area 1, SU-1f
December 1, 2004	Started Excavation, Area 3, SU-1g
December 6, 2004	Started Excavation, Area 4, SU-2b
December 8, 2004	Started Excavation, Area 4, SU-2c
December 14, 2004	Started Excavation, Area 2, SU-2d
December 20, 2004	Started Excavation, SU-1h
December 27, 2004	Started Excavation, Area 4, SU-2e
January 5, 2005	Started Excavation, Area 4, SU-2f
January 17, 2005	Started Excavation, Area 2, SU-2g
February 1, 2005	Started Excavation, Area 2, SU-2h
April 20, 2005	Completed Final Inspection SU-1a through SU-1h and SU-2a through SU-2h
June 1, 2006	Started Excavation, North Strip, SU-1i and SU-2i
June 8, 2006	Verified final SU. Issued final authorization to backfill final SU.
August 24, 2006	Completed Final Inspection SU-1i and SU-2i

3.2 REMAINING EVENTS

As previously described, the remediation of DT-10 is part of the much larger overall SLDS project. When all projects in the program are completed, a Final Closeout Report for the ROD will be developed at the program level. This project-level Post-Remedial Action Report (PRAR) will support that Final Closeout Report. The remedial action specified in the ROD and described in this PRAR addressed accessible soil and ground water. Inaccessible soil and soil attached as residual material on the exterior and interior of buildings and non-building structures will be addressed in a subsequent CERCLA action.

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4.0 DESCRIPTION OF CONSTRUCTION ACTIVITIES

4.1 HEALTH AND SAFETY

Public and worker health and safety are the highest priorities at St. Louis District FUSRAP sites. USACE follows the safety requirements of the U.S. Occupational Safety and Health Administration's (OSHA) *Occupational Safety and Health Standards*, 29 CFR 1910 (OSHA 2006), and USACE's *Safety - Safety and Health Requirements*, EM 385-1-1 (USACE 2003a). The USACE follows the radiation safety requirements of *The Army Radiation Safety Program*, Army Regulation 11-9 (AR 1999).

Specific health and safety requirements for construction and remediation activities were specified in the *Site Safety and Health Plan, FUSRAP St. Louis Airport Site, St. Louis, Missouri/FUSRAP St. Louis Downtown Site* (Shaw 2004d). Also, health and safety requirements for FSS activities were specified in the *SAIC Site Safety and Health Plan St. Louis - FUSRAP Activities* (USACE 2000b). No health and safety problems were encountered during the construction or FSS activities. Personal protective equipment (PPE) was required for personnel who worked on site. The determination of appropriate PPE was made prior to the work effort, and the PPE level was adjusted when necessary to ensure proper protection of workers at all times. Construction safety permits were developed prior to the performance of work that required a permit.

4.2 REMEDIAL ACTIONS

Approximately 2,375 m² of surface area was affected by remediation activities and 1,995 bank cubic yards of radiologically contaminated soil were excavated from DT-10. Figures 3 through 6 depict the as-built drawings of the DT-10 excavation areas, including excavation and final elevation contours. The sequence of remediation activities were generally as follows:

- A civil survey of the location, including utilities and structures was conducted to document original conditions.
- Safety, erosion, surface water, and traffic controls were established as required.
- Paving (if present) was cut and removed, as required.
- Excavation within the work area was conducted to the planned depth. As necessary, the excavation continued when information from radiological surveys and soil sampling identified contaminated soil.
- Soil was transported to the load-out area where it was sampled for COCs to verify the waste profile for off-site disposal. Heavy construction equipment was used to excavate, transport, and load the soil into gondola railcars.
- After completing the excavation, a civil survey documenting the areal extent and depth of the excavation was performed. In addition, preferential pathway analysis was performed and samples were collected if necessary.
- The Verification Contractor performed an FSS of the soil at the bottom of the excavation to confirm whether the RGs had been met.
- If the FSS indicated that the RGs had not been met, additional soil was excavated and transported until a subsequent FSS identified that the remaining soil met the RGs.

- After the FSS indicated that the RGs had been met, backfill with approved off-site borrow was initiated.
- The exclusion and contamination reduction zone postings were removed and traffic controls were established as required for the backfilling operation.
- The excavated areas were restored to conditions agreed upon by the USACE and the property owner and documented on as-built drawings.
- Safety, erosion, surface water, and traffic controls were removed. The remediated locations were released after satisfactory inspection.
- U.S. Department of Transportation classifications (49 CFR 173) were used to determine the disposal facility to which the DT-10 soils were shipped. All waste materials were shipped by rail in accordance with the requirements of 49 CFR 174, *Carriage by Rail*. Waste materials excavated as a result of remedial actions were shipped to U.S. Ecology Idaho (formerly EnviroSAFE of Idaho) in Grand View, Idaho.

4.3 FINAL INSPECTION

The remedial action is complete for accessible soils at DT-10. Final inspections were conducted for the remediated SUs at the conclusion of site restoration and provided closure for the remediation activities at DT-10. The final inspection is documented on the final inspection form and is retained in the Project Files.

5.0 PERFORMANCE STANDARDS AND PROPERTY STATUS

5.1 PERFORMANCE STANDARDS

In accordance with the ROD, mitigation of the exposure pathways of concern and compliance with ARARs provide a framework for media-specific RAOs. The performance results of the remedial action are summarized in Table 4.

Table 5 contains a comparison of RGs and the results of the FSS. The FSS results and the risk and dose assessment demonstrate that DT-10 satisfies the ROD performance standards for unrestricted use.

5.2 POST-REMEDIAL ACTION MEASUREMENTS/VERIFICATION

Verification sampling (i.e., FSS) of each excavated area was conducted by the verification contractor. The FSSE is provided in Appendix A of this report. The FSSE provides detailed information regarding: (1) the survey process for accessible soil and consolidated materials (including the design, methodology, and approach for area-weighted averaging); (2) the assessment of survey results for soil and consolidated materials (including statistical tests and data quality); (3) an assessment of residual risk, dose, and toxicity; and (4) conclusions. As described below, the FSSE demonstrates that the conditions established in the ROD for protecting human health and the environment have been achieved at DT-10.

Post-Remedial Action Measurements/Verification, referred to as the FSS, were performed to demonstrate that the remaining accessible soils on DT-10 could be released for unrestricted use. All FSS activities relevant to radiological contamination were conducted using a MARSSIM-based approach established in the *Final Status Survey Plan (FSSP) for the Accessible Soil within Mallinckrodt Property and the Vicinity Properties, Excluding Plants 1, 2, and the City Property at the St. Louis Downtown Site* (USACE 2002a). FSS activities relevant to both radiological and non-radiological contamination were conducted in accordance with ROD requirements. The FSS at DT-10 included the following activities:

- Collecting systematic and biased soil samples for radiological COCs consistent with MARSSIM and soil samples for non-radiological COCs consistent with applicable EPA requirements;
- Performing GWSs to identify gross radiological contamination and small (relative to the soil sampling grid) areas of elevated activity;
- Comparing both radiological sampling results and non-radiological exposure point concentrations (EPC¹s) (in accordance with EPA methodology (USEPA 1989, 1992, and 2002) to their corresponding RGs to demonstrate compliance with the ROD RGs;
- Calculating risk (non-radiological and radiological) and radiological dose to demonstrate that residual exposures are compliant with the limits specified in the ROD; and
- Performing radiological surveys of designated impacted consolidated materials (e.g., non-soil like material with any one dimension greater than 10 inches, such as asphalt or concrete) consistent with the MARSSIM approach.

¹ The EPC is the concentration from a given medium or route of exposure that is representative of a chemical contaminant (USACE 2005a).

Table 4. Performance Results

Remedial Action Objectives	Selected Remedy Components	Performance Results
Prevent exposures from surface residual contamination in soils greater than the criteria prescribed in 40 CFR Part 192.	Excavate all accessible contaminated soils at SLDS properties to RGs that support unrestricted use and dispose off-site at a permitted facility.	FSS data has confirmed that accessible soils left in place at DT-10 meet RGs that support unrestricted use. Soils excavated from DT-10 were properly disposed off-site at a permitted facility.
Eliminate or minimize the potential for humans or biota to contact, ingest, or inhale soil containing COCs.	Excavate all accessible contaminated soils at SLDS properties to RGs that support unrestricted use and dispose off-site at a permitted facility. Inaccessible soils that contain MED/AEC contamination and associated buildings and structures are excluded from the scope of the ROD. Until a decision is developed to address the ultimate disposition of inaccessible soils, steps will be taken to control uses inconsistent with current uses and to learn of anticipated changes in conditions that might make these soils accessible or increase the potential for exposure.	FSS data has confirmed that accessible soils left in place at DT-10 meet RGs that support unrestricted use. Soils excavated from DT-10 were properly disposed off-site at a permitted facility.
Eliminate or minimize volume, toxicity, and mobility of impacted soil.	Excavate all accessible contaminated soils at SLDS properties to RGs that support unrestricted use and dispose off-site at a permitted facility.	FSS data has confirmed that accessible soils left in place at DT-10 meet RGs that support unrestricted use.
Eliminate or minimize the potential for migration of radioactive materials offsite.	Excavate all accessible contaminated soils at SLDS properties to RGs that support unrestricted use and dispose off-site at a permitted facility. Safety, erosion, surface water, and traffic controls were established as required. Environmental monitoring was conducted to determine if the public and/or the environment (i.e., ground water and surface water) was being impacted by conditions at the site or remedial actions on the site.	FSS data has confirmed that accessible soils left in place at DT-10 meet RGs that support unrestricted use. Environmental monitoring for the FUSRAP in St. Louis has confirmed that radiation safety regulations for the public, workers, and environment have been met during the conduct of this project.
Comply with ARARs.	Excavate all accessible contaminated soils at SLDS properties to RGs that support unrestricted release and dispose off-site at a permitted facility.	Soils excavated from DT-10 were properly disposed off-site at a permitted facility.

Table 4. Performance Results (Continued)

Remedial Action Objectives	Selected Remedy Components	Performance Results
Eliminate or minimize potential exposure to external gamma radiation.	Excavate all accessible contaminated soils at SLDS properties to RGs that support unrestricted use and dispose off-site at a permitted facility. Inaccessible soils that contain MED/AEC contamination and associated buildings and structures are excluded from the scope of the ROD. Until a decision is developed to address the ultimate disposition of inaccessible soils, steps will be taken to control uses inconsistent with current uses and to learn of anticipated changes in conditions that might make these soils accessible or increase the potential for exposure.	FSS data has confirmed that accessible soils left in place at DT-10 meet RGs that support unrestricted use. Soils excavated from DT-10 were properly disposed off-site at a permitted facility.
Remove sources of COCs in the ground water A Unit.	Monitor ground water long-term in selected areas where soils contaminated above RGs are left in place.	FSS data has confirmed that no accessible soils have been left in place at DT-10 with contamination above RGs, thus the source of COCs in the A Unit have been removed.
Continue to maintain low concentrations of OU COCs in the ground water B Unit.	Monitor contaminated ground water that has the potential to degrade adjacent ground-water or surface-water systems.	USACE will continue to monitor SLDS B Unit ground water in the general area as specified in the ROD.

Table 5. Comparison of FSS Results to Remediation Goals

Media	Specification		Results ^a								
Soil Radionuclide (Note: 40 CFR 192 limits area-weighted averaging to any 0.5 ft layer of soil and to 100 m ²)	SOR _N < 1 when systematic samples averaged over SU Sample SOR _N < 1 when averaged over 100 m ²		The average result for each SU was less than the specification: <table><tr><th>SU</th><th>Average SOR_N</th></tr><tr><td>1</td><td>0.21</td></tr><tr><td>2</td><td>0.24</td></tr><tr><td>3</td><td>0.15</td></tr></table> The maximum area-weighted average was SOR _N = 0.66	SU	Average SOR _N	1	0.21	2	0.24	3	0.15
SU	Average SOR _N										
1	0.21										
2	0.24										
3	0.15										
Consolidated Material Surfaces	Gross alpha	< 600 dpm/100 cm ²	The average result for each SU was less than the specification: <table><tr><th>SU</th><th>Average Result</th></tr><tr><td>4</td><td>101 dpm/100 cm²</td></tr><tr><td>5</td><td>167 dpm/100 cm²</td></tr></table> The maximum area-weighted average was 475 dpm/100 cm ² over 1 m ² .	SU	Average Result	4	101 dpm/100 cm ²	5	167 dpm/100 cm ²		
	SU	Average Result									
4	101 dpm/100 cm ²										
5	167 dpm/100 cm ²										
	Gross beta	< 6,000 dpm/100 cm ²	The average result for each SU was less than the specification: <table><tr><th>SU</th><th>Average Result</th></tr><tr><td>4</td><td>1,470 dpm/100 cm²</td></tr><tr><td>5</td><td>1,140 dpm/100 cm²</td></tr></table> All results were less than 6,000 dpm/100 cm ² .	SU	Average Result	4	1,470 dpm/100 cm ²	5	1,140 dpm/100 cm ²		
SU	Average Result										
4	1,470 dpm/100 cm ²										
5	1,140 dpm/100 cm ²										
Health Risk	10 ⁻⁶ to 10 ⁻⁴		Radionuclide: 1x10 ⁻⁴								
Dose	TEDE < 25 mrem/yr		6 mrem/yr								
Toxicity	HR < 1 ^b		All non-radiological HRs < 1.0 ^b								
Soil Non-Radionuclide	Arsenic: < 60 mg/kg in upper 6 feet of soil		The highest result was 46.7 mg/kg								
	Cadmium: < 17 mg/kg in upper 6 feet of soil		The highest result was 1.4 mg/kg								

^a Results shown for non-radiological COCs are the calculated EPCs which are the lowest of the 95 percent upper confidence limit (UCL₉₅) or maximum concentration values.

^b HRs are discussed in Appendix A, Attachment 9 of this report.

After field FSS data were collected, the data for each individual SU were evaluated as follows:

- The non-radiological and radiological data were evaluated in the Quality Control Summary Report (QCSR) to determine if the Data Quality Objectives were met (see Appendix A for additional details regarding this evaluation);
- The GWS and biased radiological sample data were evaluated to resolve any identified areas of elevated residual radioactivity; and
- Systematic soil sampling data (radiological and non-radiological) were evaluated for compliance with ROD requirements, including statistical testing established in MARSSIM and the FSSP.

The primary goal of the FSS is to establish whether the “Null Hypothesis,” which states “residual radioactivity in the SU exceeds the release criterion (i.e., the RG),” is accepted or rejected for a particular SU. There were several evaluations conducted to test the Null Hypothesis.

- Evaluate if the average systematic sample result over the area is less than the RG.
- If there were any sample results greater than the RG (surface, subsurface, systematic or biased), then an evaluation was conducted to determine if the RG is exceeded over any 100 m² area (40 CFR 192.12[a]).

- The Wilcoxon Rank Sum (WRS) test is used in situations where the radiological COCs are present in background and establishes with sufficient statistical probability that the average concentration in the SU does not exceed the RG. The test outcome, if required, must exceed the “critical value” in order to reject the Null Hypothesis and release the SU. See Appendix A, Section A-2.1.2 for further details.
- Evaluate if the radiological risk and dose for the property is less than the requirements for unrestricted use in the ROD. See Appendix A, Attachment 9 for further details.
- Non-radiological results were evaluated to determine if risk for the property met the requirements for unrestricted use established in the ROD. An EPC was calculated for the COC. Then, this concentration was compared to the RGs identified in the ROD. The non-radiological toxicity assessment generally consists of a two-tiered approach that involves the comparisons of site concentrations of COCs to corresponding RGs. See Appendix A, Attachment A-11, page A-9-4, for further details.

5.2.1 Soil Sampling Methods

Soil sampling for the FSS was the primary method used to verify attainment of the RAOs. All samples were collected, shipped, analyzed, and validated as specified in the FSSP and the *Sampling and Analysis Guide (SAG) for the St. Louis Sites* (USACE 2000a).

All soil samples (systematic and biased) were prepared and analyzed using gamma spectroscopy and isotopic thorium analysis via alpha spectroscopy. Metals analysis was also conducted on a limited number of samples for applicable non-radiological COCs. All soil sampling data in Appendix A, Attachment A-4, are presented as “gross” with no subtraction for background soil concentrations. For radiological contaminants, net soil sampling data was calculated by subtracting the mean background value from gross concentrations. Net and gross radiological soil sampling data is summarized for each SU in Appendix A, Attachment A-5. Background was not subtracted from gross soil sampling data applicable to non-radiological contaminants.

Data review and evaluation was performed on 100 percent of FSS analytical radiological and non-radiological soil sample results. Data validation was performed on 10 percent of the FSS analytical soil sample results. The quality assurance/quality control (QA/QC) requirements and results associated with the FSS samples are summarized in Section 6.2. A more detailed evaluation of QA/QC data is included in the QCSR in Appendix A, Attachment A-8.

5.2.1.1 Surface Sampling

Surface samples collected within the limits of an excavation (i.e., excavation surface samples) were collected from the 0-0.5 ft interval at the bottom of the excavation with a stainless steel hand auger, trowels and mixing bowls. All sampling equipment was decontaminated prior to use using manual washing. Surface samples collected in the areas outside an excavation were collected from grade to 0.5 ft bgs. If a sample to be collected occurred in a location where the surface was covered (e.g., asphalt, concrete or gravel), the surface sample was collected from the first 0.5 ft interval below cover material (bcm).

5.2.1.2 Subsurface Sampling

Subsurface soils were sampled (if required by the FSSP) to confirm that no unexpected subsurface radioactive contamination was present. These samples were generally taken at the same locations as the systematic surface samples. The subsurface samples were collected with a stainless steel hand auger, trowels and mixing bowls in a manner similar to surface sampling

conducted during verification. All sampling equipment was decontaminated prior to use by manual washing. Each subsurface sampling hole was abandoned using bentonite.

5.2.2 Gamma Walkover Surveys

The purpose of the GWS is to identify small areas of elevated radioactivity in surface soils, which may not be fully characterized by the statistically located systematic (soil) sample grid. The GWS procedure consisted of walking nearly straight parallel lines approximately one meter (3.28 feet) apart, while moving a 2-inch by 2-inch sodium iodide gamma scintillation detector coupled to a scaler/rate meter in a serpentine pattern.

Data in counts per minute (cpm) was logged automatically from the scaler/rate meter into a global positioning system (GPS) unit every second. All GWS measurements were recorded as "gross" with no subtraction of ambient background radiation. A GPS was used to record gamma measurements and corresponding location data. The data was then downloaded from the GPS unit into a computer file and then into a geospatial software program to plot the results. When satellite reception was poor, not permitting the use of the GPS for logging the GWS data, the GWS data was manually recorded. The GWS results for DT-10 are located in Appendix A (Attachment A-2).

Scan Minimum Detectable Concentration (MDC) values have been established in the FSSE for instruments used to perform the GWS. Locations where elevated GWS results were obtained within the SU were subjected to representative biased sampling as necessary to ensure compliance with ROD RGs.

5.2.3 Biased Soil Sample Collection

Potential biased sample locations for radiological COCs were determined from field measurements (elevated GWS count rates) and geographic information system (GIS) evaluation of GWS data. Locations within the property corresponding to the maximum GWS measurements were selected to be representative of relevant areas within the SU that exhibited elevated count rates. A sufficient number of biased samples were collected to ensure that samples representative of the SU were obtained.

5.2.4 Systematic Soil Sample Collection

Based on a review of site information and data, the accessible soil on DT-10 was classified into two Class 1 soil SUs (SU-1 and SU-2) and one Class 2 soil SU (SU-3) in accordance with the FSSP. Classification is based on the extent of the potential contamination located within the boundaries of each SU. A Class 1 SU is considered to have radiological contamination in soils that exceed the release criteria, and Class 2 area soils are expected to meet or be lower than the release criteria. Class 3 SUs are not expected to have residual radioactivity at levels more than a small fraction of the release criteria. For the area addressed by this document, there were no Class 3 areas. The layout of SUs at DT-10 is presented on Figure 2.

The location of systematic sample stations was based on a triangular grid pattern, extended from a random starting point. Per MARSSIM, triangular grids are generally more efficient for locating small areas of elevated radioactivity. The random-start point for the systematic grids ensures that the sample results are representative of the SU. At least one systematic sample was collected for every 100 m² in Class 1 SUs.

5.2.5 Verification Summary

The conditions established in the ROD for protecting human health and the environment are verified to have been met for DT-10. This conclusion is the result of a comparison of ROD requirements and the current conditions, as presented in Appendix A of this report. The survey results demonstrate that the remaining accessible soils and consolidated materials on DT-10 are releasable for unrestricted use in accordance with the ROD.

5.3 POST-REMEDIAL RISK AND DOSE ASSESSMENT

The remaining accessible soils and consolidated materials on DT-10 are releasable for unrestricted use based on the soil sampling results, radiological surveys, and risk and dose assessment. The highest residual radiological risk that was calculated for DT-10 is 1×10^{-4} , which meets the CERCLA target risk range of 10^{-6} to 10^{-4} . The highest residual radiological dose that was calculated for DT-10 is 6 millirem per year (mrem/yr), which is compliant with the dose limit of 25 mrem/yr. This potential risk and dose was the highest result for the next 1,000 years, was based on a residential scenario, and assumed no cover materials over the remaining soil. For non-radiological COCs, all EPCs were less than corresponding RGs (i.e., all HRs < 1.0); therefore, DT-10 meets the ROD criteria for toxicity.

As indicated above, the FSSE provided in Appendix A of this report contains a residual risk, dose, and toxicity assessment (Attachment A-9). These assessments also indicate the accessible soils on DT-10 are protective of public health and the environment and can be released for unrestricted use.

5.4 PROPERTY STATUS CONCLUSIONS

The results of the analytical data collected under the FSS support the release of the remaining accessible soils on DT-10 for unrestricted use based on a comparison with RGs established in the ROD. Demonstration of compliance with the ROD RGs ensures that the substantive requirements of state and federal ARARs have been achieved.

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6.0 CONSTRUCTION AND ANALYTICAL QUALITY CONTROL

Multiple levels of quality control (QC) were conducted as part of the response actions completed at DT-10. The USACE, as lead agency for the response actions, provided QA/QC oversight of its contractors during construction activities. Also, during construction activities the USACE and its contractors used QA/QC and chain of custody procedures for all investigation, monitoring, sample collection and laboratory analysis conducted as specified in the SAG (USACE 2000a).

MDNR conducted site visits to observe and document the status of the remedial/removal actions and to ensure that environmental monitoring and prevention of contaminant migration was being conducted. Also, MDNR collected samples and reviewed documentation, independently of the USACE, to verify results and ensure that ROD soil RGs were being met. EPA and MDNR regulatory oversight of construction and sampling activities provided an additional level of QA/QC to the response actions at DT-10.

6.1 CONSTRUCTION QUALITY CONTROL

6.1.1 Quality Assurance and Quality Control

QA/QC requirements were specified in the *Contractor Quality Control Plan, FUSRAP St. Louis Airport/St. Louis Downtown Sites* (CQCP) (Shaw 2004c). A goal in the CQCP was to verify that the remedial and construction activities were conducted in accordance with the specified requirements. The *Small Area Remediation Work Area-Specific Description, FUSRAP St. Louis Downtown Site* (Shaw 2005) describes the common aspects for all small area remediation activities at the SLDS. The *DT-10 Remediation Activity Work Description* (Shaw 2004b) describes the specific elements of the planned remediation activities required for DT-10. The objectives to meet the CQCP goal, as set forth in these plans, were met and are summarized as follows:

- The guidelines and requirements as presented in the WASD, RAWD, and CQCP were followed.
- Inspection and verification testing was performed to ensure that remedial and construction activities were performed in accordance with applicable specifications and requirements presented in the WASD, RAWD, and CQCP.
- Design variances that occurred during the remedial and/or construction activities, and the effects of the variances upon the system design and/or performance, were evaluated.
- Complete documentation was prepared and maintained during and after construction/remediation activities to demonstrate that the WASD, RAWD, and CQCP requirements were met.
- Variances to the design included in the WASD and RAWD were documented and authorized by Field Work Variances, which are retained in the project files.

6.1.2 Contamination Control Measures

The following measures were included as required during site remedial actions as a means of controlling contamination:

- Establishing erosion, surface water and traffic controls,
- Establishing an exclusion zone, and a contamination reduction zone, and
- Performing personnel and equipment surveys.

- Additionally, potentially contaminated materials such as disposable PPE were collected and disposed of appropriately.

Environmental monitoring was conducted to measure if the public and/or the environment (i.e., air, ground water, and surface water) were being impacted by conditions at the site or remedial actions on the site. Environmental monitoring for the FUSRAP in St. Louis has confirmed that radiation safety regulations for the public, workers, and environment have been met during the conduct of this project.

6.2 ANALYTICAL QUALITY CONTROL

Analytical QC was performed for samples collected in support of the DT-10 remedial action as outlined in the approved SAG (USACE 2000a). The analytical QC program enables the evaluation of the analytical results to determine whether they are accurate and adequate and to ensure satisfactory execution of the remedial action. In support of analytical QC protocols, all FSS activities were documented in field logbooks that were maintained by USACE Contractors and are included on a compact disc attached to this report.

The FSSE provided in Appendix A of this report provides detailed information regarding data quality, including a QCSR (Attachment A-8).

The overall quality of the project data meets or exceeds the established project objectives. Through proper implementation of the project data verification, validation, and assessment process, project information has been determined to be acceptable for use. Sample data, as presented, have been qualified as usable, but estimated when necessary. Data that have been estimated 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.

The *Department of Defense Quality Systems Manual for Environmental Laboratories* defines allowable marginal exceedances as 10 percent of the total analysis for random anomalies that occur during regular laboratory analysis. As presented in the QCSR, there are 261 total comparisons with 17 exceedances, or 6.5 percent, which is well within the 10 percent allowance. The requirements for this project have been met for 90 percent of the data to be acceptable, which allows for some noticeable trends and randomness of anomalous exceedances between laboratories.

The QCSR demonstrates that project data can withstand scientific scrutiny, are appropriate for its intended purpose, are technically defensible, and are of known and acceptable sensitivity, precision, and accuracy. Data integrity has been documented through proper implementation of QA/QC measures. The environmental information presented has an established confidence, which allows utilization for the project objectives and provides data for future needs.

6.2.1 Gamma Walkover Survey Instrumentation Requirements

6.2.1.1 Calibration Requirements

Instruments used to perform the GWS included a 2 x 2-inch sodium iodide gamma scintillation detector coupled to a Ludlum Model 2221 scaler/rate meter (or equivalent). Current calibration and maintenance records for these instruments are maintained for review and inspection. The records 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.

Instrumentation was maintained and calibrated to manufacturers' specifications to ensure that required traceability, sensitivity, accuracy, and precision of the equipment / instrumentation were maintained. Instruments were calibrated in accordance with American National Standards Institute (ANSI) ANSI N323A-1997 (ANSI 1997).

The GWS scan MDCs are presented in the FSSP as 1.2, 1122, and 40 pCi/g for Ra-226, Th-230, and uranium, respectively.

6.2.1.2 Sodium Iodide Quality Control Source and Background Checks

Prior to, and following daily use, instruments were QC checked by comparing the instruments' responses to a designated cesium-137 gamma radiation source and to ambient background. Prior to the commencement of field operations, a reference location was selected for performance of these checks. QC source checks consisted of a one-minute integrated count with the designated source positioned in a reproducible geometry, performed at the reference location. Background checks were performed in an identical fashion with the source removed.

During the QC checks, instruments used to obtain radiological data were inspected for physical damage, current calibration and erroneous readings in accordance with applicable procedures and/or protocols. Instrument responses to the designated QC check source were evaluated against the average established at the start of the field activities. A performance criterion of +/- 20 percent of this average was used as an investigation action level. All QC checks were within the established performance criteria.

6.2.2 Soil Sampling Requirements

6.2.2.1 Confirmatory Analysis Samples

The primary intent of QA/QC requirements is to evaluate whether data generated from samples can withstand scientific scrutiny, are appropriate for their intended purpose, are technically defensible, and are of known and acceptable sensitivity, precision, and accuracy. To meet project QA/QC requirements, additional soil samples were collected for field duplicate, and independent quality assurance (QA) split purposes. The regular, duplicate and split samples were collected from the same homogeneous mixture of soil.

The USACE memorandum entitled *SAG Implementation Guidance for Interpretation of Quality Assurance Split Program* (USACE 2005b), states that a QA split sample should be collected and analyzed at a frequency of approximately one every twenty samples (5 percent). For radiological analyses, 11 split samples and 11 field duplicate samples were analyzed using both gamma and alpha spectrometry. These represent 4.2 percent of the 261 systematic, biased, and subsurface samples collected on the property which meets the requirement of approximately 5 percent.

A detailed evaluation of the accuracy and precision obtained through the evaluation of split and field duplicate samples is presented in the QCSR located in Appendix A, Attachment A-8 of this report. In summary, for both accuracy and precision, the analytical data met the quality objective of 90 percent acceptability.

6.2.2.2 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 Quality Systems Manual for Environmental Laboratories* (DoD 2006);
- *USACE Kansas City and St. Louis District Radionuclide Data Quality Evaluation Guidance for Alpha and Gamma Spectroscopy* (USACE 2002b); and
- *Data Validation* (SAIC 2006).

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 had been reported and contract specified requirements were met (i.e., analytical holding times, contractual turnaround times, etc.).

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 above 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 affect the usability of the data. Qualifiers were applied to each analytical result to indicate the usability of the data for its intended purpose with a reason code to explain the retention or the qualifier.

6.2.3 Acceptability of the Final Status Survey Design

Per the FSSP, eighteen samples per Class 1 SU were conservatively estimated based on historical results and MARSSIM guidance. In addition, the FSSP required a minimum systematic sample density of one sample per 100 m² in Class 1 SUs. For the Class 2 SU, previous characterization sample data was used for the pre-FSS calculation, indicating that 13 systematic radiological samples were required for DT-10. The determination for the required number of samples is discussed in more detail in Appendix A. Table A-1 in Appendix A of this report contains the number of radiological systematic samples that were collected in each SU.

The actual number of samples collected in each SU exceeded or equaled the required number of samples. In addition, each SU was evaluated using actual verification sample data which indicated that the required number of samples had been collected in each SU to meet the minimum statistical requirements for FSS. Also, all SUs that required WRS testing passed the test; therefore, the data collected for each SU is of sufficient quantity for evaluation to determine compliance with radiological RGs. The WRS test is discussed in further detail in Section A-2.1.2 of Appendix A.

Two systematic samples from DT-10 were also analyzed for the non-radiological COCs. Non-radiological COCs were addressed in this evaluation even though the FSSP did not include the subject property as requiring analysis for non-radiological COCs.

7.0 OPERATION AND MAINTENANCE ACTIVITIES

7.1 DESCRIPTION OF POST-CONSTRUCTION OPERATION AND MAINTENANCE ACTIVITIES

USACE remediated the accessible soils on DT-10 and achieved residual conditions suitable for unrestricted use. Therefore, long-term operation and maintenance is unnecessary.

The ROD states that the goal of the ground-water portion of the selected remedy is to maintain protection of the potentially usable ground water (i.e., the Mississippi Alluvial Aquifer, also referred to as the B Unit) and establish the effectiveness of the source removal action in this regard. In addition, the ROD states that the shallow unit (i.e., the A Unit) is not considered a potentially usable ground-water source. Monitoring of the A Unit ground water will continue to be conducted to assure protectiveness of the final remedy and to verify that ground-water conditions are not degrading. Ground-water monitoring is conducted in the B Unit to demonstrate that there will be no significant impacts from COCs on the Mississippi Alluvial Aquifer. Therefore, USACE will continue to monitor ground water in the general area of SLDS, pursuant to five year CERCLA review, as specified in the ROD.

7.2 POTENTIAL PROBLEMS

There are no problems related to operation and maintenance of the SLDS DT-10.

7.3 DEVIATION FROM FEASIBILITY STUDY/ROD

There were no deviations from the SLDS FS or ROD.

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8.0 SUMMARY OF COMMUNITY INVOLVEMENT ACTIVITIES

The community has been provided with multiple opportunities to be involved with the decision-making process at the SLDS. In 1994, two committees were established for the purpose of working closely with FUSRAP representatives and serving as a "voice of the people." These organizations were the St. Louis Radioactive and Hazardous Waste Oversight Committee and the City of St. Louis Mayor's Advisory Task Force on Radioactive Waste. In 1994, the St. Louis Sites Remediation Task Force (SLSRTF), made up of members from the above-referenced two groups plus other community stakeholders, was established. Working together as the SLSRTF, these organizations studied cleanup activities at the St. Louis Sites and, in 1996, issued a report detailing the community's recommendations for cleanup and removal of MED/AEC contaminants. Eventually, in 1997, the smaller St. Louis Oversight Committee was formed from members of these organizations. These organizations have developed strong working relationships with FUSRAP and have been active participants in the decision-making process. USACE provided quarterly briefings at the St. Louis Oversight Committee meetings, which were open to the public. The USACE maintains a web site with current information about the status of the St. Louis FUSRAP Sites and historical documentation. Newsletters and fact sheets were distributed throughout the community on an as-needed basis.

A public meeting was held at the Henry Clay Elementary School near the SLDS on April 21, 1998, to present the SLDS FS and Proposed Plan (FS/PP) to interested members of the community and to solicit comments on the SLDS FS/PP. A notice announcing the availability of the SLDS FS/PP and the intent to hold a public meeting to discuss the documents was published in the Federal Register and in the *St. Louis Post-Dispatch*. The meeting included an open-house session allowing one-on-one discussions with agency representatives, an informal presentation, and an open microphone question and answer period. A complete transcript of the meeting was kept and provided to individuals upon request. In addition, the transcript of the public meeting and comment period was made available to the public on the USACE's St. Louis District FUSRAP website <http://www.mvs.usace.army.mil/eng-con/expertise/fusrap.html> and was included as part of the Administrative Record. A 30-day comment period for the SLDS FS/PP began on April 8, 1998, and ended on May 8, 1998. Responses to the comments received from the public, and local, state and federal agencies, were provided in the Responsiveness Summary. The detailed responsiveness summary on the FS/PP, including responses to comments received during the public meeting was included in the final ROD, Appendix A. USACE accepted and complied with the public's recommendation for remediation to follow Alternative 6 rather than USACE's preferred Alternative 4.

In August 1998 EPA signed the final ROD developed by the USACE in accordance with Alternative 6. The ROD is available to the public through the Administrative Record maintained at the USACE FUSRAP Project Office, 8945 Latty Avenue, Berkeley, Missouri; at the St. Louis Public Library, Government Information Section, 1301 Olive Street, St. Louis, Missouri; or at Henry Clay Elementary School, 3820 North 14th Street, St. Louis, Missouri. The DOE will assume a stewardship responsibility beginning two years after completion of the RA at SLDS. At that time, the DOE will also assume responsibility for maintaining the Administrative Record.

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9.0 PROJECT COSTS

As previously described, the DT-10 property is one of the sites addressed in the ROD. The calculation of the final cost for the overall SLDS program has not yet been completed. When each of the projects within the SLDS program has been completed, the programmatic costs will be presented in a Final ROD Closeout Report.

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10.0 OBSERVATIONS AND LESSONS LEARNED

No observations or lessons learned were realized upon completion of the remedial action on DT-10.

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11.0 CONTACT INFORMATION

Contact information for the primary project team participants is provided below.

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Remedial Action Contract Number: DACW41-98-D-9006

Verification Contract Number: W912P9-06-D-0534

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Phone Number: (314) 260- 3901

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FIGURES

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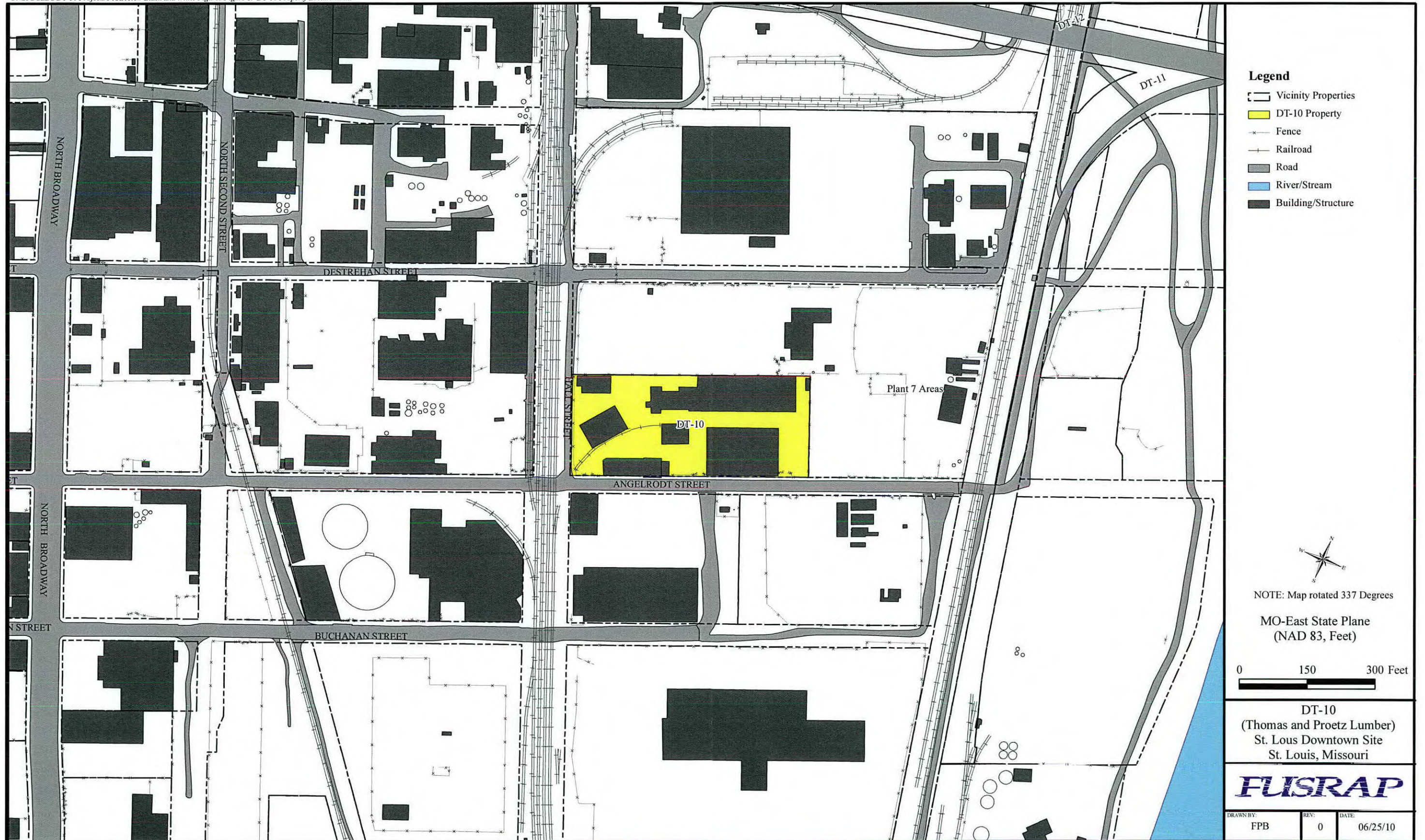


Figure 1. DT-10 Property Location

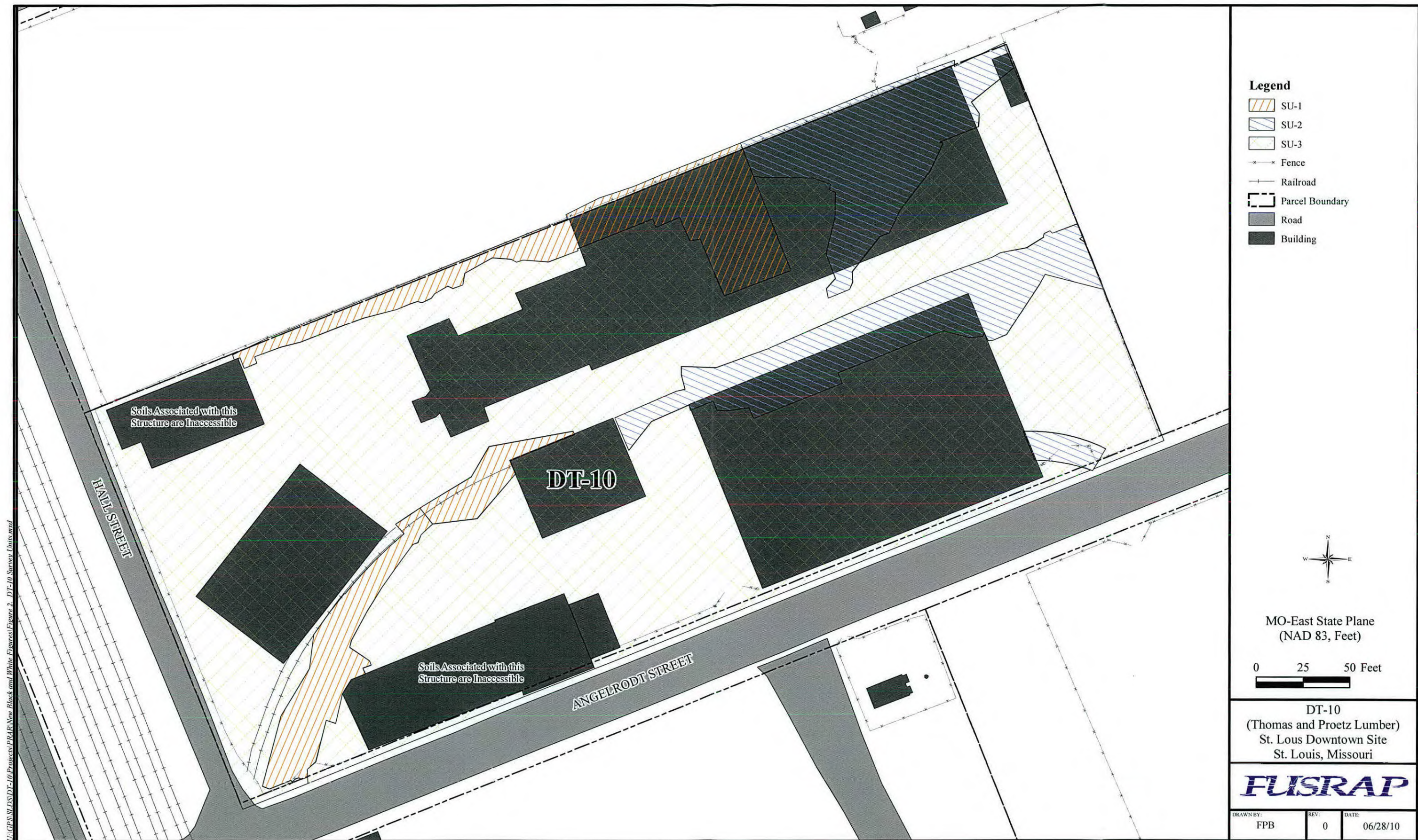
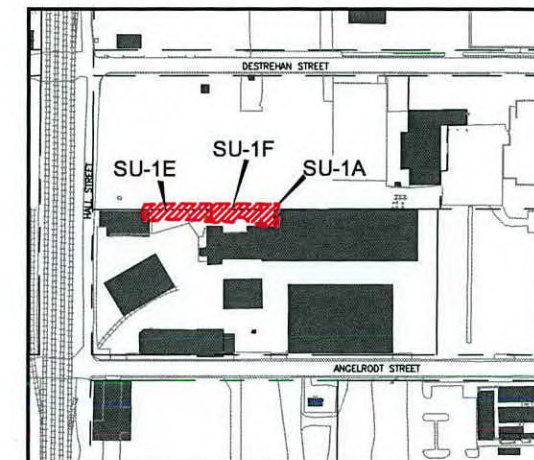
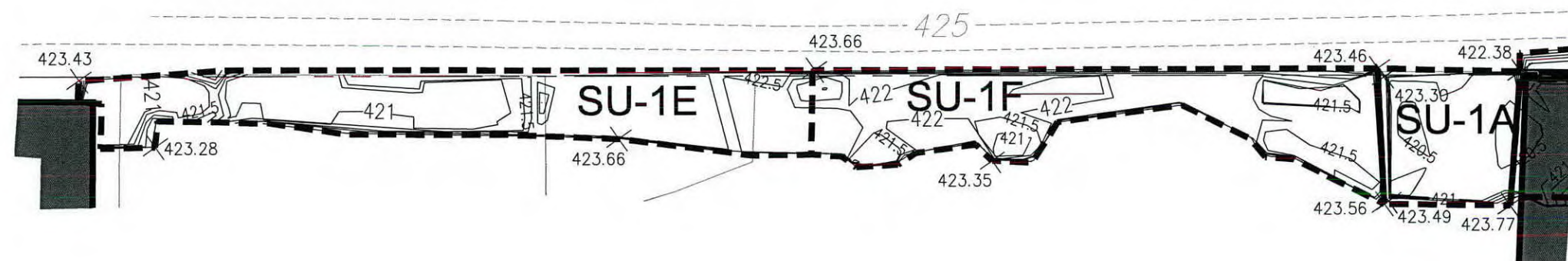


Figure 2. DT-10 Survey Units

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KEY PLAN
NOT TO SCALE

LEGEND:

- APPROXIMATE PROPERTY LINE
- BUILDING OR STRUCTURE (INCLUDING TEMPORARY STRUCTURES)
- 425 — EXISTING GROUND CONTOUR (FEET ABOVE MEAN SEA LEVEL)
- - - - SURVEY UNIT BOUNDARY
- SU-1 SURVEY UNIT ID
- 423 — EXCAVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)



FUSRAP

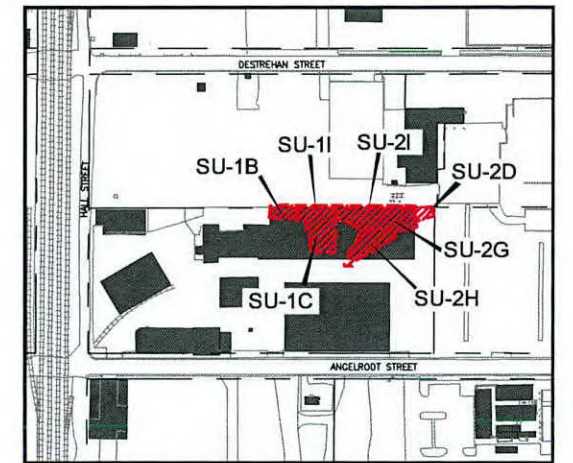
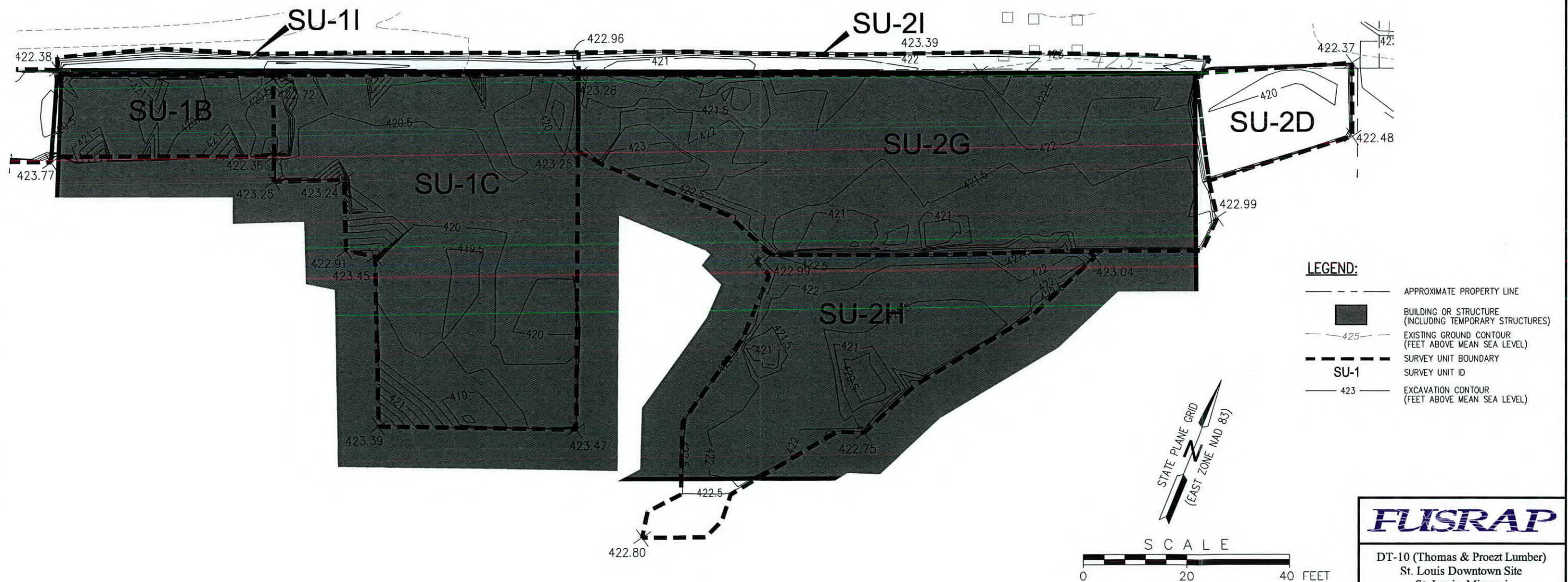
DT-10 (Thomas & Proetz Lumber)
St. Louis Downtown Site
St. Louis, Missouri

DRAWN BY:
F. Bauer

REV. NO./DATE:
7/6/2010

Figure 3. As-Built Excavation/Survey Units:
SU-1A, SU-1E and SU-1F

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KEY PLAN
NOT TO SCALE

LEGEND:

- APPROXIMATE PROPERTY LINE
- BUILDING OR STRUCTURE (INCLUDING TEMPORARY STRUCTURES)
- 425 — EXISTING GROUND CONTOUR (FEET ABOVE MEAN SEA LEVEL)
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FUSRAP

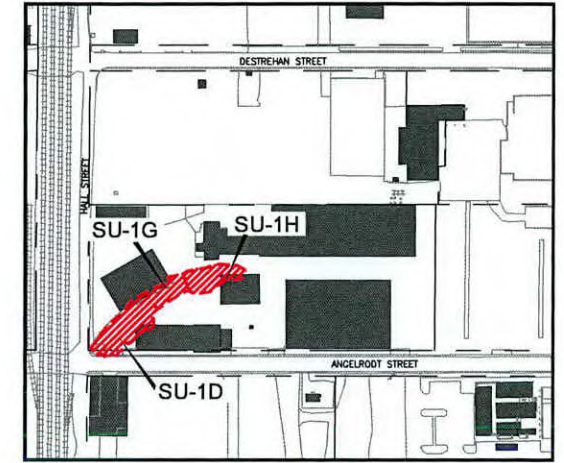
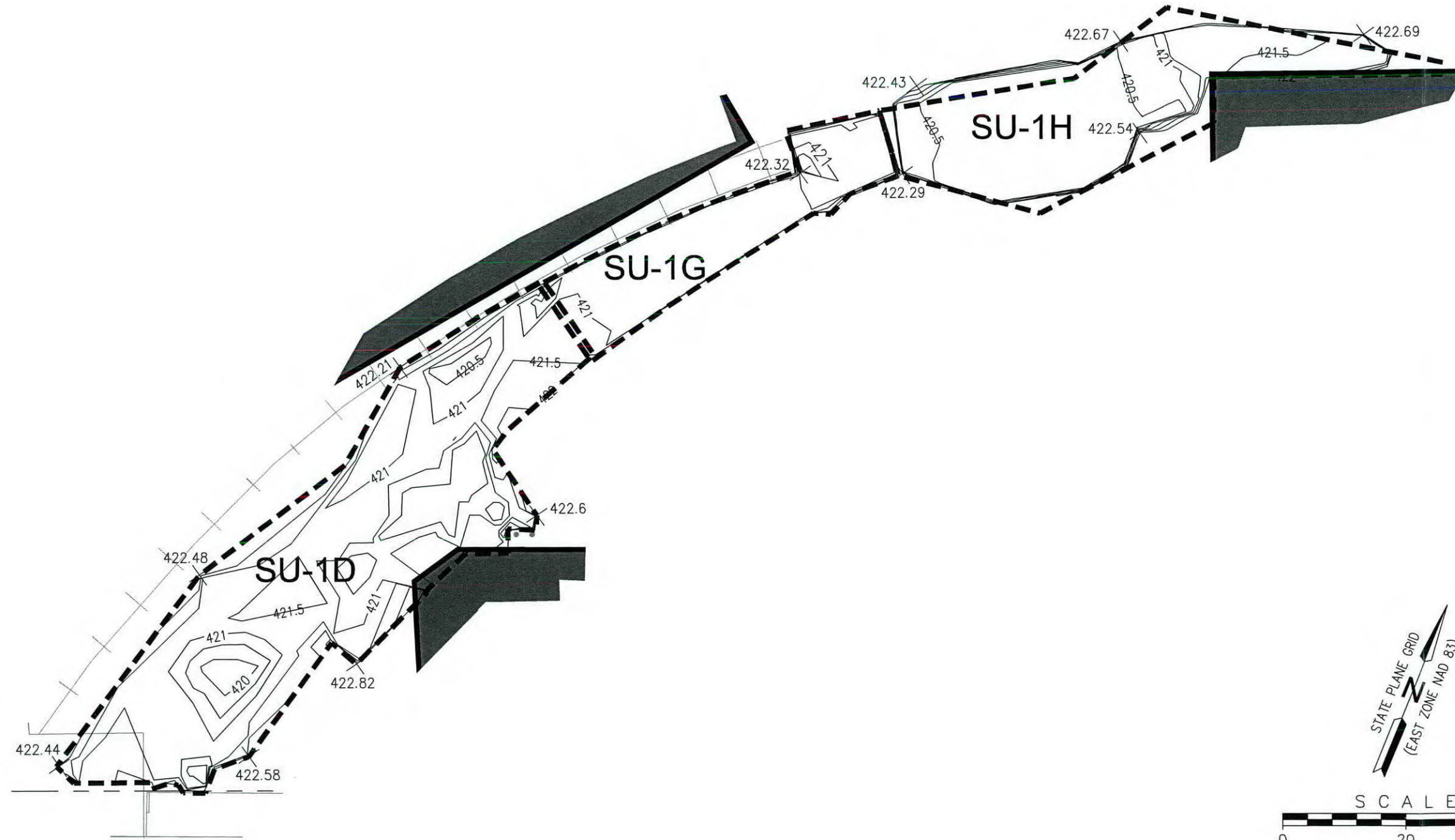
DT-10 (Thomas & Proetz Lumber)
St. Louis Downtown Site
St. Louis, Missouri

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F. Bauer

REV. NO./DATE:
7/6/2010

Figure 4. As-Built Excavation/Survey Units:
SU-1B, SU-1C, SU-1I, SU-2D, SU-2G,
SU-2H, and SU-2I

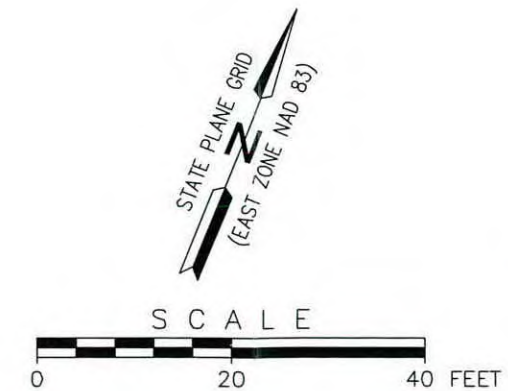
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KEY PLAN
NOT TO SCALE

LEGEND:

- APPROXIMATE PROPERTY LINE
- BUILDING OR STRUCTURE (INCLUDING TEMPORARY STRUCTURES)
- 425 — EXISTING GROUND CONTOUR (FEET ABOVE MEAN SEA LEVEL)
- - - SURVEY UNIT BOUNDARY
- SU-1 SURVEY UNIT ID
- 423 — EXCAVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)



FUSRAP	
DT-10 (Thomas & Proezt Lumber) St. Louis Downtown Site St. Louis, Missouri	
DRAWN BY: F. Bauer	REV. NO./DATE: 7/7/2010

Figure 5. As-Built Excavation/Survey Units:
SU-1D, SU-1G, and SU-1H

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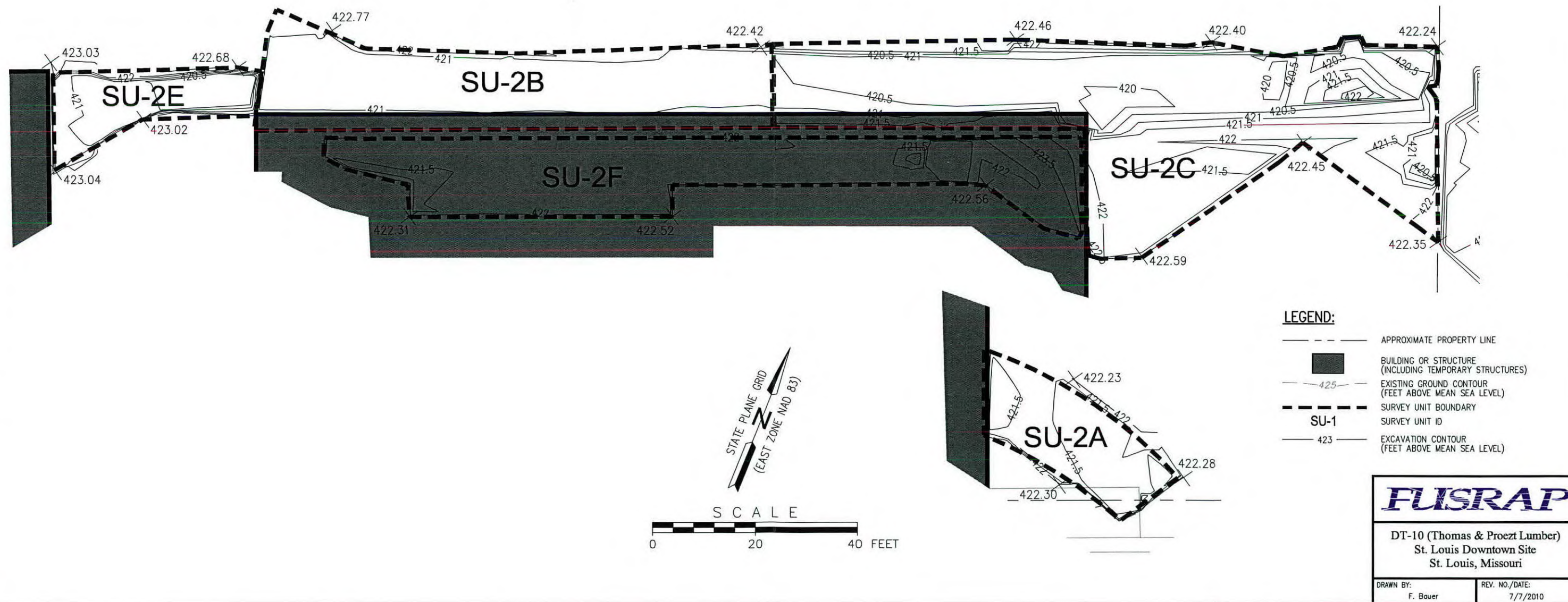


Figure 6. As-Built Excavation/Survey Units:
SU-2A, SU-2B, SU-2C, SU-2E, and SU-2F

APPENDIX A
FINAL STATUS SURVEY EVALUATION

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BACK COVER

*CD-ROM	Attachments A-3, A-4, and A-8, A-9-1, and A-9-2

A-1.0 FINAL STATUS SURVEY PROCESS

A-1.1 DATA QUALITY OBJECTIVES

The Data Quality Objective process is a strategic planning approach for a data collection activity. It provides a systematic procedure for defining the criteria that a data collection design should satisfy, including where to collect samples, how many samples to collect, and the tolerable level of decision errors for the study. The Data Quality Objective process includes the following seven steps from EPA's *Guidance on Systematic Planning Using the Data Quality Objectives Process* (USEPA 2006a):

- State the problem. Inadvertent release of contaminants into the environment.
- Identify the decision. Determine if the remaining accessible soil on DT-10 can be released for unrestricted use in accordance with the ROD.
- Identify inputs to the decision. Radiological and non-radiological sample data for remaining accessible soil.
- Define the study boundaries. Accessible soil on DT-10.
- Develop a decision rule. See Table 2 of the main document.
- Specify tolerable limits on decision errors. The MDC for soil samples should be less than 50 percent of the RG. The MARSSIM evaluation should use decision errors where less than 5 percent of the decisions are falsely negative and less than 20 percent of the decisions are falsely positive. This means that the decision is more likely to conclude contamination is present when it is not, than to conclude that contamination is not present when it is.
- Optimize the design for obtaining data. Property-specific data was used to calculate the number of required samples to be collected.

The FSS data were examined using Data Quality Assessment guidance to ensure two things: (1) that the data met the quality requirements of the FSSP, the *Final Status Survey Plan for Structures and Other Consolidated Material Left in Place at the St. Louis Sites* (USACE 2003b), and the SAG (USACE 2000a), and (2) that the data provided the necessary basis for determining whether the properties can be released for unrestricted use. The Data Quality Assessment involves scientific and statistical evaluations to determine if data are of the right type, quality, and quantity to support the intended use. The Data Quality Assessment process is based on guidance from Chapter 8 and Appendix E in MARSSIM and follows EPA's *Data Quality Assessment: A Reviewer's Guide* (USEPA 2006b). The five steps in the Data Quality Assessment process are listed below and are addressed by the subsequent report sections and attachments.

- Review the FSS design, including Data Quality Objectives.
- Conduct a preliminary data review.
- Select a statistical test.
- Verify the assumptions of the statistical test.
- Draw conclusions from the data.

A-1.2 FINAL STATUS SURVEY PROCESS FOR SOIL

A-1.2.1 Final Status Survey Design for Soil

In accordance with MARSSIM, land areas receiving an FSS should be classified into Class 1, Class 2, or Class 3 soil SUs. The classification is based on their potential for radioactive contamination in soil. Class 1 areas have the greatest potential for contamination, and Class 3 areas have the lowest potential. Per the FSSP, Class 1 SUs are typically limited in size to 2,000 m² plus ten percent, Class 2 SUs are typically limited in size to 10,000 m² plus ten percent, and Class 3 SUs are unlimited in size. MARSSIM states that Class 1 and 2 areas are to be sampled using a systematic grid, and that Class 3 areas are to be sampled using random locations.

Based on a review of site information and data, the remaining accessible soil on DT-10 was classified into two Class 1 soil SUs (SU-1 and SU-2) and one Class 2 soil SU (SU-3). The SUs are shown on Figures A-1 and A-2. In general, excavated areas are Class 1 areas. There were no Class 3 areas identified for DT-10.

The location of systematic sample stations was based on a triangular grid pattern, extended from a random starting point. Per MARSSIM, triangular grids are generally more efficient for locating small areas of elevated radioactivity. The random-start point for the systematic grid ensure that the sample results are representative of the SU.

An important factor in sampling is estimating an appropriate number of systematic samples for the statistical test. Collecting too few samples can result in an inaccurate conclusion that excavation is required. Collecting an excessive number of systematic or random samples diverts resources that could be better used elsewhere. MARSSIM establishes a method for determining the minimum number of radiological samples. The St. Louis District USACE generally collects more than the minimum number of systematic or random samples per the calculations, without collecting an excessive number. In a Class 1 area this is due to the requirement to collect one sample per 100 m². Attachment A-1 contains the detailed process for determining the minimum number of samples.

Table A-1 contains information on the area and the number of samples collected for each SU.

Table A-1. Area and Number of Samples in Each Survey Unit

SU	Area (m ²)	Estimated Minimum Number of Systematic Samples	Number of Systematic Radiological Samples ^a	Number of Biased Radiological Samples	Number of Subsurface Radiological Samples ^b
1	994	18	19	52	26
2	1,380	18	18	36	30
3	8,918	13	18	15	47

^a Systematic samples collected within an excavation were collected from the top 0.5 ft of the excavation surface.

^b Subsurface samples were collected below 0.5 ft of the excavation surface.

A-1.2.2 Final Status Survey Methodology for Soil

FSS sampling of soil involves collecting soil samples at the locations identified in the FSS design. Figures A-1 and A-2 depict the sampling locations. These samples are collected from the top 0.5 ft bgs or within the top 0.5 ft of soil bcm (e.g., gravel). Samples collected in excavation areas are collected from the top 0.5 ft of the excavation surface. All excavations on DT-10 were

greater than 0.5 ft in depth and therefore, subsurface soil criteria were applied to the systematic samples collected in these areas, unless otherwise noted.

Per the FSSP, subsurface soil is sampled to confirm that no unexpected subsurface radioactive contamination was present. These samples are generally taken at the same locations as the systematic surface samples.

- For Class 1 areas, the process for collecting subsurface samples for laboratory analysis starts with removing a soil column that is 1.5 to 2.0 ft in length up to a depth of 6 ft below pre-remediation grade. A scan survey of the soil column is performed. A sample is collected from the highest scanned area (or collected from the bottom of the column if the scanned results are relatively uniform). Subsurface samples taken from the upper 1.5 to 2.0 ft interval and 20 percent of the subsurface samples taken at other intervals undergo laboratory analysis.
- For Class 2 areas, the process for collecting subsurface samples for laboratory analysis starts with removing a soil column that is 1.5 to 2.0 ft long. A scan survey of the soil column is performed. A sample is collected from the highest scanned area (or collected from the bottom of the column if the scanned results are relatively uniform). One-third of the locations should continue this process for each 1.5 to 2.0 ft soil column to a depth of 6 ft bgs.

MARSSIM also recommends performing radiological scans of the ground surface (with any cover material). For Class 1 areas, 100 percent of the area should be surveyed. The size of the area surveyed for Class 2 areas should be 10 to 100 percent (proportional to the potential for finding areas of elevated radioactivity). These radiological scans are called GWSs. The GWSs are used to select biased sample locations as an additional effort to locate areas requiring further investigation and ensure that the systematic samples are representative of the SU. There are no RGs specifying an unacceptable GWS result. Additional information on GWSs is in Attachment A-2.

The biased sample locations determined from the GWS are designated with the "HTZ" prefix and are assigned an area, in square meters, that the sample represents. (The "HTZ" prefix can also be used for biased samples that are taken to bound the extent of contaminated soil, but no areas are assigned to these HTZ samples.) The biased sample locations are shown on Figures A-1 and A-2. GWS based biased samples are generally collected within the upper 0.5 ft of the soil being investigated (i.e., surface soil or excavation surface soil). Some HTZ samples may be taken at greater depths based on field surveys of the surface sample.

Prior to completing the FSS for each soil SU, the SU was inspected for features that could enhance migration of water, and any contamination carried by the water. Examples of such preferential pathways include transport along subsurface utilities, through ash fill, or along clay layers. If a means for potential preferential pathway was identified, a sample was collected for laboratory analysis.

A-1.2.3 Soil Sampling for Area-Weighted Averaging

Area weighting is not required where Class 1 sample net sum-of-the-ratio (SOR_N) values are less than 1.0 because the area represented by each Class 1 sample is compliant with the criteria specified in 40 CFR 192.12(a) (e.g., 100 m²). The radionuclide RGs include averaging sample results that are within a 100 m² area (or less if the SU has an area of less than 100 m²) when some of the sample results in that 100 m² have an SOR_N greater than one. The averaging applies

to 0.5 ft thick layers of soil, so a ground surface sample is not averaged with a subsurface sample. As necessary, biased samples are collected near sample locations having SOR_N greater than one. The sample locations are selected to be within a 100 m² area and to help bound the area represented by the sample with a SOR_N greater than one.

A-1.2.4 Final Status Survey Methodology for Asphalt

The asphalt located on the subject property was added in 1972 (Shaw 2004b) after AEC had closed out its work at Mallinckrodt in 1962 (USACE 1998a). Asphalt was not sampled on DT-10. However, each time an asphalt plug was removed to allow access for sampling the soil underneath the asphalt, a radiation survey of the bottom of the asphalt plug was performed.

A-1.2.5 Final Status Survey Methodology for Non-Radiological Soil Samples

Based on the FSSP, non-radiological samples are not required for DT-10. However, two systematic samples from DT-10 were also analyzed for the non-radiological COCs.

A-1.3 FINAL STATUS SURVEY PROCESS FOR CONSOLIDATED MATERIAL SURFACES

During the excavation process, surfaces of consolidated materials, such as concrete building footings and railroad ties, were unearthed. Per the *Final Status Survey Plan for Structures and Other Consolidated Material Left in Place at the St. Louis Sites*, the surfaces of consolidated materials were surveyed to determine if contamination exceeded standards.

A-1.3.1 Final Status Survey Design for Consolidated Material Surfaces

In accordance with MARSSIM, consolidated material surfaces receiving an FSS should be classified into Class 1, Class 2, and Class 3 SUs. The classification is based on their potential for radioactive contamination on surfaces. Class 1 areas have the greatest potential for contamination, and Class 3 areas have the lowest potential. Per the *Final Status Survey Plan for Structures and Other Consolidated Material Left in Place at the St. Louis Sites*, Class 1 SUs are typically limited in size to 100 m², Class 2 SUs are typically limited in size to 1,000 m², and Class 3 SUs are unlimited in size. MARSSIM states that Class 1 and 2 areas should use a systematic grid to determine the locations of the fixed-point measurements, and that Class 3 areas should use random locations.

Because consolidated materials were unearthed during excavation of Class 1 soil, the surfaces of the consolidated materials were classified into two Class 1 SUs, SU-4 and SU-5. SU-4 and SU-5 consisted of consolidated materials, primarily concrete footings and railroad ties. The scan survey covered 80 m² and 15 m² for SU-4 and SU-5, respectively. The MARSSIM analysis is in Attachment A-1. Fixed-point measurements were taken at 78 systematic locations in SU-4 and 12 systematic locations in SU-5. This achieves MARSSIM requirements as explained in Attachment A-1.

A-1.3.2 Final Status Survey Methodology for Consolidated Materials

The FSS of consolidated material surfaces involves fixed-point measurements of the surfaces at locations discussed above. Alpha-beta scintillation detectors are used for the fixed-point measurements. These detectors provide simultaneous but different sounding audible counts for alpha and beta radioactivity. The gross alpha and gross beta radiation results are each recorded for the fixed-point measurements. Per the FSSP, the fixed-point measurements for each

consolidated materials SU are compared to the surface screening levels for clearance of 600 disintegrations per minute per 100 square centimeters (dpm/100 cm²) total alpha radioactivity and 6,000 dpm/100 cm² total beta radioactivity (USACE 2002a). These guideline values were established by ANSI in the *Surface and Volume Radioactivity Standards for Clearance* ANSI/HPS N13.12–1999 (ANSI 1999).

In addition, MARSSIM calls for biased fixed-point measurements based on radiation scans of the consolidated material surfaces. These biased fixed-point measurements represent an additional effort to ensure that the systematic or random fixed-point locations are representative of the SU by attempting to locate areas requiring further investigation. MARSSIM recommends that radiation scans be performed on 100 percent of Class 1 areas; 10 to 100 percent of the Class 2 areas (proportional to the potential for finding areas of elevated radioactivity); and be based on the professional judgment of the survey supervisor for Class 3 areas (typically about 10 percent of the area).

Structural materials may contain natural radioactivity that would be detected by the fixed-point measurements and scans. However, experience has been that this radiation is insignificant. No surface material background levels of radiation are subtracted from the direct survey measurements.

A-1.3.3 Fixed-Point Measurements for Area-Weighted Averaging

Consistent with ANSI survey protocols (e.g., ANSI N13.12), biased fixed-point measurements are collected near survey locations with radioactivity exceeding the screening levels. The survey locations are selected to be within a 1 m² area and to help bound the area represented by the elevated survey result.

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A-2.0 ASSESSMENT OF FINAL STATUS SURVEY RESULTS

A-2.1 ASSESSMENT OF SOIL SAMPLE RESULTS

A-2.1.1 Radiological Soil Sample Results

The assessment of the radiological soil sample results starts with subtracting natural background radionuclide concentrations from the results. The background reference soil data used in the evaluation of the FSS sample results are summarized in Attachment A-3 from the *Background Soils Characterization for the St. Louis Downtown Site* (USACE 1999). The radiological sample results are reported in Attachment A-4. Attachment A-5 contains summaries of the radiological sample results for each SU, including the SOR_N results. The surface and subsurface RGs were applied as follows to calculate the SOR_N :

- SOR_N using surface RGs: If no cover material was present, then the sample was collected from the upper 0.5 ft of the soil. If cover material was less than 0.5 ft, then the sample was collected from the first 0.5 ft of soil bcm.
- SOR_N using subsurface RGs: The sample was collected from below 0.5 ft of the ground surface.

The soil sample results had an SOR_N less than one or the area-weighted average was less than one. Attachment A-6 contains the area-weighted averaging analysis for all samples with an SOR_N greater than one.

The sample data for each soil SU were evaluated to ensure the average SOR_N of the systematic samples of the SU did not exceed one. From Attachment A-5, the highest average SOR_N for all of the SUs was 0.24.

In addition to a direct comparison to the RGs, MARSSIM recommends that an investigation level be established to investigate results that pass the statistical test, but potentially represent the edge of more significant contamination. MARSSIM identifies the derived concentration guideline level (DCGL), which is an SOR_N of one for this report, as the investigation level for Class 1 and Class 2 areas. Sample results with an SOR_N greater than one underwent area-weighted averaging analysis with other nearby samples. The results are in Attachment A-6. The analysis did not identify any conditions where the RGs were exceeded.

The preferential pathway evaluation for DT-10 identified 16 locations that were sampled. The locations are shown on Figures A-1 and A-2, and the results are in Attachment A-4. The SOR_N for these samples ranged from 0 to 0.73.

A-2.1.2 Statistical Test for Radiological Soil Sample Results

Because background radioactivity is significant for soil, the WRS statistical test is used for soil samples results per MARSSIM. MARSSIM also states that "if the difference between the largest SU measurement and the smallest reference area measurement is less than or equal to the DCGL [i.e., $SOR_G^{max \text{ systematic or random}} - SOR_G^{min \text{ reference}} < 1.0$], the WRS will always show the SU meets the release criterion." From the SLDS reference area data sets, the minimum surface gross sum-of-the-ratio (SOR_G) is 0.53 and the minimum subsurface SOR_G is 0.19.

For all three soil SUs, this difference was always less than one (e.g., for SU-1, $0.86 - 0.19 = 0.67$). Therefore, a WRS test is not necessary for these SUs.

A-2.1.3 Asphalt Survey Results

There were no elevated radiation survey results for any of the asphalt plugs that were removed to allow access for sampling the soil underneath the asphalt.

A-2.1.4 Non-Radiological Soil Sample Results

Non-radiological sample results are contained in Table A-2. The results did not exceed the RGs for arsenic (60 milligrams per kilogram [mg/kg]) or cadmium (17 mg/kg) listed in the ROD.

Table A-2. Final Status Survey Non-Radiological Data

Station Name	Sample Name	Easting	Northing	Arsenic (RG is 60 mg/kg)			Cadmium (RG is 17 mg/kg)		
				Result (mg/kg)	Detection Limit	VQ ^a	Result (mg/kg)	Detection Limit	VQ
SLD77213	SLD77213	908888	1029846	46.7	0.33	=	1.4	0.054	=
SLD78997	SLD78997	908920	1029844	4.4	0.25	=	0.22	0.041	U

^a Validation Qualifier (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.

The maximum results were compared to the risk-based concentrations presented in Table 6-1 of the ROD. The highest arsenic result corresponds to a cancer risk less than 7×10^{-5} and a toxic Hazard Quotient (HQ) of 0.8. The highest cadmium result corresponds to an HQ less than 0.1. Accordingly, these samples did not indicate a human health or environmental danger from non-radiological COCs.

In addition, the primary contribution to risk from uranium at SLDS is from uranium's radiological properties and not its chemical properties. Although uranium also presents a chemical risk to the kidneys and was retained in the ROD as both a radiological and non-radiological COC, the carcinogenic effects of uranium are addressed by comparing site concentrations of uranium to the radiological RGs listed in the ROD. Cleanup of uranium to 150 pCi/g will result in a non-carcinogenic HQ of less than 0.1. Therefore, addressing uranium as a radiological threat reduces the non-carcinogenic effects of uranium to negligible values.

A-2.2 ASSESSMENT OF CONSOLIDATED MATERIAL SURVEY RESULTS

The survey results for consolidated material surfaces are in Attachment A-7. Each total surface activity measurement that was greater than the surface screening levels for clearance was subjected to further evaluation, based on the following:

- Each individual measurement generally should be limited to three times the surface screening levels for clearance and in no case shall exceed ten times the surface screening levels.
- Each elevated area when averaged with the surrounding 1 m² must not exceed the surface screening levels for clearance.
- Items with a surface area less than 1 m² are averaged over the entire surface area and must be less than the surface screening levels for clearance.

All systematic measurements of alpha and beta radioactivity were less than the guidelines of 600 dpm/100 cm² and 6,000 dpm/100 cm², for alpha and beta radioactivity, respectively. All of the biased measurements of beta radioactivity were less than 6,000 dpm/100 cm². Two of the biased measurements of alpha radioactivity were higher than 600 dpm/100 cm², but less than three

times the screening levels for clearance. Attachment A-6 contains the area-weighted average for these results. In each instance, the area-weighted average of these results with other results in a 1 m² area was less than 600 dpm/100 cm².

A-2.2.1 Statistical Test for Consolidated Material Survey Results

For the consolidated material SUs, the radionuclide COCs were either not present in background or are present at such a small fraction of the RGs as to be considered insignificant. As previously discussed, surface material background levels of radiation were not subtracted from the direct survey measurements. In such situations, MARSSIM identifies that the Sign test is the appropriate statistical test. When the largest SU systematic measurement is below the DCGL, the Sign test will always show that the SU meets release criterion. No systematic direct measurement locations exceed the surface screening levels for clearance. Therefore, DT-10 SU-4 and SU-5 do not require the Sign test to show compliance.

A-2.3 DATA QUALITY

QA/QC measures for FSS data are summarized in the FSSP and are presented in the QA/QC sections of the SAG. The QCSR in Attachment A-8 discusses these measures in detail for DT-10. The FSS data met QA/QC requirements.

A-2.3.1 Minimum Detectable Concentration for Soil Samples

Soil samples were analyzed in a laboratory in order to measure the radioactivity at very low levels. In general, the MDC represented the lowest level that the laboratory achieved for each sample given a set of variables including detection efficiencies and conversion factors due to influences such as individual sample aliquot, sample density, and variations in analyte background radioactivity at the laboratory. The MDC was reported with each sample result in Attachment A-4.

In accordance with the FSSP, analytical techniques will provide an MDC of 50 percent of the individual radionuclide RGs for Ra-226, Th-230, and U-238. These MDC limits are in Table A-3. All of the FSSE samples met the MDC requirements.

Table A-3. Minimum Detectable Concentration Limits

Radionuclide	MDCs*	
	Surface Soil (pCi/g)	Surface Soil (pCi/g)
Ra-226	2.5	7.5
Th-230	2.5	7.5
U-238	25	25

* Actual MDCs were generally on the order of 0.1 pCi/g

As discussed in MARSSIM, the reported radionuclide concentrations from the laboratory were used in this FSSE even if those results were below the MDC. These data were used to complete the MARSSIM evaluation and assess the risk and dose for the SUs.

A-2.3.2 Radiological Detection Sensitivity for Consolidated Material Surveys

Field instrumentation was calibrated annually and checked daily during use against a known radiation source. The result of the source check must be within 20 percent of the known value. In addition, daily field performance checks were conducted in accordance with instrument use

procedures. The performance checks were conducted prior to initiating the daily field activities, upon completion of daily field activities, and if the instrument response appeared questionable.

The field radiation detection survey instruments (and their functional and performance specifications) used during the surveys are listed in Table A-4 below. Detection sensitivities were determined following the guidance of *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*, Nuclear Regulatory Commission Regulation (NUREG)-1507 (NRC 1998) and are derived in the FSSP and the *Final Status Survey Plan for Structures and Other Consolidated Material Left in Place at the St. Louis Sites*. The sensitivities presented were derived using typical instrument parameters and are below the screening levels for surveys of consolidated materials.

Table A-4. Radiological Field Instrument Detection Sensitivity

Description	Application	QA Metric	Detection Sensitivity
Ludlum Model 2360 with a Ludlum Model 43-89 (zinc-sulfide plastic scintillator)	Alpha fixed-point measurement	$\leq 600 \text{ dpm}/100 \text{ cm}^2$ (goal 60-300 dpm/100 cm ²)	Mean: 120 dpm/100 cm ² Max: 250 dpm/100 cm ² Min: 50 dpm/100 cm ²
	Alpha surface scan	≥ 0.85 Probability ^a at 1 in/sec	Mean: 0.95 Probability ^a at 1 in/sec Max: 1.0 Min: 0.83
	Beta fixed-point measurement	$\leq 6,000 \text{ dpm}/100 \text{ cm}^2$ (goal 600-3,000 dpm/100 cm ²)	Mean: 900 dpm/100 cm ² Max: 1,150 dpm/100 cm ² Min: 600 dpm/100 cm ²
	Beta surface scan	$\leq 6,000 \text{ dpm}/100 \text{ cm}^2$	Mean: 1,600 dpm/100 cm ² at 1 in/sec Max: 2,350 dpm/100 cm ² at 1 in/sec Min: 1,050 dpm/100 cm ² at 1 in/sec

^a The probability of detecting a single count of alpha radioactivity when scanning an area with surface contamination of 480 dpm/100 cm² (80 percent of the guideline). Probability greater than or equal to 0.85 is the goal.

A-3.0 RESIDUAL RISK AND DOSE ASSESSMENT

A property-specific residual risk and dose assessment was performed for DT-10 in accordance with the ROD to confirm that conditions are protective of human health and the environment. The ROD established the CERCLA target risk range as the risk RG and the dose limit of 25 mrem/yr as the dose RG for SLDS. The EPA defines the CERCLA target risk range as 10^{-6} to 10^{-4} where "the upper boundary of the risk range is not a discrete line at 10^{-4} . A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions" per memorandum OSWER 9200.4-18, *Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination* (USEPA 1997a).

The risk and dose scenario for the ROD is based on the industrial worker and utility worker exposure scenarios defined in the FS. The assessment for DT-10 was performed for each of these scenarios. In addition, an on-site residential scenario was considered at the request of regulators.

CERCLA recommends a lifetime exposure assessment period of 30 years for individuals under a residential exposure scenario. 40 CFR 192 Subpart A requires a 1,000 year exposure assessment scenario that takes into account the risk posed by residual levels of long-lived radionuclides and the in-growth of their decay products. This is the period of time over which achievement of the cleanup standard must be reasonably assured.

Section C.2.1.3 of the FS states "To estimate a dose or risk, the appropriate exposure parameters, the source term (concentrations of radionuclides), and other variables such as depth of contamination and distribution coefficients are selected to provide conservative yet realistic estimates of exposure." This means that the actual risk and dose received by an individual from MED/AEC material on these properties will be lower than the estimates in this assessment. Additionally, the protection provided by clean backfill within the excavation area is not reflected in the estimates. This is another example of how the actual MED/AEC-related risk and dose will be lower than the estimates provided in this assessment.

The results of systematic, biased, and subsurface samples were used in the residual risk and dose assessment. The risk and dose estimate is provided in Table A-5. More information on how these values were calculated is provided in Attachment A-9.

Table A-5. Risk and Dose Estimate

Scenario	Period Assessed (years)	Maximum Risk*	Maximum Dose (mrem/yr)
Industrial Worker	0 to 1,000	3×10^{-5}	1
Utility Worker	0 to 1,000	6×10^{-8}	0.08
On-Site Resident	0 to 1,000	1×10^{-4}	6
On-Site Resident with 6 inches of cover**	0 to 1,000	6×10^{-5}	3

* Maximum risk assumes the worst case scenario such that receptors are in direct contact with residual soils, without regard to any clean cover.

** Six (6) inches of cover or equivalent was placed on all excavated areas thus this represents on-site resident with cover.

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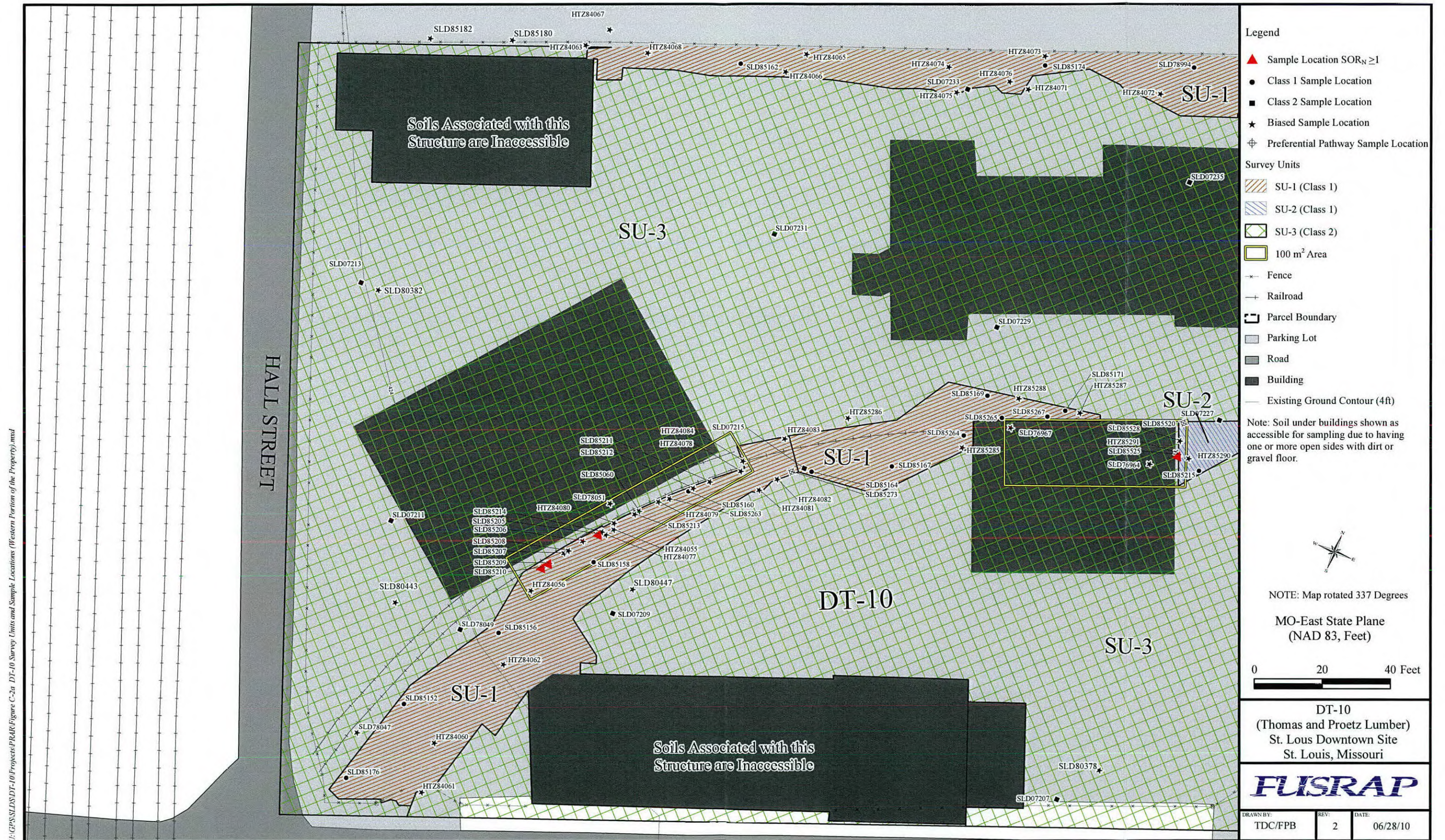
A-4.0 CONCLUSIONS

The conditions established in the ROD for protecting human health and the environment have been met for the remaining accessible soil on DT-10. This conclusion is the result of a comparison of ROD requirements and the current conditions. The survey results and the risk and dose assessment demonstrate that the remaining accessible soil is releasable for unrestricted use in accordance with the ROD. Table 4 in the main body of this report contains the comparison of results to the RGs.

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APPENDIX A
FIGURES

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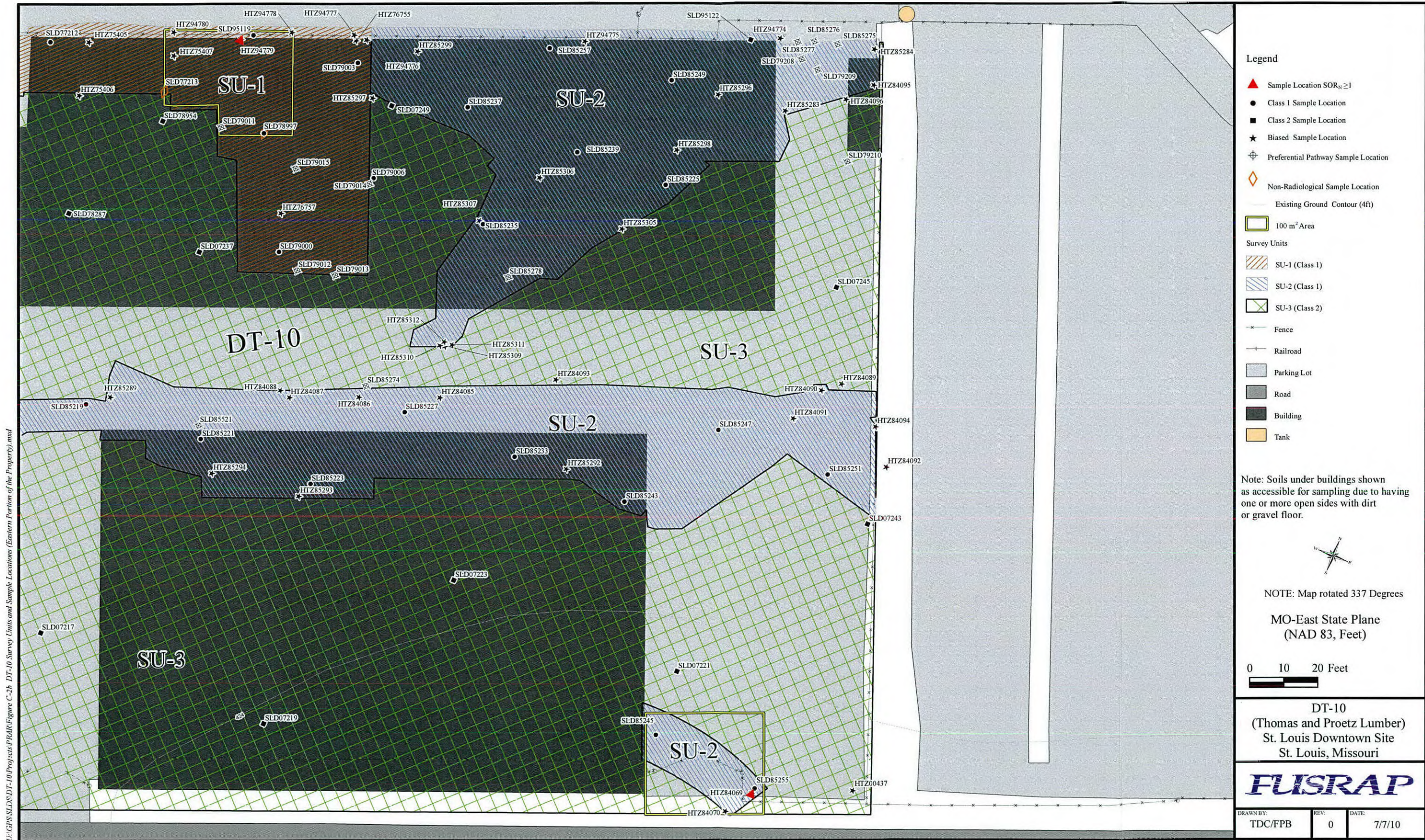


Figure A-2. Survey Units and Sample Locations (Eastern Side)

ATTACHMENT A-1

ESTIMATION OF THE MINIMUM NUMBER OF SYSTEMATIC SAMPLES

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ESTIMATION OF THE MINIMUM NUMBER OF SYSTEMATIC SAMPLES

FOR RADIOLOGICAL SOIL SURVEY UNITS

To ensure that sufficient data was collected to meet the minimum statistical requirements (i.e., WRS test) for each soil SU, MARSSIM provides guidance on estimating the minimum number of samples. The necessary parameters for calculating the minimum number of samples and their values are:

- 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.
- Type II error probability (probability of a false decision that the radionuclide RGs are not met when they actually are met)—normally set at 0.20, within an allowed range of 0.05 to 0.25, per the FSSP.
- DCGL—set at $SOR_N = 1.0$ per the ROD.
- 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 sample results from the SU, and using a σ_{eff} based on samples taken previously from other SUs within the SLDS.
- Lower bound of the gray region (LBGR)—set based upon engineering estimates for the SU per MARSSIM. Examples include using the mean SOR_N calculated from characterization or screening samples in the SU, and using half of the DCGL as an arbitrary, but 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 and 3, with up to 4 being acceptable.

The Class 1 SUs were remediated in small sections to accommodate the property owner's continuing operations. The boundaries of each of the two Class 1 SUs were initially estimated based on the remedial design. Eighteen samples per Class 1 SU were conservatively estimated based on previous results of FSSs at SLDS. This established the grid spacing used for the Class 1 SUs. A review of Ra-226 to Th-230 ratios resulted in the conclusion that additional samples were not required for the identification of potential small areas of elevated activity in Class 1 areas.

Initially for the Class 2 SU-3, the calculation was performed using an assumed LBGR of 0.5 and a calculated σ_{eff} using characterization data. This resulted in a minimum number of samples of 13 for SU-3. Since the number of characterization samples in SU-3 that were potentially usable for MARSSIM statistics was more than the minimum required, valid characterization data could also be used as FSS data.

As an additional check to ensure sufficient samples were taken, the calculation of the minimum number of samples was retrospectively calculated for each SU using the σ and mean SOR_N calculated from the systematic sample results. An example of these calculations using SU-1 FSS data is presented below.

The first step in determining the number of samples to support the WRS test was to determine the σ_{eff} . The specific σ values for SU-1 are: 2.05 for Ra-226; 1.66 for Th-230; 0.48 for Th-232;

and 4.81 for U-238. Using these values, an σ_{eff} was calculated using subsurface RGs since backfill after remediation results in all of these samples being subsurface.

$$\sigma_{eff} = \sqrt{\left(\frac{\sigma_{Ra-226}}{DCGL_{Ra-226}}\right)^2 + \left(\frac{\sigma_{Th-230}}{DCGL_{Th-230}}\right)^2 + \left(\frac{\sigma_{Th-232}}{DCGL_{Th-232}}\right)^2 + \left(\frac{\sigma_{U-238}}{DCGL_{U-238}}\right)^2} = \sqrt{\left(\frac{2.05}{15}\right)^2 + \left(\frac{1.66}{15}\right)^2 + \left(\frac{0.48}{15}\right)^2 + \left(\frac{4.81}{50}\right)^2} = 0.20$$

The next step was to calculate the Δ/σ .

$$\frac{\Delta}{\sigma} = \frac{DCGL - LBGR}{\sigma_{eff}} = \frac{DCGL - SOR_N^{mean}}{\sigma_{eff}} = \frac{1.0 - .21}{0.20} = 3.9$$

The final step was to use Equation 5-1 in MARSSIM to determine that the minimum number of systematic surface samples required for SU-1 was six.

The process presented above was repeated for the remaining SUs using actual SU data. For SU-3, an σ_{eff} was calculated using surface RGs even though some samples were taken 0.5 ft bcm. Table A-1-1 lists the actual number of systematic surface samples collected and the minimum number of systematic surface samples for each soil SU. A sufficient number of samples were collected from each SU.

Table A-1-1. Minimum Number of Samples for Each Soil Survey Unit

SU	Class	Minimum Number of Samples per MARSSIM Calculation		Minimum Number of Samples for Class 1 Areas Based on 1 per 100 m ²	Number of Systematic Samples Collected
		Prospective	Retrospective		
1	1	18	6	10	19
2	1	18	5	14	18
3	2	13	8	N/A	18

FOR CONSOLIDATED MATERIALS SURVEY UNITS

An equivalent calculation is required to determine the minimum number of systematic fixed-point surveys for consolidated material SUs. Initially, since SU areas were remediated in sections to accommodate the property owner, a systematic fixed-point survey was taken in approximately each 1 m² area to ensure sufficient data points were collected.

Similar to the soil SUs, retrospective calculations of the minimum number of samples were performed for the consolidated material SUs. Table A-1-2 lists the calculated minimum number of systematic fixed-point surveys and the actual number of systematic fixed-point surveys performed in each SU. A sufficient number of systematic fixed-point surveys were performed in each SU.

Table A-1-2. Minimum Number of Fixed-Point Surveys for Each Consolidated Material Survey Unit

SU	Class	Prospective (about 1 per 1 m ²)	Minimum Number of Systematic Fixed-Point Surveys per MARSSIM Calculation (Retrospective)	Number of Systematic Fixed-Point Surveys Performed
1	1	About 80	8	78
2	1	About 15	8	12

Note: MARSSIM does not require retrospective calculations using actual SU data to be adjusted to get the Δ/σ between one and four.

ATTACHMENT A-2
GAMMA RADIATION WALKOVER SURVEY

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GAMMA RADIATION WALKOVER SURVEY

Many radioactive contaminants can be identified through field detection methods such as surface gamma radiation scans. (Field detection methods are generally not available for detection of non-radioactive contaminants, which solely rely on laboratory analysis of field samples.) While radioactive contaminants that emit gamma radiation can be detected through radiation scans, the contaminants are not the only radioactivity that may be detected. The gamma scans detect radiation from both naturally-occurring sources and environmental contamination, and both are present in the GWS results.

GWS is a qualitative tool that can help locate radioactive contamination. However, elevated GWS readings do not in and of themselves provide a definitive indication that the RGs are exceeded. There are no RGs specifying an unacceptable GWS result. Where there are higher levels of naturally-occurring radioactivity, higher GWS readings will occur even though the RGs are met. Such readings can be thought of as false positive results. Representative biased samples are collected and analyzed in a radioanalytical laboratory to investigate areas identified during the GWS. These areas are investigated to ensure the RGs are met in those areas. Unlike the GWS, the analytical laboratory can quantitatively identify radionuclides for comparison to the RGs.

Before starting the GWS, the professional health physics technicians established the relative background radiation level in cpm for the specific survey area with the survey instrument being used. During the GWS, the technicians assessed the count rates displayed on the instrument and the associated audible click rates to identify locations (by paint or flag) from which representative biased samples should be obtained. The identified locations had radiation readings that typically exceeded the relative background radiation levels by 2,000 cpm or higher. Then, professional health physicists reviewed the results of the GWSs and defined locations from which any additional representative biased samples were collected.

This review considered count rates, mathematical analysis of the count rates, existing systematic and biased sample information in the vicinity of the area(s) of interest, increased radiation from materials with higher concentrations of natural-occurring radioactivity (such as granite, brick, some concrete, and coal or coal ash), increased radiation from soil located horizontal to the surveyed surface (such as in an excavation or next to a hill or mound), attempts to duplicate higher count rates, and experience with variations in the radiation readings of soil. As an example of the wide variation of naturally-occurring radioactivity in soil, the laboratory results for soil samples collected to establish background levels for SLDS identified some samples with isotopic concentrations that were nearly twice of the average background results.

In all, 114 biased samples were taken for the FSS based on the GWS. *All of these biased samples met the RGs.* Overall, this is a high number of GWS-based samples for a property of this size. In addition, two samples were collected during the PDI near location SLD07280. These samples were collected to investigate the red data points that appear to be slightly southeast of the sample due to known variability in the GPS. These sample results are included in Attachment A-4.

The GWS figures were developed by using a GIS. The GWS results in count rates and the location coordinates were translated into maps of colored data points. The range for the colors was calculated using the mean and σ of the count rate from each GWS, with a factor to account for the level of cpm that the surveyors can distinguish from general levels. The factor is calculated using equations from the NRC's *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*, NUREG 1507 (NRC 1998).

Since MARSSIM identifies that environmental data does not generally fit a normal distribution and uses non-parametric tests, Chebyshev's Inequality was used for setting the ranges of the colors for the GWS data. The 85th and 95th percentile of the data were 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 for the σ was calculated for each GWS file using Chebyshev's Inequality. To achieve the 95th percentile of the data, a 3.15 factor for the σ was calculated using Chebyshev's Inequality. A factor to account for the level of cpm that surveyors can distinguish from general levels was added to these percentile values to determine the color set points for each GWS file.

The area represented by red on the GWS figures indicates an area of interest. 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 example, HTZ84079 is representative of the red data points to the south of that sample.

Data points from every GWS, including pre-excavation GWSs, are present in the GIS. Each GWS is contained in a separate electronic file. In some cases, some of the information in an older GWS file is from soil that was excavated. This outdated information no longer represents an FSS. A new and final GWS of the excavated area was performed after the excavation was completed. In these cases, the area with new GWS information replaced the equivalent area on the older GWS figure. The GWS is a composite figure of data collected over time. Figures A-2-1 and A-2-2 present the GWS results for the western and eastern areas of DT-10, respectively.

The GPS used for the GWSs has inherent variability in identifying location coordinates. Some of the GWS and samples may be or appear to be outside the subject property or SU boundary due to structural interferences, samples being taken in the sloped wall of an excavation, and/or variance in the GPS and the GIS. Some sample station coordinates were obtained at a time different than the time that the GWS was performed and the sample locations were painted or flagged. Thus, samples and their corresponding elevated GWS readings may have different coordinates and may be separated by several feet on the figures when in reality they are in the same location. Use of a GPS during the GWS of the eastern portion of the site was not always possible due to satellite signal interference (e.g., buildings). The manual GWS for the eastern portion of the site is shown on Figure A-2-2.

The GWS instruments and their detection sensitivities are listed in Table A-2-1 below. Detection sensitivities were determined following the guidance of NUREG 1507, and are derived in the FSSP. The sensitivities presented were derived using typical instrument parameters and are well below the RGs for soil, with the exception of Th-230. Since Ra-226 and Th-230 are commingled, Ra-226 was used as a surrogate for Th-230. For each SU, the ratio of Ra-226 and Th-230 was confirmed to be high enough for Ra-226 to be a surrogate for Th-230 so Th-230 would be identified at levels below its RG.

Field instrumentation was calibrated annually and source checked daily during use. In addition, daily field performance checks were conducted in accordance with instrument use procedures. The performance checks were conducted prior to initiating the daily field activities, upon completion of daily field activities, and if the instrument response appeared questionable.

Table A-2-1. Radiological Field Instrument Detection Sensitivity

Description	Application	Detection Sensitivity ^{a, b}	
Ludlum Model 2221 with a Ludlum Model 44-10 (2" x 2" sodium iodide gamma scintillation detector)	Gamma scans of ground surface and cover material	Ra-226	1.2 pCi/g
		Th-230	1,120 pCi/g
		U-natural	40 pCi/g

Note:

Field instrumentation is calibrated annually.

^a Isotopic detection sensitivity is based on radiological characteristics of that isotope. The presence of other co-located radionuclides tends to significantly increase the sensitivity to some radionuclides due to the detection of surrogates.

^b Scan MDCs shown in the table were calculated for areas without surface cover (i.e., rock, asphalt, concrete, etc.) based on increased knowledge of site-specific parameters.

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ATTACHMENT 2
FIGURES

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SLDSDT-10/Project/PRAR/Figure A-2.1 DT-10 Gamma Walkover Survey Weighted Mean Rev.1.mxd

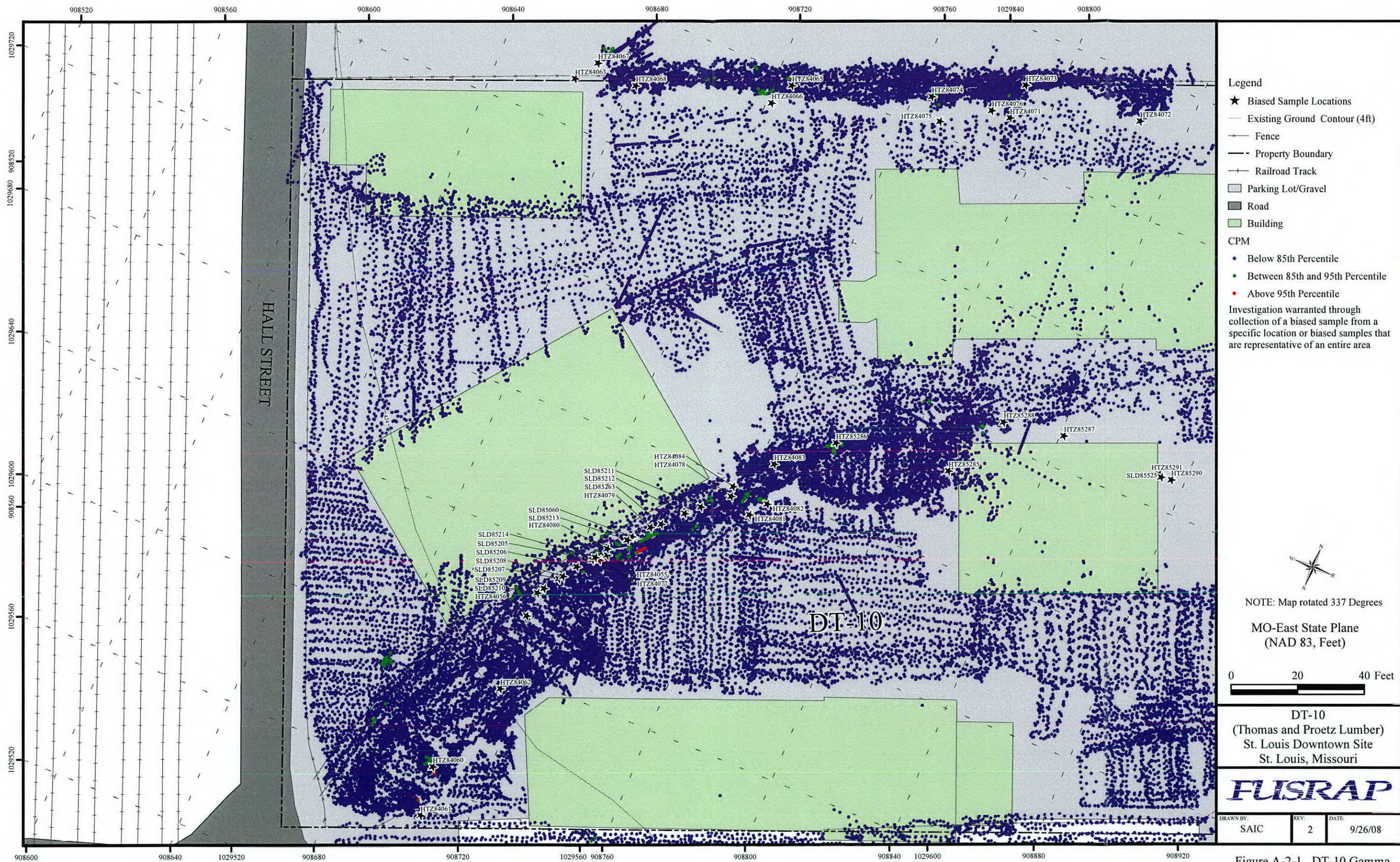
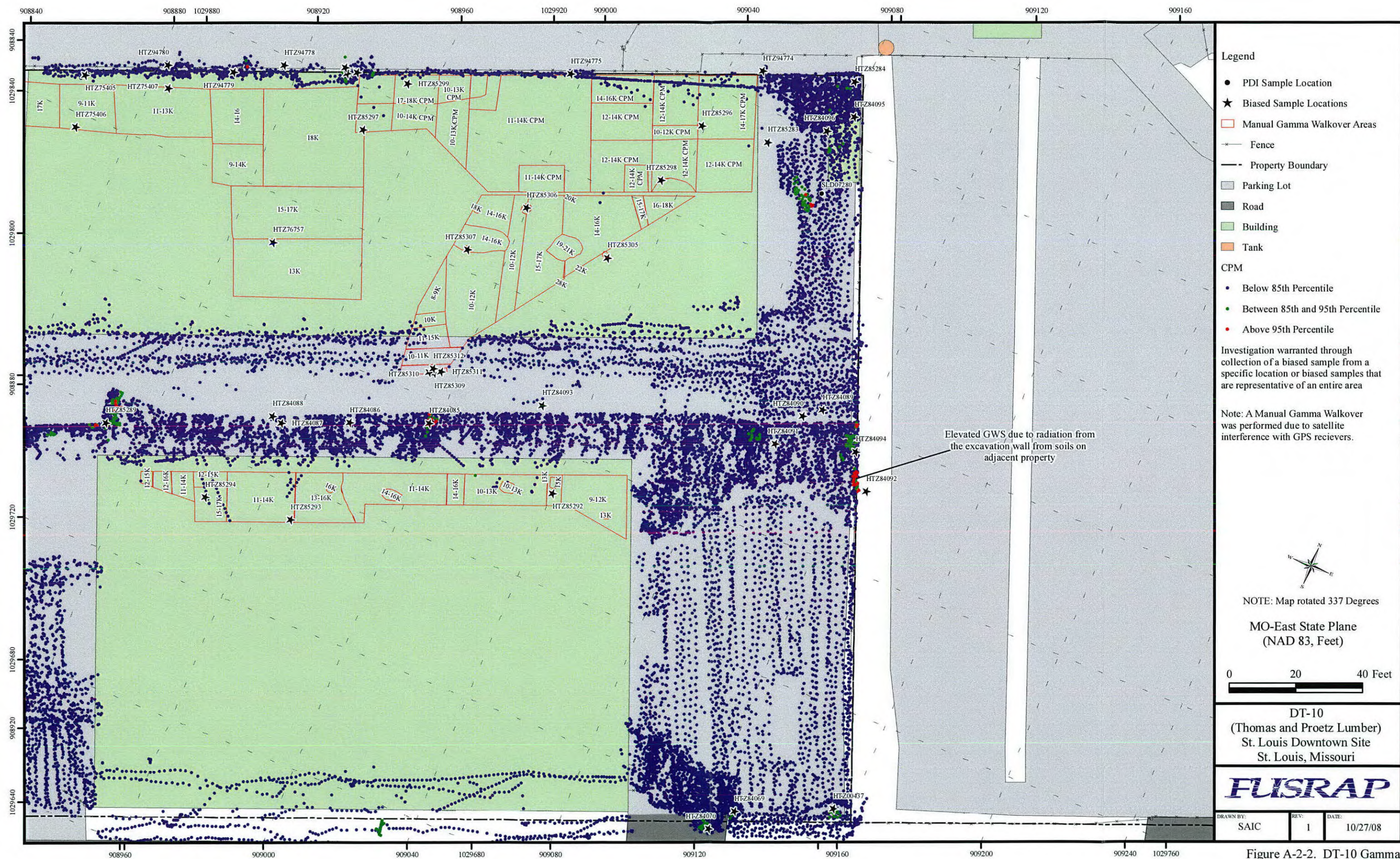


Figure A-2-1. DT-10 Gamma Walkover Survey (Western Side)



ATTACHMENT A-3
BACKGROUND REFERENCE SOIL SAMPLE DATA
(On the CDROM on the Back Cover of this Report)

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Table A-3-1. Background Reference Soil Data

Background Reference Soil Data Summary (32 Samples)											
Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	Surf. SOR _G	Sub. SOR _G
Mean	0.14	0.89	2.78	0.95	1.16	1.94	1.09	0.10	1.44	0.82	0.29
Median	0.11	0.98	2.53	0.97	1.10	1.66	1.07	0.09	1.16	0.76	0.27
Std. Dev.	0.14	0.76	0.89	0.17	0.35	0.76	0.29	0.08	0.75	0.21	0.08
Maximum	0.70	2.34	5.46	1.28	2.10	4.15	1.68	0.31	3.78	1.48	0.54
Minimum	-0.10	-0.21	1.53	0.46	0.51	0.96	0.43	-0.02	0.59	0.53	0.19
Range	0.80	2.55	3.93	0.82	1.59	3.19	1.25	0.33	3.19	0.95	0.35

Background Reference Soil Sample Results											
Statistic	Ac-227	Pa-231	Ra-226	Ra-228	Th-228	Th-230	Th-232	U-235	U-238	Surf. SOR _G	Sub. SOR _G
SLD00001	0.18	0.62	1.94	0.97	1.29	2.07	1.11	0.25	1.66	0.67	0.25
SLD00002	-0.03	2.34	2.39	1.03	1.08	1.67	1.12	0.00	0.61	0.71	0.25
SLD00022	0.36	1.33	2.56	1.17	1	1.83	1.49	0.24	1.38	0.84	0.30
SLD00023	0.29	0.95	2.26	0.76	0.51	2.80	1.23	0.00	1.17	0.83	0.29
SLD00041	0.16	-0.09	2.48	0.84	0.77	1.98	1.13	0.17	1.57	0.75	0.27
SLD00042	0.70	-0.02	3.02	1.07	1.14	2.24	1.05	0.00	1.80	0.85	0.31
SLD00043	0.28	2.07	2.59	0.99	1.24	2.69	1.68	0.11	1.15	0.90	0.31
SLD00044	0.13	1.65	3.46	1.03	1.06	1.16	1.33	0.00	0.90	0.98	0.34
SLD00061	0.10	1.23	3.11	1.08	1.02	2.67	1.43	-0.01	1.47	0.94	0.33
SLD00062	0.12	1.36	2.59	1.28	1.29	1.91	1.59	0.11	0.94	0.85	0.30
SLD00063	0.15	2.12	2.11	1.03	1.01	1.61	0.70	-0.02	0.74	0.64	0.22
SLD00081	0.24	0.98	2.44	0.96	1.46	1.47	1.30	0.12	1.05	0.77	0.27
SLD00082	0.06	1.19	2.89	1.28	2.1	1.97	1.17	0.18	1.28	0.86	0.30
SLD00083	0.20	0.98	2.33	0.88	1.6	1.94	0.69	0.11	0.59	0.65	0.23
SLD00101	0.15	1.01	4.24	0.79	1.12	3.05	0.90	0.22	3.12	1.09	0.41
SLD00102	0.06	1.42	3.53	0.86	1	3.11	1.41	0.08	2.53	1.04	0.38
SLD00103	0.08	1.30	3.08	0.81	0.54	1.46	0.92	0.05	1.69	0.83	0.30
SLD00121	0.17	-0.10	3.31	0.87	1.27	2.25	1.34	0.31	1.84	0.97	0.35
SLD00122	0.09	0.42	2.68	0.85	1.69	1.46	0.94	0.06	1.13	0.75	0.26
SLD00123	0.23	0.25	3.51	1.02	1.23	1.33	0.94	0.06	1.17	0.93	0.33
SLD00141	0.16	-0.21	5.46	1.04	1.4	4.15	1.56	0.07	3.78	1.48	0.54
SLD00142	0.08	0.33	5.30	1.12	1.74	3.61	1.04	0.16	3.15	1.35	0.49
SLD00143	0.19	0.02	2.33	0.96	1.5	1.45	1.02	0.05	0.93	0.69	0.24
SLD00144	0.10	0.01	2.04	1.10	1.51	1.48	1.25	0.17	1.61	0.69	0.25
SLD00161	0.10	0.11	1.53	0.86	1.38	1.56	1.01	0.10	1.11	0.54	0.19
SLD00162	0.04	2.01	2.07	1.04	0.73	1.35	0.86	0.12	1.00	0.64	0.23
SLD00181	0.03	1.13	2.24	0.73	0.94	1.34	0.78	0.00	0.91	0.62	0.22
SLD00201	0.06	1.74	2.40	0.86	1.07	1.64	1.08	0.10	1.15	0.72	0.26
SLD00202	-0.10	1.73	2.67	0.97	0.88	1.62	0.78	0.05	1.11	0.75	0.26
SLD00241	0.01	-0.04	2.04	0.46	0.87	1.28	0.43	0.11	1.70	0.53	0.20
SLD00242	0.07	0.42	2.50	0.89	0.8	1.05	0.80	0.00	0.92	0.70	0.24
SLD00243	0.03	0.37	1.97	0.65	0.84	0.96	0.90	0.08	0.86	0.59	0.21

Notes:

Results are expressed in pCi/g; sum of ratios (SOR) values are unitless.

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

Ac - actinium

Pa - protactinium

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ATTACHMENT A-4
FINAL STATUS SURVEY SOIL SAMPLE DATA
(On the CDROM on the Back Cover of this Report)

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Table A-4-1. Final Status Survey Soil Sample Data

SU	Station Name	Sample Name	Easting	Northing	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238			
					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	Result	Error	MDC
1	HTZ75405	HTZ75405	908861	1029852	U	0.56	0.26	0.50	U	0.42	1.44	2.26	=	7.53	0.33	0.19	=	1.22	0.17	0.20	=	2.10	0.82	0.17	=	6.55	1.73	0.17	=	1.97	0.79	0.17	U	0.72	0.67	1.13	=	17.48	3.80	2.90
1	HTZ75406	HTZ75406	908865	1029836	U	0.28	0.32	0.53	U	1.44	1.77	2.55	=	5.06	0.29	0.14	=	1.27	0.19	0.23	=	2.50	0.97	0.55	=	4.60	1.41	0.19	=	1.32	0.65	0.19	U	0.99	0.76	1.18	=	14.17	3.42	3.21
1	HTZ75407	HTZ75407	908886	1029857	U	0.30	0.25	0.42	U	0.84	1.13	1.88	=	2.92	0.19	0.18	=	1.44	0.17	0.18	=	1.49	0.60	0.14	=	2.46	0.81	0.14	=	1.94	0.70	0.14	U	0.27	0.47	0.81	UJ	1.96	1.89	2.40
1	HTZ76755	HTZ76755	908934	1029882	U	0.65	0.47	0.75	UJ	1.09	2.05	3.24	=	7.79	0.42	0.28	=	4.96	0.38	0.27	=	4.30	1.05	0.28	=	7.09	1.46	0.13	=	3.61	0.94	0.13	UJ	0.47	0.87	1.46	=	9.20	4.11	4.06
1	HTZ76757	HTZ76757	908933	1029826	UJ	0.16	0.33	0.53	UJ	-0.35	1.49	2.57	=	6.82	0.36	0.22	=	1.01	0.19	0.24	=	1.92	0.69	0.36	=	6.41	1.43	0.14	=	0.95	0.47	0.14	UJ	0.38	0.65	1.11	=	6.47	2.99	2.97
1	HTZ84055	HTZ84055	908728	1029644	=	0.46	0.12	0.36	UJ	0.49	0.71	1.03	=	6.44	0.17	0.09	=	1.06	0.08	0.09	J	0.93	0.47	0.30	=	5.60	1.41	0.14	=	0.91	0.45	0.14	=	1.22	0.27	0.49	=	20.25	1.45	0.84
1	HTZ84056	HTZ84056	908713	1029618	=	0.47	0.11	0.30	U	1.32	0.64	0.98	=	5.16	0.15	0.08	=	0.90	0.07	0.08	=	1.46	0.57	0.23	=	10.01	2.09	0.12	J	0.78	0.40	0.12	=	0.82	0.25	0.44	=	13.11	1.07	0.71
1	HTZ84060	HTZ84060	908704	1029565	UJ	0.10	0.56	0.92	UJ	-1.75	1.91	2.49	=	5.07	0.25	0.25	=	1.30	0.20	0.23	=	1.89	0.72	0.15	=	3.94	1.16	0.28	J	0.89	0.47	0.15	UJ	0.03	0.63	1.07	J	2.34	1.96	1.73
1	HTZ84061	HTZ84061	908706	1029550	U	0.19	0.18	0.28	UJ	0.34	0.51	0.74	=	3.65	0.11	0.07	=	0.70	0.06	0.07	=	1.36	0.59	0.32	=	3.92	1.13	0.32	J	0.84	0.45	0.27	U	0.26	0.18	0.34	=	3.25	0.56	0.51
1	HTZ84062	HTZ84062	908714	1029594	=	1.63	0.11	0.26	=	1.83	0.48	0.65	=	3.96	0.12	0.06	=	0.78	0.06	0.06	J	1.09	0.51	0.14	=	7.02	1.68	0.31	=	1.19	0.53	0.14	=	0.54	0.22	0.39	=	8.99	0.87	0.71
1	HTZ84065	HTZ84065	908725	1029797	=	0.56	0.14	0.40	UJ	0.91	1.0	1.20	=	7.12	0.19	0.11	=	1.00	0.10	0.10	=	1.65	0.62	0.24	=	6.29	1.49	0.13	=	1.05	0.48	0.13	U	0.40	0.29	0.53	=	8.12	1.13	0.87
1	HTZ84066	HTZ84066	908722	1029790	UJ	0.24	0.25	0.37	UJ	0.18	0.64	0.91	=	6.68	0.17	0.08	=	1.11	0.08	0.08	=	1.70	0.66	0.14	=	5.11	1.33	0.14	=	1.64	0.64	0.26	=	0.56	0.26	0.48	=	10.73	1.11	0.77
1	HTZ84067	HTZ84067	908669	1029781	UJ	-0.09	0.31	0.46	UJ	-0.12	0.80	1.17	=	3.78	0.16	0.12	=	1.00	0.11	0.12	=	1.54	0.66	0.29	=	4.45	1.27	0.16	=	1.33	0.60	0.16	=	1.35	0.46	0.63	=	20.08	2.29	1.74
1	HTZ84068	HTZ84068	908682	1029779	=	0.42	0.13	0.37	U	0.78	0.78	1.15	=	7.42	0.20	0.10	=	0.92	0.09	0.11	=	1.40	0.63	0.30	=	6.72	1.73	0.30	=	1.42	0.63	0.16	J	0.53	0.30	0.53	=	10.12	1.13	0.80
1	HTZ84071	HTZ84071	908789	1029813	UJ	-0.14	0.16	0.24	UJ	0.28	0.42	0.62	=	2.54	0.09	0.06	=	0.63	0.06	0.05	J	0.77	0.40	0.30	=	2.05	0.69	0.12	J	0.53	0.32	0.12	UJ	0.19	0.20	0.33	=	2.19	0.57	0.53
1	HTZ84072	HTZ84072	908826	1029827	U	0.20	0.18	0.27	UJ	-0.02	0.49	0.69	=	3.92	0.12	0.06	=	0.67	0.06	0.06	J	0.80	0.41	0.23	=	3.98	1.06	0.12	=	0.95	0.44	0.12	UJ	0.17	0.21	0.35	=	3.69	0.68	0.57
1	HTZ84073	HTZ84073	908790	1029824	U	0.37	0.27	0.41	UJ	0.33	0.71	1.03	=	6.62	0.19	0.09	=	1.11	0.09	0.09	=	1.65	0.64	0.25	=	6.77	1.62	0.34	=	1.35	0.57	0.25	=	1.47	0.36	0.54	=	32.54	2.06	1.03
1	HTZ84074	HTZ84074	908765	1029810	U	0.30	0.26	0.32	UJ	0.13	0.58	0.82	=	4.59	0.14	0.08	=	0.88	0.08	0.08	=	1.25	0.53	0.13	=	3.12	0.92	0.13	=	1.20	0.52	0.13	UJ	0.07	0.27	0.44	=	4.57	0.86	0.69
1	HTZ84075	HTZ84075	908770	1029804	UJ	0.10	0.24	0.35	UJ	-0.02	0.64	0.90	=	5.92	0.17	0.09	=	1.53	0.09	0.08	=	2.17	0.77	0.31	=	5.13	1.35	0.26	=	1.52	0.62	0.14	U	0.61	0.45	0.50	=	6.99	0.94	0.82
1	HTZ84076	HTZ84076	908783	1029813	U	0.32	0.20	0.27	UJ	0.15	0.50	0.71	=	4.20	0.12	0.07	=	0.81	0.07	0.06	=	1.67	0.61	0.22	=	2.61	0.79	0.12	J	0.78	0.40	0.22	UJ	0.22	0.25	0.38	=	4.22	0.65	0.60
1	HTZ84077	HTZ84077	908726	1029642	UJ	0.14	0.31	0.47	UJ	-0.59	0.79	1.28	=	5.02	0.18	0.12	=	0.88	0.11	0.11	=	0.87	0.43	0.23	=	4.99	1.26	0.13	J	0.70	0.38	0.13	=	0.98	0.36	0.62	=	18.39	2.14	1.74
1	HTZ84078	HTZ84078	908756	1029675	UJ	-0.04	0.25	0.38	UJ	0.15	0.67	1.01	=	3.35	0.14	0.09	=	0.67	0.09	0.09	=	1.12	0.51	0.25	=	3.45	1.00	0.13	J	0.87	0.44	0.25	=	0.84	0.32	0.52	=	14.15	1.62	1.41
1	HTZ84079	HTZ84079	908737	1029657	UJ	-0.11	0.28	0.46	UJ	0.72	0.83	1.29	=	4.75	0.18	0.12	=	1.12	0.12	0.12	=	1.52	0.62	0.31	=	4.44	1.21	0.35	=	1.22	0.54	0.26	=	0.82	0.39					

Table A-4-1. Final Status Survey Soil Sample Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238			
					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	Result	Error	MDC
1	SLD79003	SLD79003	908937	1029876	U	0.52	0.26	0.50	UJ	-1.10	1.41	2.35	=	4.40	0.29	0.22	=	1.08	0.22	0.22	=	1.53	0.60	0.14	=	4.63	1.16	0.27	=	0.97	0.48	0.32	UJ	-0.05	0.60	1.00	J	4.23	2.35	2.91
		SLD79004	908937	1029876	UJ	0.16	0.20	0.32	UJ	0.10	0.93	1.44	=	4.40	0.22	0.12	=	1.17	0.13	0.13	=	2.49	0.85	0.16	=	5.00	1.30	0.36	=	1.94	0.73	0.16	UJ	-0.02	0.40	0.67	J	2.58	1.53	1.64
1	SLD79006	SLD79006	908954	1029846	UJ	0.07	0.07	0.15	UJ	-0.16	0.45	0.68	=	2.14	0.09	0.06	=	0.90	0.07	0.06	=	1.78	0.65	0.31	=	3.45	0.95	0.14	J	0.82	0.42	0.14	U	0.36	0.24	0.34	=	4.90	0.74	0.51
		SLD79007	908954	1029846	U	0.17	0.13	0.19	UJ	0.23	0.52	0.82	=	2.53	0.11	0.08	=	1.07	0.09	0.08	=	2.12	0.68	0.23	=	3.64	0.94	0.23	=	0.85	0.42	0.28	UJ	0.10	0.23	0.40	=	4.31	0.75	0.57
1	SLD85060	SLD85060	908733	1029652	UJ	-0.07	0.20	0.31	UJ	-0.01	0.58	0.81	=	4.76	0.14	0.08	=	0.84	0.06	0.07	=	0.96	0.45	0.23	=	3.40	0.97	0.13	J	0.79	0.40	0.13	=	0.59	0.24	0.41	=	9.34	0.95	0.73
1	SLD85152	SLD85152	908691	1029572	U	0.19	0.18	0.27	UJ	0.09	0.52	0.73	=	3.72	0.11	0.07	=	0.98	0.07	0.06	J	1.21	0.55	0.27	=	3.29	1.00	0.14	=	1.01	0.49	0.14	UJ	-0.04	0.22	0.36	=	2.56	0.54	0.60
		SLD85153	908691	1029572	UJ	0.23	0.25	0.30	UJ	0.38	0.56	0.82	=	3.88	0.12	0.07	=	1.13	0.08	0.07	J	1.44	0.60	0.14	=	4.34	1.21	0.32	J	0.90	0.47	0.14	UJ	0.23	0.24	0.40	=	2.45	0.67	0.67
		SLD85154	908691	1029572	UJ	0.03	0.15	0.24	UJ	0.19	0.44	0.64	=	2.98	0.10	0.06	=	0.88	0.07	0.06	J	0.79	0.41	0.24	=	3.21	0.94	0.13	=	1.04	0.47	0.13	UJ	0.13	0.20	0.33	=	2.14	0.54	0.53
1	SLD85156	SLD85156	908709	1029602	UJ	0.04	0.19	0.30	UJ	0.23	0.55	0.79	=	5.10	0.14	0.07	=	1.05	0.07	0.07	J	1.28	0.57	0.14	=	4.21	1.19	0.14	=	1.49	0.62	0.14	U	0.67	0.41	0.42	=	4.17	0.73	0.63
		SLD85157	908709	1029602	UJ	0.16	0.17	0.31	UJ	0.30	0.58	0.83	=	5.32	0.15	0.08	=	1.09	0.08	0.07	J	1.23	0.57	0.28	=	3.68	1.11	0.15	=	1.36	0.60	0.15	UJ	0.07	0.25	0.42	=	3.77	0.65	0.68
1	SLD85158	SLD85158	908726	1029633	U	0.23	0.18	0.28	UJ	0.12	0.54	0.77	=	4.20	0.13	0.07	=	0.99	0.07	0.07	J	1.86	0.83	0.50	=	5.14	1.58	0.37	=	1.99	0.86	0.20	U	0.37	0.24	0.40	=	4.13	0.82	0.62
		SLD85159	908726	1029633	UJ	0.09	0.21	0.35	UJ	0.45	0.56	0.90	=	2.17	0.11	0.09	=	0.78	0.09	0.10	J	1.29	0.53	0.27	=	1.49	0.57	0.12	=	0.90	0.43	0.12	UJ	0.13	0.27	0.46	=	1.59	0.60	0.66
1	SLD85160	SLD85160	908744	1029663	UJ	-0.13	0.22	0.37	UJ	0.49	0.74	1.15	=	2.67	0.13	0.10	=	0.76	0.10	0.10	=	1.01	0.49	0.14	=	2.40	0.82	0.14	=	1.28	0.56	0.14	=	1.18	0.36	0.57	=	18.93	2.21	1.60
		SLD85161	908744	1029663	UJ	0.08	0.21	0.30	UJ	0.32	0.60	0.87	=	2.44	0.10	0.08	=	0.96	0.08	0.08	=	0.97	0.48	0.26	=	3.09	0.95	0.26	=	1.81	0.68	0.14	J	0.42	0.22	0.40	=	6.91	0.85	0.66
1	SLD85162	SLD85162	908708	1029787	UJ	0.13	0.31	0.44	UJ	0.29	0.79	1.20	=	6.13	0.19	0.12	=	1.19	0.11	0.11	J	1.34	0.58	0.26	=	5.36	1.39	0.14	=	1.40	0.59	0.14	=	1.03	0.37	0.55	=	16.29	1.33	0.96
		SLD85163	908708	1029787	UJ	-0.05	0.21	0.33	UJ	0.53	0.64	0.95	=	2.77	0.11	0.09	=	1.19	0.09	0.09	J	1.72	0.67	0.15	J	2.79	0.91	0.15	J	0.90	0.47	0.27	=	0.82	0.24	0.44	=	13.44	1.24	0.87
1	SLD85164	SLD85164	908775	1029683	UJ	-0.04	0.16	0.25	UJ	0.34	0.44	0.65	=	2.93	0.09	0.06	=	0.77	0.05	0.07	J	1.10	0.56	0.46	=	2.88	0.97	0.16	J	0.88	0.48	0.16	UJ	0.14	0.20	0.34	=	3.10	0.62	0.53
		SLD85165	908775	1029683	UJ	-0.08	0.19	0.29	UJ	-0.38	0.59	0.79	=	2.96	0.11	0.08	=	1.33	0.08	0.09	=	1.75	0.73	0.17	=	3.38	1.10	0.17	=	2.31	0.87	0.17	UJ	-0.03	0.25	0.41	=	2.98	0.82	0.66
		SLD85166	908775	1029683	UJ	0.13	0.14	0.27	UJ	0.20	0.49	0.71	=	3.55	0.11	0.06	=	1.13	0.06	0.08	=	1.00	0.47	0.13	=	3.91	1.07	0.13	=	1.38	0.56	0.13	UJ	0.18	0.21	0.36	=	2.63	0.73	0.58
1	SLD85167	SLD85167	908796	1029694	UJ	0.01	0.17	0.27	UJ	0.24	0.48	0.70	=	3.29	0.11	0.07	=	0.90	0.06	0.09	=	1.95	0.76	0.35	=	2.86	0.97	0.39	J	0.97	0.51	0.29	U	0.28	0.18	0.35	=	2.65	0.68	0.60
		SLD85168	908796	1029694	UJ	0.08	0.18	0.26	U	0.67	0.50	0.74	=	2.40	0.09	0.06	=	0.84	0.07	0.07	=	1.32	0.61	0.30	J	1.97	0.78	0.36	J	0.79	0.46	0.16	UJ	-0.10	0.21	0.34	=	1.91	0.62	0.56
1	SLD85169	SLD85169	908814	1029724	UJ	-0.05	0.23	0.38	UJ	0.24	0.64	1.05	=	5.53	0.16	0.09	=	1.06	0.08	0.12	=	2.22	0.85	0.17	=	4.85	1.42	0.38	J	1.14	0.58	0.17	J	0.49	0.26	0.48	=	6.50	0.88	0.75
		SLD85170	908814	1029724	UJ	0.07	0.25	0.36	U	0.86	0.67	1.01	=	4.58	0.14	0.09	=	1.05	0.08	0.12	=	1.24	0.54	0.13	=	2.94	0.91	0.13	=	1.34	0.56	0.13	UJ	0.17	0.28	0.47	=	2.94	0.74	0.70
1	SLD85171	SLD85171	908837	1029729	UJ	0.00	0.12	0.20	UJ	-0.09	0.40	0.55	=	1.57	0.07	0.05	=	0.50	0.04	0.07	J	0.65	0.40	0.28	J	1.15	0.55	0.28	J	0.50	0.34	0.15	U	0.31	0.28	0.29	=	3.36	0.54	0.46
		SLD85172	908837	1029729	UJ	0.16	0.22	0.33	UJ	0.16	0.60	0.85	=	3.89	0.14	0.08	=	1.11	0.08	0.09	=	1.28	0.59	0.34	=	2.78	0.93	0.29												

Table A-4-1. Final Status Survey Soil Sample Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238			
					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	Result	Error	MDC
1	SLD95119	SLD95119	908905	1029872	UJ	-0.01	0.27	0.41	UJ	0.39	0.76	1.16	=	3.08	0.76	0.11	=	1.47	0.11	0.11	J	2.45	0.90	0.15	=	3.68	1.19	0.34	=	2.45	0.90	0.15	UJ	0.15	0.33	0.54	=	3.41	1.42	1.37
		SLD95120	908905	1029872	UJ	0.03	0.13	0.20	UJ	0.10	0.36	0.55	=	1.27	0.32	0.05	=	0.60	0.05	0.07	J	0.70	0.40	0.13	J	1.28	0.57	0.25	J	0.80	0.43	0.13	UJ	0.02	0.16	0.26	=	0.82	0.40	0.40
		SLD95121	908905	1029872	UJ	-0.11	0.15	0.23	UJ	-0.17	0.45	0.61	=	2.55	0.60	0.05	=	1.18	0.06	0.07	J	1.02	0.46	0.12	=	2.61	0.83	0.12	=	1.08	0.49	0.26	UJ	0.01	0.19	0.32	=	1.92	0.56	0.52
2	HTZ84069	HTZ84069	909128	1029719	=	0.64	0.12	0.36	UJ	0.54	0.75	1.09	=	6.79	0.19	0.10	=	0.98	0.08	0.09	=	1.70	0.72	0.37	=	15.86	3.47	0.17	=	1.41	0.65	0.31	UJ	0.22	0.30	0.52	=	7.94	0.95	0.00
2	HTZ84070	HTZ84070	909123	1029711	UJ	0.12	0.19	0.32	UJ	0.33	0.59	0.86	=	3.80	0.12	0.07	=	1.05	0.07	0.07	J	0.67	0.38	0.25	=	3.24	0.96	0.13	=	1.18	0.52	0.13	U	0.62	0.40	0.42	=	7.65	0.85	0.61
2	HTZ84085	HTZ84085	908998	1029793	UJ	0.14	0.31	0.48	UJ	-0.64	0.80	1.13	=	3.46	0.14	0.12	=	0.95	0.10	0.15	=	1.06	0.52	0.28	=	4.54	1.28	0.34	J	0.89	0.48	0.28	=	1.40	0.37	0.61	=	19.85	2.08	1.68
2	HTZ84086	HTZ84086	908975	1029784	UJ	0.21	0.26	0.46	UJ	0.00	0.82	1.22	=	4.11	0.16	0.11	=	0.94	0.10	0.14	=	1.41	0.63	0.30	=	4.69	1.33	0.16	=	1.18	0.57	0.16	J	0.66	0.34	0.59	=	11.82	1.33	1.52
2	HTZ84087	HTZ84087	908956	1029776	U	0.70	0.36	0.51	U	1.10	0.91	1.43	=	5.65	0.19	0.13	=	1.23	0.11	0.16	=	1.05	0.50	0.26	=	7.26	1.71	0.26	=	1.40	0.59	0.30	=	0.87	0.41	0.66	=	12.14	1.94	1.73
2	HTZ84088	HTZ84088	908953	1029777	UJ	-0.13	0.30	0.49	UJ	0.15	0.90	1.34	=	5.53	0.19	0.12	=	0.92	0.11	0.15	=	1.77	0.70	0.28	=	4.72	1.31	0.28	=	1.10	0.53	0.28	=	1.79	0.46	0.66	=	26.84	2.10	1.82
2	HTZ84089	HTZ84089	909106	1029842	UJ	0.01	0.25	0.36	U	0.66	0.63	0.98	=	5.78	0.15	0.09	=	1.03	0.08	0.11	=	2.03	0.77	0.29	=	11.64	2.58	0.15	J	0.91	0.48	0.15	=	0.61	0.29	0.46	=	10.83	0.98	0.73
2	HTZ84090	HTZ84090	909101	1029838	UJ	0.09	0.17	0.28	UJ	0.41	0.47	0.73	=	4.81	0.12	0.07	=	0.53	0.06	0.08	=	1.39	0.56	0.28	=	5.55	1.36	0.24	J	0.47	0.31	0.13	=	0.54	0.23	0.35	=	7.87	0.63	0.54
2	HTZ84091	HTZ84091	909097	1029827	UJ	0.07	0.26	0.37	UJ	0.52	0.69	1.06	=	4.85	0.15	0.09	=	1.08	0.09	0.12	=	1.36	0.65	0.33	=	4.40	1.34	0.18	J	1.12	0.58	0.18	U	0.94	0.50	0.59	=	22.87	1.54	0.83
2	HTZ84092	HTZ84092	909127	1029824	UJ	0.06	0.23	0.33	UJ	0.27	0.55	0.84	=	3.48	0.12	0.09	=	0.94	0.08	0.11	=	1.32	0.56	0.30	=	3.32	0.99	0.30	=	1.10	0.50	0.14	UJ	0.07	0.24	0.40	=	2.17	0.61	0.61
2	HTZ84093	HTZ84093	909027	1029811	UJ	0.02	0.20	0.28	U	0.87	0.51	0.83	=	3.12	0.10	0.07	=	0.74	0.06	0.10	=	1.79	0.74	0.36	=	2.71	0.95	0.36	J	0.97	0.52	0.16	U	0.52	0.35	0.40	=	7.07	0.82	0.61
2	HTZ84094	HTZ84094	909120	1029834	=	0.54	0.14	0.41	U	0.94	0.78	1.22	=	10.07	0.24	0.11	=	0.90	0.08	0.14	=	0.97	0.47	0.30	=	9.00	1.99	0.13	J	0.50	0.32	0.13	=	1.01	0.39	0.59	=	20.95	1.58	0.97
2	HTZ84095	HTZ84095	909081	1029928	=	0.36	0.13	0.35	U	0.81	0.67	1.01	=	7.05	0.19	0.09	=	1.24	0.08	0.11	=	1.51	0.67	0.31	=	5.60	1.54	0.16	=	1.15	0.57	0.16	UJ	0.21	0.31	0.52	=	4.78	0.98	0.83
2	HTZ84096	HTZ84096	909075	1029921	UJ	0.03	0.24	0.38	UJ	-0.27	0.72	0.98	=	5.18	0.16	0.09	=	1.14	0.08	0.12	=	1.53	0.59	0.27	=	5.11	1.27	0.27	=	0.96	0.45	0.12	UJ	0.22	0.31	0.53	=	4.46	0.91	0.81
2	HTZ85283	HTZ85283	909059	1029911	U	0.44	0.25	0.37	UJ	0.46	0.64	0.92	=	8.02	0.20	0.09	=	1.05	0.06	0.10	=	2.17	0.96	0.49	=	6.36	1.93	0.49	=	1.64	0.80	0.22	U	0.27	0.21	0.46	=	5.55	0.85	0.76
2	HTZ85284	HTZ85284	909077	1029938	U	0.35	0.35	0.41	UJ	0.05	0.77	1.09	=	8.05	0.22	0.09	=	1.03	0.08	0.12	=	1.31	0.58	0.32	=	5.69	1.47	0.15	=	1.18	0.54	0.15	U	0.83	0.45	0.57	=	5.95	1.03	0.90
2	HTZ85289	HTZ85289	908907	1029756	UJ	0.20	0.25	0.37	U	0.69	0.68	1.00	=	5.49	0.16	0.09	=	0.73	0.07	0.10	J	1.12	0.51	0.14	=	5.81	1.46	0.26	=	1.06	0.50	0.26	=	1.71	0.30	0.50	=	32.66	1.93	0.86
2	HTZ85290	HTZ85290	908876	1029730	U	0.33	0.29	0.38	U	0.83	0.75	1.11	=	6.17	0.18	0.10	=	1.33	0.09	0.12	J	1.38	0.59	0.14	=	5.19	1.37	0.27	=	1.22	0.55	0.14	U	0.45	0.30	0.51	=	6.98	0.95	0.79
2	HTZ85291	HTZ85291	908872	1029730	UJ	0.09	0.23	0.33	U	0.97	0.65	0.98	=	4.16	0.13	0.08	=	1.07	0.07	0.10	J	1.76	0.75	0.38	=	4.97	1.45	0.32	=	1.26	0.62	0.32	=	0.97	0.28	0.44	=	15.75	1.16	0.73
2	HTZ85292	HTZ85292	909040	1029787	UJ	0.11	0.25	0.41	U	0.79	0.76	1.12	=	7.08	0.19	0.10	=	1.03	0.09	0.13	=	1.20	0.56	0.15	=	5.84	1.54	0.34	J	1.02	0.52	0.15	UJ	0.						

Table A-4-1. Final Status Survey Soil Sample Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238			
					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	Result	Error	MDC
2	SLD85225	SLD85225	909035	1029877	UJ	0.20	0.21	0.31	UJ	0.13	0.56	0.80	=	4.76	1.09	0.07	=	0.71	0.06	0.09	J	0.84	0.47	0.35	=	4.44	1.28	0.29	J	0.58	0.38	0.16	J	0.45	0.23	0.40	=	5.36	0.78	0.68
		SLD85226	909035	1029877	U	0.29	0.21	0.35	UJ	0.23	0.61	0.88	=	4.92	1.13	0.08	=	0.92	0.07	0.09	J	1.13	0.61	0.41	=	4.12	1.31	0.19	J	1.10	0.59	0.19	UJ	0.23	0.28	0.46	=	2.99	0.66	0.71
2	SLD85227	SLD85227	908990	1029785	UJ	-0.01	0.30	0.33	UJ	-0.04	0.59	0.83	=	3.97	0.12	0.08	=	1.01	0.07	0.09	=	1.32	0.57	0.34	=	3.28	0.98	0.14	=	1.05	0.49	0.25	=	1.57	0.28	0.45	=	27.68	1.67	0.86
		SLD85228	908990	1029785	UJ	0.15	0.20	0.30	UJ	0.15	0.54	0.78	=	3.93	0.12	0.07	=	1.19	0.08	0.08	=	1.63	0.64	0.30	=	3.57	1.03	0.14	=	1.08	0.51	0.30	=	0.86	0.24	0.39	=	13.16	1.05	0.72
		SLD85229	908990	1029785	UJ	-0.07	0.11	0.18	UJ	0.21	0.33	0.49	=	1.39	0.06	0.05	=	0.50	0.04	0.06	=	1.04	0.47	0.13	J	2.11	0.72	0.28	J	0.60	0.36	0.24	UJ	0.11	0.15	0.26	=	2.81	0.49	0.42
2	SLD85233	SLD85233	909025	1029785	UJ	0.09	0.12	0.21	UJ	-0.06	0.39	0.54	=	1.82	0.07	0.05	=	0.39	0.04	0.06	=	0.96	0.48	0.34	=	2.59	0.84	0.25	J	0.45	0.31	0.14	UJ	0.16	0.17	0.27	=	2.00	0.45	0.38
		SLD85234	909025	1029785	UJ	0.01	0.17	0.28	UJ	0.50	0.51	0.76	=	2.98	0.10	0.07	=	0.86	0.06	0.08	=	0.98	0.48	0.25	=	2.45	0.81	0.14	=	1.35	0.56	0.14	UJ	0.03	0.22	0.36	=	2.80	0.65	0.54
2	SLD85235	SLD85235	908990	1029846	UJ	0.12	0.24	0.35	UJ	0.19	0.64	0.92	=	4.83	1.11	0.08	=	0.95	0.07	0.09	=	1.38	0.59	0.27	=	3.31	1.01	0.27	J	0.75	0.42	0.15	U	0.43	0.26	0.45	=	5.57	0.90	0.76
		SLD85236	908990	1029846	UJ	0.05	0.20	0.29	UJ	0.11	0.53	0.75	=	4.40	1.01	0.07	=	0.91	0.06	0.09	=	1.55	0.68	0.17	J	3.23	1.07	0.17	=	1.43	0.65	0.17	UJ	0.51	0.29	0.41	=	2.61	0.72	0.65
2	SLD85237	SLD85237	908972	1029876	UJ	-0.03	0.29	0.48	UJ	0.41	0.82	1.26	=	5.10	1.20	0.12	=	1.03	0.10	0.15	=	1.35	0.57	0.14	=	5.61	1.41	0.25	=	0.94	0.46	0.25	UJ	0.37	0.41	0.62	=	4.73	1.88	1.52
		SLD85238	908972	1029876	UJ	-0.23	0.29	0.42	UJ	0.14	0.78	1.18	=	3.92	0.95	0.11	=	0.89	0.10	0.15	=	0.97	0.48	0.34	=	3.28	0.98	0.26	J	0.61	0.37	0.14	U	0.44	0.26	0.54	J	1.97	1.24	1.43
2	SLD85239	SLD85239	909007	1029876	UJ	-0.05	0.29	0.43	UJ	0.36	0.78	1.19	=	4.41	1.05	0.11	=	0.91	0.10	0.15	=	1.05	0.49	0.29	=	2.87	0.88	0.25	=	0.88	0.44	0.13	UJ	-0.14	0.35	0.56	=	4.82	1.49	1.39
		SLD85240	909007	1029876	UJ	-0.03	0.18	0.30	UJ	-0.34	0.51	0.82	=	2.12	0.53	0.08	=	0.54	0.07	0.09	=	1.20	0.55	0.27	J	2.68	0.88	0.27	J	0.53	0.35	0.14	UJ	0.11	0.24	0.39	=	2.17	0.93	0.99
		SLD85241	909007	1029876	UJ	-0.02	0.23	0.38	UJ	-0.78	0.71	0.98	=	3.39	0.82	0.09	=	1.21	0.09	0.12	=	1.67	0.69	0.16	J	2.77	0.93	0.16	=	1.21	0.57	0.16	UJ	0.16	0.31	0.51	J	1.69	1.23	1.29
2	SLD85243	SLD85243	909060	1029785	UJ	0.02	0.18	0.29	UJ	-0.07	0.57	0.80	=	3.23	0.11	0.07	=	1.02	0.07	0.09	=	1.28	0.55	0.14	=	2.40	0.81	0.14	J	0.66	0.38	0.14	UJ	0.12	0.22	0.38	=	2.78	0.60	0.56
		SLD85244	909060	1029785	UJ	0.19	0.27	0.39	UJ	-0.09	0.73	1.03	=	7.45	0.19	0.09	=	0.98	0.07	0.12	=	1.37	0.61	0.15	=	6.81	1.72	0.34	=	1.31	0.59	0.15	UJ	0.22	0.30	0.51	=	4.77	0.78	0.71
2	SLD85245	SLD85245	909095	1029724	UJ	-0.10	0.19	0.30	UJ	0.19	0.53	0.81	=	3.07	0.10	0.08	=	0.74	0.08	0.07	J	0.93	0.47	0.26	=	2.82	0.90	0.26	J	0.94	0.47	0.14	U	0.34	0.23	0.37	=	6.20	0.76	0.63
		SLD85246	909095	1029724	UJ	0.00	0.14	0.20	U	0.39	0.36	0.58	=	1.13	0.06	0.05	=	0.78	0.06	0.05	=	0.87	0.42	0.29	=	2.03	0.67	0.26	J	0.68	0.36	0.12	UJ	0.13	0.16	0.27	=	1.13	0.38	0.43
2	SLD85247	SLD85247	909077	1029815	UJ	0.16	0.18	0.27	UJ	0.36	0.50	0.74	=	2.37	0.09	0.06	=	1.06	0.07	0.09	=	1.66	0.69	0.29	J	2.82	0.95	0.29	=	1.27	0.59	0.16	=	0.74	0.27	0.37	=	14.70	1.21	0.71
		SLD85248	909077	1029815	UJ	0.08	0.16	0.23	UJ	0.08	0.43	0.61	=	1.89	0.07	0.05	=	0.88	0.06	0.07	=	1.21	0.51	0.13	J	2.39	0.77	0.28	J	0.78	0.40	0.23	U	0.35	0.25	0.32	=	3.32	0.66	0.53
2	SLD85249	SLD85249	909025	1029906	UJ	-0.02	0.27	0.45	UJ	-0.79	0.77	1.22	=	4.30	1.03	0.12	=	0.98	0.10	0.16	=	1.46	0.59	0.30	=	3.51	1.01	0.13	=	0.94	0.46	0.13	UJ	0.16	0.38	0.62	=	3.89	1.69	1.43
		SLD85250	909025	1029906	UJ	0.12	0.25	0.44	UJ	0.64	0.79	1.25	=	2.90	0.72	0.12	=	1.19	0.11	0.15	=	1.24	0.57	0.33	J	1.63	0.67	0.33	=	1.10	0.53	0.15	U	0.61	0.50	0.59	J	2.05	1.40	1.33
2	SLD85251	SLD85251	909112	1029815	UJ	0.04	0.11	0.18	UJ	0.06	0.32	0.46	=	1.80	0.06	0.04	=	0.42	0.04	0.05	=	1.37	0.61	0.15	=	3.02	0.99	0.29	J	0.51	0.35	0.15	U	0.18	0.16	0.26	=	4.52	0.55	0.41
		SLD85252	909112	1029815	UJ	-0.03	0.15	0.21	UJ	0.08	0.39	0.55	=	2.07	0.07	0.05	=	0.75	0.05	0.06	J	0.93	0.47	0.34	J	2.65	0.86	0.14	=	1.31	0.56	0.26	J	0.35	0.19	0.28	=	5.96	0.52	0.50
		SLD85253	909112	1029815	UJ	-0.09	0.16	0.25	UJ	0.30	0.45	0.67	=	2.67</																										

Table A-4-1. Final Status Survey Soil Sample Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238			
					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	Result	Error	MDC
3	SLD07211	SLD07211	908666	1029621	U	0.09	0.11	0.17	U	0.19	0.49	0.79	=	1.08	0.08	0.05	=	0.65	0.08	0.08	J	0.67	0.38	0.28	=	1.37	0.55	0.23	J	0.45	0.30	0.23	U	0.11	0.13	0.17	U	2.40	1.06	3.68
		SLD07212	908666	1029621	U	0.12	0.14	0.21	U	-0.07	0.84	0.93	=	1.76	0.11	0.06	=	0.90	0.10	0.09	=	1.41	0.60	0.26	=	2.88	0.92	0.14	=	1.19	0.54	0.26	U	0.23	0.17	0.22	U	1.49	1.04	4.09
3	SLD07213	SLD07213	908630	1029683	U	-0.04	0.17	0.19	U	0.22	0.53	0.85	=	2.25	0.13	0.05	=	0.43	0.07	0.08	J	0.72	0.42	0.32	=	4.62	1.28	0.14	J	0.83	0.45	0.27	U	0.19	0.13	0.19	=	4.77	1.23	3.75
		SLD07214	908630	1029683	U	0.07	0.11	0.17	U	-0.36	0.50	0.74	=	0.95	0.07	0.05	=	0.84	0.09	0.07	J	0.65	0.37	0.24	=	1.08	0.48	0.13	J	0.56	0.34	0.13	U	0.11	0.10	0.17	U	1.34	1.01	3.93
3	SLD07215	SLD07215	908773	1029683	U	0.28	0.20	0.23	U	-0.11	0.66	0.98	=	3.44	0.20	0.06	=	0.43	0.08	0.09	J	0.95	0.56	0.42	=	9.24	2.41	0.19	J	0.61	0.44	0.35	=	0.42	0.15	0.23	=	4.57	1.96	4.04
		SLD07216	908773	1029683	U	0.15	0.17	0.26	U	-0.35	0.78	1.15	=	4.01	0.24	0.08	=	0.97	0.11	0.10	J	0.61	0.38	0.26	=	2.40	0.82	0.14	J	0.88	0.45	0.14	=	0.46	0.22	0.27	=	7.24	2.16	4.79
3	SLD07217	SLD07217	908915	1029683	U	0.19	0.08	0.11	U	0.03	0.32	0.58	=	1.04	0.07	0.03	J	0.13	0.04	0.05	U	0.27	0.34	0.48	=	2.88	1.23	0.26	UJ	0.00	0.00	0.26	U	0.10	0.10	0.12	U	1.37	0.60	1.80
		SLD07218	908915	1029683	U	0.18	0.16	0.23	U	0.12	0.63	0.99	=	2.09	0.13	0.06	=	1.09	0.12	0.09	=	1.44	0.58	0.24	=	2.65	0.84	0.13	J	1.06	0.48	0.13	U	0.13	0.14	0.22	U	2.26	1.23	4.33
3	SLD07219	SLD07219	908987	1029683	U	0.23	0.14	0.28	U	0.22	0.73	1.13	=	1.86	0.13	0.07	=	1.13	0.13	0.10	=	1.04	0.51	0.32	=	3.07	0.97	0.27	=	1.75	0.68	0.14	U	0.19	0.25	0.30	U	2.26	1.98	4.51
		SLD07220	908987	1029683	U	0.23	0.13	0.21	U	-0.06	0.57	0.86	=	1.14	0.08	0.06	=	1.03	0.11	0.09	=	1.69	0.73	0.18	=	2.01	0.81	0.18	J	1.16	0.59	0.39	U	0.05	0.12	0.21	U	0.51	1.45	3.98
3	SLD07221	SLD07221	909093	1029744	U	0.01	0.06	0.09	U	0.04	0.25	0.39	=	0.67	0.05	0.02	=	0.10	0.03	0.03	U	0.15	0.19	0.27	=	1.40	0.60	0.15	U	0.05	0.11	0.15	U	0.12	0.08	0.10	U	0.92	0.72	1.53
		SLD07222	909093	1029744	U	0.31	0.11	0.18	U	-0.14	0.48	0.71	=	1.64	0.10	0.04	=	0.77	0.08	0.07	=	1.05	0.50	0.31	=	2.43	0.82	0.26	J	0.91	0.46	0.14	U	0.17	0.12	0.15	U	1.59	0.37	3.14
3	SLD07223	SLD07223	909022	1029744	U	0.09	0.09	0.16	U	-0.12	0.46	0.71	=	1.20	0.08	0.04	=	0.48	0.07	0.06	J	0.82	0.48	0.36	=	3.94	1.22	0.16	J	0.79	0.46	0.16	U	0.12	0.12	0.15	U	0.78	0.87	3.76
		SLD07224	909022	1029744	U	0.08	0.10	0.21	U	0.06	0.58	0.91	=	1.97	0.12	0.06	=	0.86	0.10	0.09	=	1.33	0.59	0.32	=	3.09	0.99	0.36	=	1.34	0.59	0.27	U	0.22	0.15	0.22	U	1.15	1.06	4.49
3	SLD07227	SLD07227	908880	1029744	U	0.00	0.07	0.12	U	0.18	0.32	0.51	=	0.74	0.06	0.03	=	0.12	0.04	0.04	U	0.23	0.22	0.24	=	2.08	0.72	0.13	U	0.19	0.20	0.13	U	0.06	0.07	0.13	U	1.86	0.92	1.90
		SLD07228	908880	1029744	U	0.22	0.18	0.29	U	0.24	0.83	1.28	=	3.53	0.22	0.08	=	1.11	0.14	0.12	=	1.71	0.73	0.17	=	5.31	1.52	0.17	=	1.39	0.65	0.17	=	0.83	0.23	0.30	=	16.21	3.18	3.96
3	SLD07229	SLD07229	908809	1029744	U	0.01	0.06	0.09	U	-0.07	0.26	0.45	=	0.69	0.05	0.03	=	0.10	0.03	0.05	J	0.80	0.61	0.72	=	2.08	1.00	0.67	U	0.29	0.38	0.61	U	0.06	0.10	0.11	U	1.25	0.84	1.78
		SLD07230	908809	1029744	U	0.13	0.13	0.13	U	0.14	0.38	0.59	=	0.53	0.04	0.04	=	0.39	0.06	0.05	J	0.61	0.39	0.28	=	1.41	0.62	0.15	J	0.84	0.46	0.15	U	0.00	0.08	0.13	U	0.82	1.17	2.87
3	SLD07231	SLD07231	908737	1029744	U	0.03	0.07	0.11	U	-0.05	0.32	0.49	=	0.74	0.05	0.03	=	0.08	0.03	0.05	U	0.12	0.15	0.21	=	1.32	0.52	0.12	U	0.09	0.12	0.12	U	0.08	0.07	0.11	U	1.47	0.60	2.71
		SLD07232	908737	1029744	U	0.13	0.16	0.24	U	0.61	0.67	1.09	=	2.55	0.15	0.07	=	0.85	0.11	0.10	J	0.96	0.49	0.15	=	5.71	1.52	0.15	J	0.95	0.49	0.15	=	0.51	0.17	0.23	=	8.25	1.48	4.03
3	SLD07233	SLD07233	908773	1029806	U	0.10	0.06	0.11	U	0.07	0.27	0.45	=	0.70	0.05	0.03	J	0.16	0.04	0.05	J	0.39	0.27	0.29	=	1.24	0.48	0.11	J	0.23	0.19	0.11	U	0.10	0.08	0.12	U	0.68	0.53	2.51
		SLD07234	908773	1029806	U	0.20	0.18	0.28	U	-0.19	0.77	1.17	=	3.66	0.21	0.07	=	1.07	0.12	0.11	=	1.01	0.44	0.20	=	3.45	0.92	0.11	J	0.85	0.39	0.11	=	0.35	0.16	0.26	U	4.03	1.29	5.66
3	SLD07235	SLD07235	908844	1029806	U	0.05	0.07	0.11	U	-0.16	0.27	0.47	=	0.73	0.05	0.03	=	0.13	0.03	0.04	U	0.41	0.36	0.44	J	2.95	1.04	0.18	U	0.05	0.14	0.33	J	0.17	0.10	0.10	=	1.79	0.48	1.77
		SLD07236	908844	1029806	U	0.21	0.08	0.27	U	0.08	0.83	1.30	=	3.82	0.22	0.09	=	1.11	0.14	0.14	=	2.01	0.81	0.32	J	5.40	1.54	0.32	=	1.89	0.77	0.17	J	0.35	0.21	0.29	=	6.18	1.38	5.31
3	SLD07237	SLD07237	908915	1029806	U	0.05	0.07	0.11	U	-0.07	0.27	0.48																												

Table A-4-1. Final Status Survey Soil Sample Data (Continued)

SU	Station Name	Sample Name	Easting	Northing	Ac-227				Pa-231				Ra-226				Ra-228				Th-228				Th-230				Th-232				U-235				U-238			
					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	Result	Error	MDC
3	SLD78954	SLD78954	908890	1029838	U	0.39	0.25	0.39	U	0.90	0.77	1.27	=	5.21	0.19	0.09	=	0.84	0.09	0.09	=	2.06	0.72	0.15	=	5.71	1.34	0.32	=	1.07	0.50	0.27	=	0.66	0.32	0.65	=	12.62	2.85	3.22
		SLD78955	908890	1029838	U	0.46	0.19	0.61	U	1.90	1.12	1.73	=	4.96	0.21	0.13	=	1.59	0.14	0.13	=	2.14	0.72	0.31	=	5.10	1.22	0.14	=	1.39	0.56	0.14	UJ	0.36	0.48	0.81	J	5.59	3.58	4.03
		SLD78956	908890	1029838	U	2.04	0.23	0.37	UJ	0.57	0.65	1.00	=	1.74	0.09	0.08	=	0.75	0.08	0.08	=	1.69	0.62	0.35	=	2.36	0.74	0.13	=	0.96	0.45	0.13	UJ	0.04	0.28	0.49	UJ	1.13	1.44	2.47
		SLD78957	908890	1029838	U	2.01	0.23	0.36	UJ	0.60	0.67	1.02	=	2.45	0.11	0.08	=	0.66	0.08	0.08	=	1.63	0.61	0.3	=	2.53	0.78	0.30	=	0.89	0.44	0.25	UJ	0.02	0.31	0.51	J	2.81	2.01	2.54
3	SLD80378	SLD80378	908888	1029634	UJ	-0.02	0.08	0.08	UJ	-0.13	0.22	0.36	=	1.06	0.05	0.03	J	0.12	0.02	0.03	J	0.592	0.48	0.44	=	2.25	1.00	0.44	UJ	0.09	0.18	0.24	U	0.14	0.13	0.18	=	0.78	0.14	0.15
		SLD80379	908888	1029634	UJ	0.20	0.20	0.20	U	0.70	0.50	0.80	=	3.75	0.12	0.06	=	0.97	0.08	0.07	=	1.963	0.80	0.18	=	5.84	1.61	0.33	J	0.97	0.53	0.18	=	0.96	0.26	0.39	=	14.35	0.73	0.45
		SLD80380	908888	1029634	UJ	-0.17	0.14	0.14	UJ	-0.09	0.40	0.59	=	1.31	0.06	0.05	=	0.79	0.06	0.05	=	0.803	0.40	0.26	=	1.45	0.55	0.26	J	0.43	0.28	0.12	UJ	0.01	0.19	0.29	=	1.33	0.26	0.27
		SLD80381	908888	1029634	UJ	0.33	0.40	0.46	UJ	1.31	1.57	1.95	=	6.51	0.26	0.18	=	1.13	0.17	0.19	=	1.49	0.62	0.27	=	5.53	1.41	0.27	=	1.12	0.52	0.14	UJ	0.05	0.57	0.93	=	3.74	0.72	0.87
3	SLD80382	SLD80382	908636	1029683	UJ	-0.06	0.13	0.12	UJ	0.25	0.35	0.54	=	2.42	0.08	0.04	=	0.35	0.04	0.04	J	0.6	0.36	0.29	=	3.00	0.89	0.13	J	0.33	0.26	0.13	=	0.28	0.13	0.26	=	3.33	0.29	0.27
		SLD80383	908636	1029683	UJ	0.08	0.14	0.13	UJ	0.03	0.39	0.59	=	1.61	0.07	0.05	=	0.68	0.06	0.05	=	1.15	0.55	0.34	=	1.83	0.71	0.28	J	0.53	0.37	0.33	UJ	0.15	0.18	0.30	=	1.43	0.25	0.26
		SLD80384	908636	1029683	UJ	-0.03	0.11	0.11	UJ	-0.09	0.31	0.45	=	1.27	0.06	0.04	=	0.49	0.05	0.04	J	0.72	0.41	0.26	=	1.14	0.52	0.14	J	0.46	0.32	0.14	U	0.16	0.14	0.24	=	1.01	0.19	0.26
		SLD80385	908636	1029683	U	0.52	0.46	0.40	UJ	2.2	1.25	1.90	=	4.74	0.23	0.17	=	1.16	0.19	0.17	=	1.26	0.57	0.36	=	2.79	0.90	0.27	=	1.4	0.59	0.15	UJ	0.05	0.54	0.89	=	3.72	0.71	0.67
3	SLD80443	SLD80443	908677	1029599	UJ	-0.15	0.48	0.43	UJ	-0.59	1.31	1.89	=	5.60	0.24	0.17	=	1.10	0.17	0.18	=	1.41	0.64	0.16	=	4.19	1.24	0.31	=	1.37	0.63	0.36	J	1.11	1.09	1.01	=	11.87	1.11	0.94
		SLD80444	908677	1029599	UJ	-0.04	0.12	0.12	UJ	-0.10	0.32	0.47	=	1.60	0.06	0.04	=	0.56	0.05	0.04	=	1.15	0.52	0.14	=	1.71	0.66	0.14	J	0.52	0.34	0.14	J	0.29	0.25	0.26	=	1.30	0.21	0.22
		SLD80445	908677	1029599	UJ	0.00	0.17	0.16	UJ	0.52	0.57	0.67	=	1.71	0.07	0.06	=	0.81	0.07	0.06	=	1.25	0.61	0.32	=	1.79	0.75	0.38	J	0.94	0.51	0.17	UJ	0.19	0.20	0.33	=	1.45	0.25	0.29
		SLD80446	908677	1029599	UJ	-0.03	0.16	0.14	UJ	0.08	0.38	0.58	=	2.41	0.08	0.05	=	0.68	0.05	0.05	=	1.21	0.56	0.28	=	2.25	0.80	0.28	=	1.09	0.53	0.28	UJ	-0.02	0.18	0.29	=	1.57	0.25	0.24
3	SLD80447	SLD80447	908740	1029630	UJ	-0.11	0.34	0.31	UJ	-0.25	0.83	1.36	=	3.13	0.17	0.13	=	0.20	0.09	0.11	J	0.29	0.34	0.26	=	1.89	0.94	0.48	J	0.29	0.34	0.26	UJ	0.093	0.37	0.61	=	1.58	0.41	0.51
		SLD80448	908740	1029630	UJ	-0.04	0.18	0.17	UJ	0.23	0.49	0.74	=	3.05	0.11	0.07	=	0.77	0.08	0.07	J	0.61	0.41	0.31	=	2.52	0.91	0.37	J	0.93	0.51	0.17	UJ	0.21	0.21	0.36	=	2.26	0.28	0.29
		SLD80449	908740	1029630	UJ	0.29	0.18	0.20	UJ	0.37	0.58	0.88	=	2.97	0.11	0.08	=	1.03	0.09	0.08	=	1.13	0.55	0.16	=	2.51	0.88	0.30	=	1.41	0.62	0.16	UJ	0.11	0.24	0.41	=	2.39	0.31	0.35
		SLD80450	908740	1029630	UJ	-0.04	0.44	0.43	UJ	0.81	1.28	1.89	=	3.22	0.19	0.18	=	1.31	0.17	0.17	=	1.74	0.68	0.15	=	3.44	1.03	0.27	=	1.56	0.64	0.15	UJ	0.32	0.50	0.84	=	2.60	0.62	0.73
3	SLD85180	SLD85180	908643	1029767	UJ	0.09	0.14	0.20	UJ	-0.16	0.37	0.54	=	1.85	0.07	0.05	=	0.36	0.04	0.05	J	0.56	0.39	0.36	J	2.08	0.79	0.16	J	0.42	0.32	0.16	UJ	0.07	0.16	0.26	=	1.69	0.48	0.41
		SLD85181	908643	1029767	=	0.31	0.09	0.29	UJ	0.10	0.54	0.76	=	4.04	0.12	0.07	=	0.93	0.07	0.06	=	1.02	0.49	0.26	=	3.73	1.07	0.14	=	1.03	0.49	0.14	=	0.76	0.24	0.39	=	14.89	1.12	0.68
3	SLD85182	SLD85182	908621	1029758	UJ	0.05	0.09	0.14	UJ	0.12	0.24	0.37	=	1.04	0.05	0.04	J	0.18	0.03	0.03	J	0.42	0.31	0.14	J	1.80	0.69	0.14	J	0.36	0.29	0.27	UJ	0.01	0.11	0.18	=	0.63	0.27	0.27
		SLD85183	908621	1029758	U	0.37	0.14	0.24	U	0.54	0.43	0.64	=	4.31	0.12	0.05	=	0.57	0.05	0.05	=	1.54	0.65	0.15	=	5.89	1.55	0.15	J	0.91	0.48	0.15	UJ	0.07	0.20	0.33	=	4.30	0.44	0.49
Preferential Pathway Samples	SLD79011	SLD79011	908907	1029843	U	0.25	0.12	0.19	UJ	0.31	0.53	0.83	=	3.58	0.14	0.08	=	1.51	0.10	0.08	=	1.86	0.68	0.30	=	2.91	0.89	0.13	=	1.82	0.67	0.13	UJ	0.23	0.24	0.41	=	2.71	0.80	0.58
	SLD79012	SLD79012	908944	1029812	UJ	0.10	0.13	0.20	U	0.56	0.52	0.84	=	4.43	0.16	0.07	=	0.93	0.09	0.08	=	1.01	0.50	0.35	=	3.49	1.03	0.14	=	0.93	0.47	0.14	J	0.43	0.27	0.41	=	5.75		

Table A-4-2. Non-Radiological Final Status Survey Data

Station ID	Sample ID	Easting	Northing	Arsenic			Cadmium		
				Result	DL	VQ	Result	DL	VQ
SLD77213	SLD77213	908888	1029846	46.7	0.33	=	1.4	0.054	=
SLD78997	SLD78997	908920	1029844	4.4	0.25	=	0.22	0.041	U

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ATTACHMENT A-5
EVALUATION OF FINAL STATUS SURVEY SOIL SAMPLE DATA

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Table A-5-1. SU-1 Class 1 Excavation Surface Soil Data Summary

Background Reference Area Soil Data Summary										
Statistic	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G
Mean	2.78	1.94	1.44	0.09	1.09	0.95	1.16	0.14	0.89	0.82
Median	2.53	1.66	1.16	0.08	1.07	0.97	1.10	0.11	0.98	0.76
UCL-95	3.04	2.18	1.67	0.12	1.18	1.00	1.26	0.18	1.12	-
St. Dev	0.89	0.76	0.75	0.08	0.29	0.17	0.35	0.14	0.76	0.21
Range	3.93	3.19	3.19	0.33	1.25	0.82	1.59	0.80	2.55	0.95
No. Samples	32	32	32	32	32	32	32	32	32	32

SU-1 Class 1 Excavation Surface Soil Data Summary												
Statistic	Type	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
Mean	Systematic	3.56	3.46	5.52	0.38	1.14	0.92	1.50	0.12	0.21	0.44	0.21
Median	Systematic	3.29	3.26	4.13	0.31	1.01	0.95	1.34	0.07	0.23	0.41	0.18
Std. Dev.	Systematic	2.05	1.66	4.81	0.36	0.48	0.22	0.58	0.15	0.18	0.20	0.17
No. samples	Systematic	19	19	19	19	19	19	19	19	19	19	19
Maximum	All	9.48	19.82	32.54	1.47	9.14	12.90	8.36	1.63	1.83	1.55	1.34
Range	All	8.52	18.85	31.97	1.47	8.64	12.90	7.77	1.63	1.83	1.42	1.34

SU-1 Class 1 Excavation Surface Soil Data													
Sample ID	Type	HTZ Area (m ²)	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
HTZ75405	Biased	2	7.53	6.55	17.48	0.72	1.97	0.20	2.10	0.56	0.42	0.98	0.70
HTZ75406	Biased	5	5.06	4.60	14.17	0.99	1.32	0.24	2.50	0.28	1.44	0.71	0.45
HTZ75407	Biased	5	2.92	2.46	1.96	0.27	1.94	0.37	1.49	0.30	0.84	0.36	0.10
HTZ76755	Biased	1	7.79	7.09	9.20	0.47	3.61	1.60	4.30	0.65	1.09	0.94	0.67
HTZ76757	Biased	4	6.82	6.41	6.47	0.38	0.95	0.00	1.92	0.16	0.00	0.65	0.40
HTZ84055	Biased	2	6.44	5.60	20.25	1.22	0.91	0.06	0.93	0.46	0.49	0.89	0.62
HTZ84056	Biased	0.5	5.16	10.01	13.11	0.82	0.78	-0.10	1.46	0.47	1.32	0.98	0.77
HTZ84060	Biased	0.5	5.07	3.94	2.34	0.03	0.89	0.26	1.89	0.10	0.00	0.44	0.17
HTZ84061	Biased	1	3.65	3.92	3.25	0.26	0.84	-0.35	1.36	0.19	0.34	0.38	0.17
HTZ84062	Biased	1	3.96	6.47	8.99	0.54	0.78	-0.25	1.09	1.63	1.83	0.66	0.45
HTZ84065	Biased	2	7.12	6.29	8.12	0.40	1.05	0.00	1.65	0.56	0.91	0.71	0.42
HTZ84066	Biased	1	6.68	5.11	10.73	0.56	1.64	0.11	1.70	0.24	0.18	0.77	0.48
HTZ84067	Biased	1	3.78	4.45	20.08	1.35	1.33	0.00	1.54	0.00	0.00	0.79	0.56
HTZ84068	Biased	2	7.42	6.72	10.12	0.53	1.42	-0.08	1.40	0.42	0.78	0.79	0.51
HTZ84071	Biased	1	2.54	2.05	2.19	0.19	0.53	-0.47	0.77	0.00	0.28	0.25	0.02
HTZ84072	Biased	1	3.92	3.98	3.69	0.17	0.95	-0.41	0.80	0.20	0.00	0.40	0.18
HTZ84073	Biased	1	6.62	6.77	32.54	1.47	1.35	0.10	1.65	0.37	0.33	1.19	0.96
HTZ84074	Biased	1	4.59	3.12	4.57	0.07	1.20	-0.12	1.25	0.30	0.13	0.48	0.19
HTZ84075	Biased	1	5.92	5.13	6.99	0.61	1.52	0.43	2.17	0.10	0.00	0.64	0.35
HTZ84076	Biased	1	4.20	2.61	4.22	0.22	0.78	-0.22	1.67	0.32	0.15	0.42	0.15
HTZ84077	Biased	1	5.02	4.99	18.39	0.98	0.70	-0.13	0.87	0.14	0.00	0.75	0.54
HTZ84078	Biased	1	3.35	3.45	14.15	0.84	0.87	-0.40	1.12	0.00	0.15	0.57	0.35
HTZ84079	Biased	1	4.75	4.44	14.77	0.82	1.22	0.12	1.52	0.00	0.72	0.69	0.44
HTZ84080	Biased	1	5.99	4.78	2.87	0.12	0.89	-0.23	1.24	0.29	1.20	0.52	0.24
HTZ84081	Biased	1	6.08	5.29	14.29	0.89	1.17	-0.11	1.41	0.29	0.00	0.77	0.49
HTZ84082	Biased	1	4.53	4.32	4.82	0.17	1.48	-0.03	1.98	0.17	0.68	0.50	0.25
HTZ84083	Biased	1	4.65	3.68	3.89	-0.03	0.63	-0.11	1.37	0.50	0.58	0.43	0.17
HTZ84084	Biased	1	6.38	5.31	21.46	1.12	1.15	-0.06	1.57	0.36	0.59	0.93	0.64
HTZ85285	Biased	2	4.40	4.01	3.50	0.19	1.23	-0.01	1.59	0.00	0.96	0.45	0.19
HTZ85286	Biased	2	5.28	4.23	4.35	-0.06	1.12	0.06	2.22	0.00	0.22	0.51	0.23
HTZ85287	Biased	2	7.56	6.81	15.22	0.96	1.32	0.14	1.76	0.29	0.77	0.90	0.62
HTZ85288	Biased	2	3.34	3.81	9.50	0.57	1.17	-0.17	1.79	0.00	0.13	0.52	0.29

SU-1 Class 1 Excavation Surface Soil Data (Continued)													
Sample ID	Type	HTZ Area (m ²)	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
HTZ94776	Biased	1	2.22	1.19	3.53	0.01	0.74	0.84	1.02	-0.01	0.00	0.27	0.04
HTZ94777	Biased	1	6.96	5.78	6.94	0.19	1.58	2.37	1.74	0.31	0.42	0.76	0.48
HTZ94778	Biased	1	3.27	3.50	4.62	0.24	1.72	1.53	1.39	0.13	0.50	0.44	0.21
HTZ94779	Biased	1	6.72	5.58	6.48	0.10	9.14	12.90	8.36	-0.13	1.63	1.44	1.16
HTZ94780	Biased	1	6.11	5.23	6.88	0.28	1.76	1.34	1.83	0.46	0.16	0.66	0.38
SLD85060	Biased	-	4.76	3.40	9.34	0.59	0.79	-0.17	0.96	0.00	0.00	0.56	0.29
SLD85205	Biased	-	8.23	17.00	12.12	0.79	0.88	-0.38	1.41	0.86	1.16	1.43	1.22
SLD85206	Biased	-	3.89	6.48	9.82	0.71	0.75	-0.43	1.16	0.20	0.00	0.68	0.47
SLD85207	Biased	-	5.89	12.74	8.99	0.55	0.83	-0.66	1.72	0.75	0.89	1.08	0.87
SLD85208	Biased	-	6.11	10.04	12.06	0.85	1.28	-0.22	1.25	0.45	0.37	1.00	0.76
SLD85209	Biased	-	6.51	13.41	13.79	0.84	1.24	-0.16	1.91	0.60	0.61	1.25	1.02
SLD85210	Biased	-	6.30	19.82	8.88	0.53	0.78	-0.54	1.47	0.79	0.94	1.55	1.34
SLD85211	Biased	-	5.71	4.74	10.03	0.60	1.09	-0.42	0.59	0.66	0.19	0.65	0.37
SLD85212	Biased	-	5.49	4.68	10.40	0.59	0.64	-0.49	0.96	0.11	0.01	0.62	0.36
SLD85213	Biased	-	5.90	6.60	15.03	1.06	1.30	-0.11	1.44	0.52	0.75	0.83	0.60
SLD85214	Biased	-	6.36	10.91	11.37	0.88	1.40	-0.27	1.05	0.52	0.16	1.05	0.82
SLD85263	Biased	-	3.71	5.18	17.79	0.04	1.44	-0.19	0.63	0.00	0.45	0.80	0.57
SLD85264	Biased	-	4.08	5.78	3.99	0.52	0.77	0.49	0.72	0.23	0.64	0.52	0.31
SLD85265	Biased	-	3.97	3.34	9.07	0.45	0.98	0.86	1.17	-0.33	0.21	0.51	0.25
SLD85267	Biased	-	3.02	2.69	3.21	0.08	0.68	0.62	0.91	-0.08	0.37	0.31	0.09
SLD77212	Systematic	-	0.96	0.97	0.97	-0.05	0.87	0.78	1.11	0.22	0.26	0.14	0.00
SLD77213	Systematic	-	1.73	2.42	3.06	0.03	1.18	0.96	1.44	0.08	0.19	0.30	0.07
SLD78994	Systematic	-	2.23	3.04	6.99	0.50	0.57	0.95	2.07	0.23	0.00	0.41	0.18
SLD78997	Systematic	-	0.96	1.17	0.57	0.15	0.56	0.46	0.71	0.00	0.06	0.13	0.00
SLD79000	Systematic	-	3.52	3.04	2.51	0.24	1.00	0.86	1.30	0.02	0.12	0.35	0.09
SLD79003	Systematic	-	4.40	4.63	4.23	-0.05	0.97	1.08	1.53	0.52	0.00	0.46	0.24
SLD79006	Systematic	-	2.14	3.45	4.90	0.36	0.82	0.90	1.78	0.07	0.00	0.39	0.17
SLD85152	Systematic	-	3.72	3.29	2.56	-0.04	1.01	0.98	1.21	0.19	0.09	0.37	0.11
SLD85156	Systematic	-	5.10	4.21	4.17	0.67	1.49	1.05	1.28	0.04	0.23	0.52	0.24
SLD85158	Systematic	-	4.20	5.14	4.13	0.37	1.99	0.99	1.86	0.23	0.12	0.56	0.33
SLD85160	Systematic	-	2.67	2.40	18.93	1.18	1.28	0.76	1.01	0.00	0.49	0.64	0.39
SLD85162	Systematic	-	6.13	5.56	16.29	1.03	1.19	1.19	1.34	0.13	0.29	0.81	0.55
SLD85164	Systematic	-	2.93	2.88	3.10	0.14	0.88	0.77	1.10	0.00	0.34	0.32	0.10
SLD85167	Systematic	-	3.29	2.86	2.65	0.28	0.97	0.90	1.95	0.01	0.24	0.34	0.09
SLD85169	Systematic	-	5.53	4.85	6.50	0.49	1.14	1.06	2.22	0.00	0.24	0.57	0.30
SLD85171	Systematic	-	1.57	1.15	3.36	0.31	0.50	0.50	0.65	0.00	0.00	0.21	0.04
SLD85174	Systematic	-	9.48	7.72	6.79	0.78	1.37	0.96	0.78	0.39	0.36	0.86	0.57
SLD85176	Systematic	-	4.01	3.26	9.80	0.67	1.48	0.93	2.64	0.14	0.66	0.56	0.28
SLD95119	Systematic	-	3.08	3.68	3.41	0.15	2.45	1.47	2.45	-0.01	0.39	0.48	0.25

Notes:

Results are expressed in pCi/g; SOR values are unitless.

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

Values reported to two decimal places regardless of the number of significant digits.

Subsurface SOR_N calculation used for excavation surface samples.

Table A-5-2. SU-1 Subsurface Soil Data Summary

Background Reference Area Soil Data Summary										
Statistic	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G
Mean	2.78	1.94	1.44	0.09	1.09	0.95	1.16	0.14	0.89	0.29
Median	2.53	1.66	1.16	0.08	1.07	0.97	1.10	0.11	0.98	0.27
UCL-95	3.04	2.18	1.67	0.12	1.18	1.00	1.26	0.18	1.12	-
St. Dev.	0.89	0.76	0.75	0.08	0.29	0.17	0.35	0.14	0.76	0.08
Range	3.93	3.19	3.19	0.33	1.25	0.82	1.59	0.80	2.55	0.35
No. Samples	32	32	32	32	32	32	32	32	32	32

SU-1 Subsurface Data Summary											
Statistic	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
Mean	3.06	2.89	3.75	0.20	1.12	0.97	1.32	0.06	0.23	0.38	0.14
Median	3.00	3.02	2.54	0.13	1.02	0.97	1.26	0.08	0.19	0.38	0.14
St. Dev.	1.05	0.99	3.93	0.29	0.42	0.19	0.39	0.12	0.30	0.12	0.10
No. Samples	26	26	26	26	26	26	26	26	26	26	26
Maximum	5.32	5.00	18.72	1.24	2.31	1.33	2.49	0.29	0.86	0.69	0.44
Range	4.12	4.81	17.90	1.24	1.87	0.73	1.79	0.29	0.86	0.53	0.44

SU-1 Subsurface Soil Data													
Sample ID	Station ID	Depth (ft bgs)	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
SLD78995	SLD78994	1.5-2.0	1.40	2.26	1.57	0.12	1.05	0.86	1.36	0.14	0.08	0.25	0.02
SLD78996	SLD78994	2.5-3.0	1.19	2.44	1.38	0.20	1.46	0.71	1.19	0.17	-0.04	0.29	0.06
SLD78998	SLD78997	1.5-2.0	3.15	3.09	2.33	0.24	0.91	0.88	1.34	0.11	0.47	0.32	0.09
SLD78999	SLD78997	2.5-3.0	1.72	2.12	1.13	-0.10	0.94	0.70	1.43	0.04	-0.27	0.23	0.01
SLD79001	SLD79000	1.5-2.0	3.65	3.30	2.33	0.06	1.09	0.86	1.23	0.08	0.18	0.36	0.11
SLD79004	SLD79003	1.5-2.0	4.40	5.00	2.58	-0.02	1.94	1.17	2.49	0.16	0.10	0.51	0.28
SLD79007	SLD79006	1.5-2.0	2.53	3.64	4.31	0.10	0.85	1.07	2.12	0.17	0.23	0.40	0.18
SLD85153	SLD85152	3.5-4.0	3.88	4.34	2.45	0.23	0.90	1.13	1.44	0.23	0.38	0.41	0.19
SLD85154	SLD85152	5.5-6.0	2.98	3.21	2.14	0.13	1.04	0.88	0.79	0.03	0.19	0.33	0.10
SLD85157	SLD85156	2.5-3.0	5.32	3.68	3.77	0.07	1.36	1.09	1.23	0.16	0.30	0.52	0.23
SLD85159	SLD85158	2.5-3.0	2.17	1.49	1.59	0.13	0.90	0.78	1.29	0.09	0.45	0.24	0.00
SLD85161	SLD85160	2.0-2.5	2.44	3.09	6.91	0.42	1.81	0.96	0.97	0.08	0.32	0.46	0.23
SLD85163	SLD85162	3.5-4.0	2.77	0.18	13.44	0.82	1.19	1.19	1.72	-0.05	0.53	0.53	0.26
SLD85165	SLD85164	3.0-3.5	2.96	3.38	2.98	-0.03	2.31	1.33	1.75	-0.08	-0.38	0.44	0.21
SLD85166	SLD85164	5.0-5.5	3.55	3.91	2.63	0.18	1.38	1.13	1.00	0.13	0.20	0.41	0.17
SLD85168	SLD85167	3.0-3.5	2.40	1.97	1.91	-0.10	0.79	0.84	1.32	0.08	0.67	0.25	0.01
SLD85170	SLD85169	2.0-2.5	4.58	2.94	2.94	0.17	1.34	1.05	1.24	0.07	0.86	0.45	0.17
SLD85172	SLD85171	1.5-2.0	3.89	2.78	4.61	0.13	0.74	1.11	1.28	0.16	0.16	0.43	0.15
SLD85175	SLD85174	2.5-3.0	3.72	3.48	2.50	0.37	1.20	1.01	1.68	-0.15	0.47	0.38	0.13
SLD85177	SLD85176	2.5-3.0	2.45	2.52	1.30	0.19	0.44	0.70	1.04	-0.13	0.49	0.24	0.04
SLD85178	SLD85176	4.5-5.0	4.16	2.83	3.49	0.02	1.00	1.25	1.06	-0.09	-0.16	0.43	0.15
SLD85179	SLD85176	5.5-6.0	3.78	3.61	3.45	0.47	1.01	0.97	1.36	-0.07	-0.04	0.39	0.15
SLD85266	SLD85265	1.0-1.5	3.73	3.32	18.72	1.24	0.52	0.96	1.13	0.15	0.17	0.69	0.44
SLD85268	SLD85267	2.0-2.5	3.02	2.57	4.23	0.12	0.97	0.82	1.16	0.29	0.59	0.35	0.10
SLD95120	SLD95119	1.5-2.0	1.27	1.28	0.82	0.02	0.80	0.60	0.70	0.03	0.10	0.15	0.00
SLD95121	SLD95119	2.5-3.0	2.55	2.61	1.92	0.01	1.08	1.18	1.02	-0.11	-0.17	0.29	0.07

Notes:
 Results are expressed in pCi/g; SOR values are unitless.
 Negative results are less than the laboratory system's background level.
 Values reported to two decimal places regardless of the number of significant digits.

Table A-5-3. SU-2 Class 1 Excavation Surface Soil Data Summary

Background Reference Area Soil Data Summary										
Statistic	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G
Mean	2.78	1.94	1.44	0.09	1.09	0.95	1.16	0.14	0.89	0.82
Median	2.53	1.66	1.16	0.08	1.07	0.97	1.10	0.11	0.98	0.76
UCL-95	3.04	2.18	1.67	0.12	1.18	1.00	1.26	0.18	1.12	-
St. Dev.	0.89	0.76	0.75	0.08	0.29	0.17	0.35	0.14	0.76	0.21
Range	3.93	3.19	3.19	0.33	1.25	0.82	1.59	0.80	2.55	0.95
No. Samples	32	32	32	32	32	32	32	32	32	32

SU-2 Class 1 Excavation Surface Soil Data Summary												
Statistic	Type	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
Mean	Systematic	3.80	3.86	6.44	0.38	0.82	0.86	1.27	0.03	0.13	0.47	0.24
Median	Systematic	4.03	3.41	4.77	0.35	0.84	0.93	1.33	0.03	0.19	0.46	0.20
St. Dev.	Systematic	1.07	1.57	6.04	0.37	0.31	0.22	0.23	0.12	0.29	0.16	0.16
No. Samples	Systematic	18	18	18	18	18	18	18	18	18	18	18
Maximum	All	10.07	15.86	39.36	2.47	1.81	1.53	2.22	0.70	1.10	1.35	1.08
Range	All	8.26	13.62	37.98	2.47	1.48	1.14	1.55	0.70	1.10	1.13	1.06

SU-2 Class 1 Excavation Surface Soil Data													
Sample ID	Type	HTZ Area (m ²)	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
HTZ84069	Biased	1	6.79	15.86	7.94	0.22	1.41	0.98	1.70	0.64	0.54	1.31	1.08
HTZ84070	Biased	1	3.80	3.24	7.65	0.62	1.18	1.05	0.67	0.12	0.33	0.48	0.22
HTZ84085	Biased	1	3.46	4.54	19.85	1.40	0.89	0.95	1.06	0.14	-0.64	0.76	0.54
HTZ84086	Biased	1	4.11	4.69	11.82	0.66	1.18	0.94	1.41	0.21	0.00	0.63	0.40
HTZ84087	Biased	2	5.65	7.26	12.14	0.87	1.40	1.23	1.05	0.70	1.10	0.82	0.59
HTZ84088	Biased	1	5.53	4.72	26.84	1.79	1.10	0.92	1.77	-0.13	0.15	0.98	0.69
HTZ84089	Biased	1	5.78	11.64	10.83	0.61	0.91	1.03	2.03	0.01	0.66	1.06	0.84
HTZ84090	Biased	1	4.81	5.55	7.87	0.54	0.47	0.53	1.39	0.09	0.41	0.56	0.37
HTZ84091	Biased	1	4.85	4.40	22.87	0.94	1.12	1.08	1.36	0.07	0.52	0.85	0.60
HTZ84092	Biased	1	3.48	3.32	2.17	0.07	1.10	0.94	1.32	0.06	0.27	0.35	0.11
HTZ84093	Biased	1	3.12	2.71	7.07	0.52	0.97	0.74	1.79	0.02	0.87	0.41	0.16
HTZ84094	Biased	2	10.07	9.00	20.95	1.01	0.50	0.90	0.97	0.54	0.94	1.15	0.88
HTZ84095	Biased	1	7.05	5.60	4.78	0.21	1.15	1.24	1.51	0.36	0.81	0.65	0.37
HTZ84096	Biased	1	5.18	5.11	4.46	0.22	0.96	1.14	1.53	0.03	-0.27	0.51	0.28
HTZ85283	Biased	1	8.02	6.36	5.55	0.27	1.64	1.05	2.17	0.44	0.46	0.75	0.47
HTZ85284	Biased	1	8.05	5.69	5.95	0.83	1.18	1.03	1.31	0.35	0.05	0.73	0.45
HTZ85289	Biased	2	5.49	5.81	32.66	1.71	1.06	0.73	1.12	0.20	0.69	1.11	0.88
HTZ85290	Biased	1	6.17	5.19	6.98	0.45	1.22	1.33	1.38	0.33	0.83	0.64	0.36
HTZ85291	Biased	1	4.16	4.97	15.75	0.97	1.26	1.07	1.76	0.09	0.97	0.73	0.50
HTZ85292	Biased	1	7.08	5.84	6.31	0.27	1.02	1.03	1.20	0.11	0.79	0.67	0.39
HTZ85293	Biased	1	4.30	3.36	3.06	0.14	1.06	1.03	1.47	-0.09	0.41	0.42	0.14
HTZ85294	Biased	1	7.48	6.49	4.86	0.41	1.81	1.35	2.22	0.32	0.89	0.72	0.43
HTZ85296	Biased	1	9.60	5.32	7.02	0.53	1.11	1.39	1.17	0.27	1.04	0.87	0.60
HTZ85297	Biased	2	6.51	5.20	5.63	0.37	1.02	1.40	1.08	0.24	0.59	0.64	0.36
HTZ85298	Biased	1	4.69	3.36	3.61	0.10	0.95	1.11	1.16	0.14	0.19	0.46	0.18
HTZ85299	Biased	2	5.19	4.18	5.67	0.29	1.21	1.53	1.41	-0.15	0.66	0.56	0.28
HTZ85305	Biased	8	4.65	4.17	4.34	0.39	1.34	0.97	0.75	0.24	-0.16	0.49	0.22
HTZ85306	Biased	2	8.70	6.99	23.45	1.37	1.36	0.98	1.73	0.41	0.76	1.14	0.85
HTZ85307	Biased	1	9.10	8.01	20.41	1.19	0.96	1.04	1.44	0.34	0.81	1.08	0.81
HTZ85309	Biased	1	2.80	3.43	2.73	0.13	1.04	0.90	1.17	0.06	0.27	0.35	0.12
HTZ85310	Biased	1	2.00	2.24	1.38	0.21	0.61	0.66	0.91	0.05	-0.07	0.22	0.02
HTZ85311	Biased	1	3.78	3.79	3.96	0.08	0.94	0.92	1.38	0.19	-0.10	0.39	0.17
HTZ85312	Biased	1	4.45	3.80	3.26	0.10	0.81	1.05	1.17	0.13	0.11	0.43	0.17

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SU-2 Class 1 Excavation Surface Soil Data (Continued)													
Sample ID	Type	HTZ Area (m ²)	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
HTZ94775	Biased	1	8.16	8.83	7.24	0.75	1.12	0.84	1.38	-0.17	0.10	0.81	0.58
SLD85525	Biased	-	7.36	6.39	39.36	2.47	1.16	1.02	1.48	0.28	0.61	1.35	1.07
SLD85528	Biased	-	3.52	2.36	18.49	0.98	1.29	0.93	1.28	0.15	0.07	0.69	0.40
SLD85215	Systematic	-	3.39	4.01	2.69	0.24	0.33	0.73	1.59	0.05	0.24	0.37	0.16
SLD85219	Systematic	-	4.54	4.71	8.19	0.59	1.37	1.00	1.35	0.03	-0.06	0.57	0.34
SLD85221	Systematic	-	4.09	4.10	5.63	0.37	1.33	1.02	1.44	0.18	0.43	0.47	0.24
SLD85223	Systematic	-	3.03	2.27	2.55	0.11	0.79	0.89	1.02	-0.10	0.29	0.31	0.04
SLD85225	Systematic	-	4.76	4.44	5.36	0.45	0.58	0.71	0.84	0.20	0.13	0.47	0.25
SLD85227	Systematic	-	3.97	3.28	27.68	1.57	1.05	1.01	1.32	-0.01	-0.04	0.89	0.62
SLD85233	Systematic	-	1.82	2.59	2.00	0.16	0.45	0.39	0.96	0.09	-0.06	0.24	0.05
SLD85235	Systematic	-	4.83	3.31	5.57	0.43	0.75	0.95	1.38	0.12	0.19	0.50	0.22
SLD85237	Systematic	-	5.10	5.61	4.73	0.37	0.94	1.03	1.35	-0.03	0.41	0.54	0.32
SLD85239	Systematic	-	4.41	2.87	4.82	-0.14	0.88	0.91	1.05	-0.05	0.36	0.45	0.18
SLD85243	Systematic	-	3.23	2.40	2.78	0.12	0.66	1.02	1.28	0.02	-0.07	0.34	0.06
SLD85245	Systematic	-	3.07	2.82	6.20	0.34	0.94	0.74	0.93	-0.10	0.19	0.39	0.15
SLD85247	Systematic	-	2.37	2.82	14.70	0.74	1.27	1.06	1.66	0.16	0.36	0.57	0.34
SLD85249	Systematic	-	4.30	3.51	3.89	0.16	0.94	0.98	1.46	-0.02	-0.79	0.43	0.16
SLD85251	Systematic	-	1.80	3.02	4.52	0.18	0.51	0.42	1.37	0.04	0.06	0.33	0.13
SLD85255	Systematic	-	4.72	8.91	7.19	0.52	0.50	0.65	1.28	0.23	0.27	0.78	0.58
SLD85257	Systematic	-	5.25	5.01	4.61	0.12	0.95	1.22	1.41	-0.20	0.08	0.52	0.29
SLD95122	Systematic	-	3.68	3.78	2.79	0.58	0.60	0.73	1.18	-0.11	0.43	0.36	0.15

Notes:

Results are expressed in pCi/g; SOR values are unitless.

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

Values reported to two decimal places regardless of the number of significant digits.

Subsurface SOR_N calculation used for excavation surface samples.

Table A-5-4. SU-2 Excavation Subsurface Soil Data Summary

Background Reference Area Soil Data Summary										
Statistic	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G
Mean	2.78	1.94	1.44	0.09	1.09	0.95	1.16	0.14	0.89	0.29
Median	2.53	1.66	1.16	0.08	1.07	0.97	1.10	0.11	0.98	0.27
UCL-95	3.04	2.18	1.67	0.12	1.18	1.00	1.26	0.18	1.12	-
St. Dev.	0.89	0.76	0.75	0.08	0.29	0.17	0.35	0.14	0.76	0.08
Range	3.93	3.19	3.19	0.33	1.25	0.82	1.59	0.80	2.55	0.35
No. Samples	32	32	32	32	32	32	32	32	32	32

SU-2 Subsurface Soil Data Summary											
Statistic	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
Mean	3.27	3.07	5.19	0.34	1.07	0.91	1.38	0.07	0.15	0.41	0.17
Median	3.09	2.84	3.10	0.22	1.10	0.91	1.26	0.02	0.18	0.36	0.12
St. Dev.	1.55	1.18	6.26	0.38	0.31	0.21	0.50	0.15	0.32	0.19	0.17
No. Samples	30	30	30	30	30	30	30	30	30	30	30
Maximum	7.45	6.81	29.46	1.77	1.64	1.23	2.59	0.40	0.84	0.97	0.70
Range	6.62	5.69	28.53	1.77	1.15	0.84	2.33	0.40	0.84	0.82	0.69

SU-2 Subsurface Soil Data													
Sample ID	Station ID	Depth (ft bgs)	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
SLD85216	SLD85215	3.0-3.5	1.24	1.99	0.94	-0.04	1.22	0.88	1.20	-0.10	0.17	0.23	0.01
SLD85217	SLD85215	3.5-4.0	2.05	2.44	1.87	0.17	1.02	0.79	1.47	0.03	-0.18	0.27	0.04
SLD85218	SLD85215	5.5-6.0	1.94	2.84	1.56	-0.02	1.09	0.68	1.43	-0.03	0.13	0.29	0.06
SLD85220	SLD85219	4.0-4.5	1.90	2.07	1.90	0.09	1.29	0.95	1.29	-0.05	0.22	0.26	0.03
SLD85222	SLD85221	3.5-4.0	2.53	2.37	2.28	0.09	0.86	0.75	0.90	0.09	0.30	0.27	0.05
SLD85224	SLD85223	1.5-2.0	4.07	2.84	3.33	0.28	1.64	1.23	2.59	0.40	0.84	0.45	0.16
SLD85226	SLD85225	3.0-3.5	4.92	4.12	2.99	0.23	1.10	0.92	1.13	0.29	0.23	0.46	0.18
SLD85228	SLD85227	2.5-3.0	3.93	3.57	13.16	0.86	1.08	1.19	1.63	0.15	0.15	0.60	0.36
SLD85229	SLD85227	4.5-5.0	1.39	2.11	2.81	0.11	0.60	0.50	1.04	-0.07	0.21	0.24	0.04
SLD85234	SLD85233	2.0-2.5	2.98	2.45	2.80	0.03	1.35	0.86	0.98	0.01	0.50	0.34	0.08
SLD85236	SLD85235	4.0-4.5	4.40	3.23	2.61	0.51	1.43	0.91	1.55	0.05	0.11	0.44	0.15
SLD85238	SLD85237	3.5-4.0	3.92	3.28	1.97	0.44	0.61	0.89	0.97	-0.23	0.14	0.36	0.10
SLD85240	SLD85239	3.5-4.0	2.12	2.68	2.17	0.11	0.53	0.54	1.20	-0.03	-0.34	0.26	0.06
SLD85241	SLD85239	5.0-5.5	3.39	2.77	1.69	0.16	1.21	1.21	1.67	-0.02	-0.78	0.34	0.08
SLD85244	SLD85243	2.5-3.0	7.45	6.81	4.77	0.22	1.31	0.98	1.37	0.19	-0.09	0.68	0.41
SLD85246	SLD85245	1.5-2.0	1.13	2.03	1.13	0.13	0.68	0.78	0.87	0.00	0.39	0.21	0.01
SLD85248	SLD85247	1.5-2.0	1.89	2.39	3.32	0.35	0.78	0.88	1.21	0.08	0.08	0.28	0.07
SLD85250	SLD85249	3.0-3.5	2.90	1.63	2.05	0.61	1.10	1.19	1.24	0.12	0.64	0.31	0.04
SLD85252	SLD85251	1.5-2.0	2.07	2.65	5.96	0.35	1.31	0.75	0.93	-0.03	0.08	0.38	0.15
SLD85253	SLD85251	3.5-4.0	2.67	2.88	4.17	0.25	1.36	1.03	1.47	-0.09	0.30	0.37	0.14
SLD85254	SLD85251	4.5-5.0	2.18	2.14	3.48	0.09	0.70	0.80	0.95	0.02	0.21	0.27	0.05
SLD85256	SLD85255	2.0-2.5	0.82	1.12	2.36	0.10	0.50	0.39	0.26	0.01	0.17	0.15	0.02
SLD85258	SLD85257	2.5-3.0	5.51	3.82	3.21	0.65	1.14	1.11	2.32	0.18	-0.67	0.51	0.23
SLD85526	SLD85525	0.5-1.0	4.66	3.36	29.46	1.77	0.94	1.11	1.22	0.00	0.32	0.97	0.70
SLD85527	SLD85525	1.0-1.5	4.87	3.49	22.33	1.17	1.42	1.11	2.11	0.14	0.35	0.87	0.58
SLD85529	SLD85528	0.5-1.0	3.19	3.55	7.40	0.49	0.96	0.88	1.31	0.29	0.19	0.45	0.23
SLD85530	SLD85528	1.0-1.5	3.71	3.95	8.62	0.20	1.15	1.00	2.17	-0.04	0.29	0.51	0.28
SLD85531	SLD85528	1.5-2.0	4.70	5.52	7.02	0.41	1.54	1.08	1.88	0.21	0.33	0.61	0.38
SLD95123	SLD95122	1.5-2.0	4.47	3.08	3.98	0.31	0.97	0.93	1.08	0.38	0.11	0.44	0.16
SLD95124	SLD95122	2.0-2.5	5.12	5.05	4.35	0.12	1.38	1.09	1.97	0.29	0.14	0.52	0.28

Notes:

Results are expressed in pCi/g; SOR values are unitless.

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

Values reported to two decimal places regardless of the number of significant digits.

Table A-5-5. SU-3 Class 2 Surface Soil Data Summary

Background Reference Area Soil Data Summary										
Statistic	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G
Mean	2.78	1.94	1.44	0.09	1.09	0.95	1.16	0.14	0.89	0.82
Median	2.53	1.66	1.16	0.08	1.07	0.97	1.10	0.11	0.98	0.76
UCL-95	3.04	2.18	1.67	0.12	1.18	1.00	1.26	0.18	1.12	-
St. Dev.	0.89	0.76	0.75	0.08	0.29	0.17	0.35	0.14	0.76	0.21
Range	3.93	3.19	3.19	0.33	1.25	0.82	1.59	0.80	2.55	0.95
No. Samples	32	32	32	32	32	32	32	32	32	32

SU-3 Class 2 Surface Soil Data Summary												
Statistic	Type	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
Mean	Systematic	1.24	3.22	2.04	0.16	0.46	0.30	0.53	0.10	0.06	0.43	0.15
Median	Systematic	0.93	2.92	1.49	0.12	0.29	0.14	0.41	0.07	0.03	0.46	0.11
Std. Dev.	Systematic	0.77	1.98	1.35	0.10	0.44	0.28	0.38	0.10	0.18	0.21	0.15
No. samples	Systematic	18	18	18	18	18	18	18	18	18	18	18
Maximum	All	3.44	9.24	4.95	0.42	1.75	1.13	1.47	0.36	0.56	0.75	0.55
Range	All	2.77	8.00	4.27	0.36	1.75	1.05	1.35	0.36	0.56	0.64	0.55

SU-3 Class 2 Surface Soil Data													
Sample ID	Type	HTZ Area (m ²)	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
HTZ00437	Biased	1	0.99	1.60	1.25	0.11	0.32	0.25	0.47	0.10	0.07	0.41	0.00
HTZ84063	Biased	1	1.76	2.16	3.27	-0.10	0.93	1.08	0.97	0.04	0.14	0.71	0.11
SLD80378	Biased	-	1.06	2.25	0.78	0.14	0.09	0.12	0.59	-0.02	-0.13	0.49	0.06
SLD80447	Biased	-	3.13	1.89	1.58	0.09	0.29	0.20	0.29	-0.11	-0.25	0.71	0.07
SLD80443	Biased	-	5.60	4.19	11.87	1.11	1.37	1.10	1.41	-0.15	-0.59	1.63	0.83
SLD80382	Biased	-	2.42	3.00	3.33	0.28	0.33	0.35	0.60	-0.06	0.25	0.74	0.25
SLD76964 ^a	Biased	-	9.22	9.12	16.25	0.85	0.83	0.48	1.16	0.59	0.44	1.00	0.77
SLD76967 ^a	Biased	-	5.31	8.49	5.52	0.51	0.98	0.83	0.86	0.50	0.55	0.74	0.52
SLD78047	Biased	-	1.59	2.85	1.39	-0.06	0.31	0.20	0.68	0.03	0.26	0.66	0.18
SLD78049	Biased	-	2.42	4.19	1.45	0.10	0.04	0.17	0.54	0.17	0.23	0.90	0.45
SLD78051	Biased	-	4.01	3.84	3.44	0.27	0.31	0.44	0.97	-0.02	0.44	0.96	0.42
SLD78287	Biased	-	1.91	2.12	2.07	0.04	0.57	0.35	0.98	0.07	0.17	0.58	0.05
SLD78954	Biased	-	5.21	5.71	12.62	0.66	1.07	0.84	2.06	0.39	0.90	1.61	0.98
SLD85180	Biased	-	1.85	2.08	1.69	0.07	0.42	0.36	0.56	0.09	-0.16	0.53	0.03
SLD85182	Biased	-	1.04	1.80	0.63	0.01	0.36	0.18	0.42	0.05	0.12	0.44	0.00
SLD07207	Systematic	-	0.98	3.29	1.39	0.14	0.29	0.10	0.14	0.11	0.23	0.74	0.27
SLD07209 ^a	Systematic	-	1.67	6.06	2.37	0.28	0.55	0.32	0.14	0.36	0.56	0.49	0.29
SLD07211 ^a	Systematic	-	1.08	1.37	2.40	0.11	0.45	0.65	0.74	0.09	0.19	0.18	0.02
SLD07213 ^a	Systematic	-	2.25	4.62	4.77	0.19	0.83	0.43	0.67	-0.04	0.22	0.46	0.25
SLD07215 ^a	Systematic	-	3.44	9.24	4.57	0.42	0.61	0.43	0.95	0.28	-0.11	0.75	0.55
SLD07217 ^a	Systematic	-	1.04	2.88	1.37	0.10	0.00	0.13	0.27	0.19	0.03	0.23	0.06
SLD07219 ^a	Systematic	-	1.86	3.07	2.26	0.19	1.75	1.13	1.04	0.23	0.22	0.37	0.14
SLD07221	Systematic	-	0.67	1.40	0.92	0.12	0.05	0.10	0.15	0.01	0.04	0.32	0.00
SLD07223 ^a	Systematic	-	1.20	3.94	0.78	0.12	0.79	0.48	0.82	0.09	-0.12	0.33	0.13
SLD07227	Systematic	-	0.74	2.08	1.86	0.06	0.19	0.12	0.23	0.00	0.18	0.49	0.04
SLD07229 ^a	Systematic	-	0.69	2.08	1.25	0.06	0.29	0.10	0.80	0.01	-0.07	0.18	0.01
SLD07231 ^a	Systematic	-	0.74	1.32	1.47	0.08	0.09	0.08	0.12	0.03	-0.05	0.12	0.00
SLD07233 ^a	Systematic	-	0.70	1.24	0.68	0.10	0.23	0.16	0.39	0.10	0.07	0.11	0.00
SLD07235	Systematic	-	0.73	2.95	1.79	0.17	0.05	0.13	0.41	0.05	-0.16	0.65	0.21
SLD07237	Systematic	-	0.67	3.40	1.32	0.10	0.23	0.14	0.41	0.05	-0.07	0.75	0.29
SLD07243	Systematic	-	0.88	2.24	1.51	0.15	0.52	0.13	0.31	0.09	-0.03	0.58	0.06
SLD07245	Systematic	-	0.72	2.40	1.04	0.09	0.20	0.13	0.43	0.06	-0.07	0.54	0.09
SLD07249 ^a	Systematic	-	2.24	4.35	4.95	0.35	1.08	0.64	1.47	0.05	0.05	0.46	0.23

Values reported to two decimal places regardless of the number of significant digits.

^a Surface sample collected below cover material used subsurface SOR calculation.

Table A-5-6. SU-3 Subsurface Soil Data Summary

Background Reference Area Soil Data Summary										
Statistic	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G
Mean	2.78	1.94	1.44	0.09	1.09	0.95	1.16	0.14	0.89	0.29
Median	2.53	1.66	1.16	0.08	1.07	0.97	1.10	0.11	0.98	0.27
UCL-95	3.04	2.18	1.67	0.12	1.18	1.00	1.26	0.18	1.12	-
St. Dev.	0.89	0.76	0.75	0.08	0.29	0.17	0.35	0.14	0.76	0.08
Range	3.93	3.19	3.19	0.33	1.25	0.82	1.59	0.80	2.55	0.35
No. Samples	32	32	32	32	32	32	32	32	32	32

SU-3 Subsurface Soil Data Summary											
Statistic	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
Mean	2.84	3.39	5.18	0.30	1.02	0.85	1.26	0.24	0.26	0.41	0.19
Median	2.55	2.88	2.26	0.17	0.95	0.85	1.25	0.15	0.18	0.34	0.09
St. Dev.	1.69	1.86	6.43	0.33	0.38	0.27	0.42	0.41	0.40	0.25	0.23
No. Samples	47	47	47	47	47	47	47	47	47	47	47
Maximum	8.30	9.23	25.56	1.25	2.22	1.59	2.14	2.04	1.90	1.21	0.97
Range	7.77	8.54	25.56	1.25	1.89	1.33	1.57	2.04	1.90	1.12	0.97

SU-3 Subsurface Soil Data													
Sample ID	Station ID	Depth (ft bgs)	Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
HTZ00438	HTZ00437	0.5-1.0	0.97	2.94	1.20	0.12	0.72	0.26	0.69	0.05	0.18	0.27	0.07
HTZ84064	HTZ84063	1.5-2.0	8.30	6.86	14.51	1.04	1.52	1.14	1.52	0.27	0.12	0.94	0.66
SLD07208	SLD07207	1.5-2.0	4.43	8.51	16.37	0.73	2.22	1.15	1.65	0.50	0.33	1.04	0.81
SLD07210	SLD07209	2.0-2.5	2.79	3.17	2.72	0.20	0.83	1.07	1.31	0.07	0.42	0.34	0.12
SLD07212	SLD07211	2.0-2.5	1.76	2.88	1.49	0.23	1.19	0.90	1.41	0.12	-0.07	0.30	0.07
SLD07214	SLD07213	2.0-2.5	0.95	1.08	1.34	0.11	0.56	0.84	0.65	0.07	-0.36	0.15	0.00
SLD07216	SLD07215	1.6-2.1	4.01	2.40	7.24	0.46	0.88	0.97	0.61	0.15	-0.35	0.48	0.20
SLD07218	SLD07217	2.0-2.5	2.09	2.65	2.26	0.13	1.06	1.09	1.44	0.18	0.12	0.29	0.07
SLD07220	SLD07219	2.0-2.5	1.14	2.01	0.51	0.05	1.16	1.03	1.69	0.23	-0.06	0.22	0.01
SLD07222	SLD07221	1.5-2.0	1.64	2.43	1.59	0.17	0.91	0.77	1.05	0.31	-0.14	0.25	0.04
SLD07224	SLD07223	2.0-2.5	1.97	3.09	1.15	0.22	1.34	0.86	1.33	0.08	0.06	0.32	0.09
SLD07228	SLD07227	1.5-2.0	3.53	5.31	16.21	0.83	1.39	1.11	1.71	0.22	0.24	0.77	0.54
SLD07230	SLD07229	2.0-2.5	0.53	1.41	0.82	0.00	0.84	0.39	0.61	0.13	0.14	0.17	0.00
SLD07232	SLD07231	2.0-2.5	2.55	5.71	8.25	0.51	0.95	0.85	0.96	0.13	0.61	0.61	0.39
SLD07234	SLD07233	2.0-2.5	3.66	3.45	4.03	0.35	0.85	1.07	1.01	0.20	-0.19	0.40	0.16
SLD07236	SLD07235	1.0-1.5	3.82	5.40	6.18	0.35	1.89	1.11	2.01	0.21	0.08	0.61	0.38
SLD07238	SLD07237	1.5-2.0	1.16	2.47	1.16	0.12	0.87	0.32	0.57	0.02	0.10	0.25	0.04
SLD07244	SLD07243	1.5-2.0	0.81	1.65	0.87	0.05	0.87	0.59	0.71	0.15	0.22	0.19	0.00
SLD07246	SLD07245	1.5-2.0	0.58	0.69	-0.05	0.08	0.33	0.54	0.62	0.11	-0.04	0.08	0.00
SLD07250	SLD07249	2.0-2.5	2.58	3.12	3.06	0.07	1.25	0.98	1.33	0.22	0.15	0.35	0.12
SLD80379	SLD80378	1.0-1.5	3.75	5.84	14.32	0.96	0.97	0.97	1.96	0.20	0.70	0.74	0.52
SLD80380	SLD80378	3.2-3.7	1.31	1.45	1.33	0.01	0.43	0.79	0.80	-0.17	-0.09	0.18	0.00
SLD80381	SLD80378	5.3-5.8	6.51	5.53	3.74	0.05	1.12	1.13	1.49	0.33	1.31	0.58	0.31
SLD80448	SLD80447	1.5-2.0	3.05	2.52	2.26	0.21	0.93	0.77	0.61	-0.04	0.23	0.31	0.05
SLD80449	SLD80447	3.0-3.5	2.97	2.51	2.39	0.10	1.41	1.03	1.13	0.29	0.37	0.34	0.08
SLD80450	SLD80447	5.5-6.0	3.22	3.44	2.60	0.32	1.56	1.31	1.74	-0.04	0.81	0.39	0.15
SLD80444	SLD80443	1.7-2.2	1.60	1.71	1.30	0.29	0.52	0.56	1.15	-0.04	-0.10	0.18	0.00
SLD80445	SLD80443	3.2-3.7	1.71	1.79	1.45	0.19	0.94	0.81	1.25	0.00	0.52	0.21	0.00
SLD80446	SLD80443	5.7-6.2	2.41	2.25	0.25	-0.02	1.09	0.68	1.21	-0.03	0.08	0.24	0.02
SLD80383	SLD80382	1.7-2.2	1.61	1.83	1.43	0.15	0.53	0.68	1.15	0.08	0.03	0.20	0.00
SLD80384	SLD80382	3.5-4.0	1.27	1.14	1.01	0.16	0.46	0.49	0.72	-0.03	-0.09	0.14	0.00
SLD80385	SLD80382	5.0-5.6	4.74	2.79	3.72	0.05	1.40	1.16	1.26	0.52	0.20	0.48	0.20
SLD76965	SLD76964	0.5-2.0	7.05	9.23	25.56	1.25	1.18	0.94	1.64	0.43	0.64	1.21	0.97

SU-3 Subsurface Soil Data (Continued)													
Sample ID	Station ID		Ra-226	Th-230	U-238	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231	SOR _G	SOR _N
SLD76968	SLD76967	0.5-2.0	3.34	3.22	6.94	0.39	1.42	1.14	1.23	0.20	0.01	0.46	0.22
SLD76969	SLD76967	2.0-4.0	1.94	2.29	1.95	0.29	0.98	0.93	1.20	0.15	0.26	0.26	0.03
SLD78048	SLD78047	1.5-2.0	3.96	3.52	19.48	1.10	1.61	0.85	1.22	0.20	0.29	0.76	0.50
SLD78050	SLD78049	1.5-2.0	4.23	3.92	23.65	1.01	0.92	0.87	1.74	0.21	0.14	0.82	0.58
SLD78052	SLD78051	1.5-2.0	1.77	2.72	1.92	0.24	0.72	0.51	1.06	0.15	0.40	0.27	0.06
SLD78053	SLD78051	3.5-4.0	1.37	1.86	0.73	0.16	0.82	0.83	1.08	0.06	0.39	0.19	0.00
SLD78288	SLD78287	1.5-2.0	3.92	4.84	4.17	0.09	0.99	0.53	1.51	0.15	0.40	0.47	0.25
SLD78289	SLD78287	3.5-4.0	1.84	3.99	1.30	0.10	0.63	0.78	1.92	0.08	0.37	0.34	0.14
SLD78290	SLD78287	5.5-6.0	3.13	4.17	2.26	0.03	0.71	0.60	1.32	0.11	0.00	0.37	0.16
SLD78955	SLD78954	0.5-1.0	4.96	5.10	5.59	0.36	1.39	1.59	2.14	0.46	1.90	0.56	0.34
SLD78956	SLD78954	3.5-4.0	1.74	2.36	1.13	0.04	0.96	0.75	1.69	2.04	0.57	0.24	0.03
SLD78957	SLD78954	5.0-5.5	2.45	2.53	2.81	0.02	0.89	0.66	1.63	2.01	0.60	0.28	0.07
SLD85181	SLD85180	1.5-2.0	4.04	3.73	14.89	0.76	1.03	0.93	1.02	0.31	0.10	0.64	0.39
SLD85183	SLD85182	1.0-1.5	4.31	5.89	4.30	0.07	0.91	0.57	1.54	0.37	0.54	0.54	0.32

Notes:

Results are expressed in pCi/g; SOR values are unitless.

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

Values reported to two decimal places regardless of the number of significant digits.

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ATTACHMENT A-6
AREA-WEIGHTED AVERAGING AND CONFIRMATION THAT THE
AS LOW AS REASONABLY ACHIEVABLE PRINCIPLE IS MET

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AREA-WEIGHTED AVERAGING AND CONFIRMATION THAT THE AS LOW AS REASONABLY ACHIEVABLE PRINCIPLE IS MET

SOIL SAMPLES

The ROD allows small, localized areas of elevated radioactivity (i.e., SOR_N greater than one) to be left in place without undue risk to human health or the environment. Specifically, the radiological RGs contain a requirement that, for any 0.5 ft layer of soil, the concentration of individual radionuclides averaged over any 100 m² be less than or equal their limit. See Table 2 in the main report for the RGs.

Since this site has multiple radionuclides of concern, this RG is applied by ensuring that the SOR_N is less than one for an area of 100 m² (or less if the SU has an area of less than 100 m²) that includes a localized area with an SOR_N value that is greater than one. This attachment contains the analysis of how the RG for localized elevated results is met.

For each sample having results with an SOR_N greater than one, the 100 m² area around that sample is evaluated. All samples, which are of equivalent depth from the ground surface, in this 100 m² area are included in the evaluation. In some cases, a 100 m² area contains more than one sample result with an SOR_N greater than one.

The areas assigned to samples used for the weighted average are based on GWS data and surrounding samples that bound the elevated samples. GWS-based biased samples were taken based on elevated readings during the GWS, and the area was determined at that time based on the area that exhibited elevated readings. The weighted areas for systematic and other biased samples within the 100 m² area were assigned to be representative based on the total area remaining after subtracting the GWS-based samples. Typically, the remaining area is divided by the number of systematic samples to get the area assigned to systematic samples, and those areas are further subdivided to account for any other biased samples. Table A-6-1 contains the data, results, and associated figure for each area-weighted average calculation. The area-weighted SOR_N values are less than one, demonstrating that the radiological RG was met.

For the 100 m² area associated with the railroad track near the center of the western half of DT-10, the samples with an SOR_N above one were located between railroad ties. Several biased samples were taken along the track to ensure the RGs were met. In addition to the 100 m² area having a weighted average SOR_N value less than one, a simple average of the SOR_N from the three elevated samples and the four closest samples between the rails is less than one.

For the area associated with the structure near the center of DT-10, stations SLD85525 (samples SLD85525-SLD85527), SLD85528 (samples SLD85528-SLD85531), and HTZ85291 were oriented horizontally instead of vertically, with the first sample at the station being from the side wall of the excavation and others being further back into the wall. These samples were about one foot bgs. With stations SLD76964 (sample SLD76965) and SLD76967 being oriented vertically, the samples used in the analysis were those had the highest SOR_N at those stations; these two samples were also about 1.5 ft below the cover surface.

Table A-6-1. Calculation of Area-Weighted Average SOR_N

Location	Principle Survey Unit	Station Number	Sample Number	Effective Surface Area (m ²)	SOR_N	Area-Weighted Average SOR
Railroad Track, Near Center of Western Half (SLD85205, SLD85209, SLD85210)	SU-1	SLD85205	SLD85205	7	1.22	0.66
		SLD85209	SLD85209	6	1.02	
		SLD85210	SLD85210	7	1.34	
		HTZ84055	HTZ84055	2	0.62	
		HTZ84056	HTZ84056	1	0.77	
		HTZ84077	HTZ84077	1	0.54	
		HTZ84078	HTZ84078	1	0.35	
		HTZ84079	HTZ84079	1	0.44	
		HTZ84080	HTZ84080	1	0.24	
		HTZ84084	HTZ84084	1	0.64	
		SLD85060	SLD85060	6	0.29	
		SLD85158	SLD85158	6	0.33	
		SLD85160	SLD85160	6	0.39	
		SLD85206	SLD85206	6	0.47	
		SLD85207	SLD85207	6	0.87	
		SLD85208	SLD85208	6	0.76	
		SLD85211	SLD85211	6	0.37	
		SLD85212	SLD85212	6	0.36	
		SLD85213	SLD85213	6	0.60	
		SLD85214	SLD85214	6	0.82	
		SLD85263	SLD85263	6	0.57	
		SLD78051	SLD78051	6	0.42	
Along Northern Edge in Eastern Half (HTZ94779)	SU-1	HTZ94779	HTZ94779	1	1.16	0.12
		HTZ75407	HTZ75407	1	0.10	
		HTZ94780	HTZ94780	1	0.38	
		HTZ94778	HTZ94778	1	0.21	
		SLD95119	SLD95119	32	0.25	
		SLD77213	SLD77213	32	0.07	
Along Southern Edge in Eastern Half (HTZ84069)	SU-2	SLD78997	SLD78997	32	0.00	0.37
		HTZ84069	HTZ84069	1	1.08	
		HTZ84070	HTZ84070	1	0.22	
		SLD85245	SLD85245	49	0.15	
Structure Near Center (SLD85525)	SU-3	SLD85255	SLD85255	49	0.58	0.57
		SLD85525	SLD85525	11	1.07	
			SLD85526	11	0.70	
			SLD85527	11	0.58	
		HTZ85291	HTZ85291	1	0.50	
		SLD85528	SLD85528	11	0.40	
			SLD85529	11	0.23	
			SLD85530	11	0.28	
			SLD85531	11	0.38	
		SLD76964	SLD76965	11	0.97	
		SLD76967	SLD76967	11	0.52	

AS LOW AS REASONABLY ACHIEVABLE ANALYSIS

To support the following an as low as reasonably achievable (ALARA) analysis, the Table A-6-1 areas and SOR_N values from the samples with an SOR_N above one are used to calculate their sum of effective surface areas (33 m^2) and their area-weighted average SOR_N (1.15).

$$SOR_N^{Area-weighted} = \frac{(\text{Eff.SurfaceArea})(SOR_N) + (\text{Eff.SurfaceArea})(SOR_N) + \dots}{\text{Sum of all Eff.SurfaceAreas with } SOR_N > 1} = \frac{38}{33} = 1.15$$

An ALARA evaluation was performed consistent with *NMSS Decommissioning Standard Review Plan* (NUREG-1757) (NRC 2006) as a measure of the cost effectiveness of leaving small, elevated areas of soils in place versus the benefit of remediation. The cost of remediating the area is estimated from the average cost incurred by the remediation contractor, which does not include disposal since that is a separate contract (a cost that NUREG-1757 allows to be considered in an ALARA analysis). This average cost is $\$700/\text{m}^3$ ($\$915/\text{yd}^3$). For an area of 206 m^2 with excavation to a depth of 1 ft bgs, the estimated cost of remediation is approximately $\$12,000$. The following formula from NUREG-1757 is used to calculate an economic benefit from averted dose; the result was $\$127$ of economic benefit if this soil were remediated. Since the cost of remediation ($\$12,000$) greatly exceeds the benefit ($\$127$) of the averted dose, ALARA has been met.

$$B_{AD} = \$2000 \times P_D \times A \times \text{Dose} \times F \times \frac{\text{Conc}}{\text{DCGL}} \times \frac{1 - e^{-(r+\lambda)N}}{r + \lambda}$$

Where:

B_{AD} = Benefit from averted dose from potential remediation.

$\$2,000$ = Value in dollars per person-rem potentially averted, from NUREG-1757.

P_D = Population density for the critical group scenario in people/ m^2 . In this case, the population density of the City of St. Louis is 0.002 per the 2000 U.S. Census (USCB 2007).

A = Area being evaluated in m^2 . In this case, the area was 33 m^2 .

Dose = Annual dose to an average member of the critical group from residual radioactivity in rem/yr. In this case, 0.025 rem/yr was conservatively used because the calculated doses from the elevated areas are all less than this.

F = Fraction of the residual radioactivity removed by potential remediation. In this case, $F = 1$ to conservatively represent removing all residual radioactivity.

Conc = Average concentration of residual radioactivity in the area being evaluated. In this case, 1.15 from the area-weighted average of SOR_N greater than one was used.

DCGL = Derived concentration guideline limit. In this case, 1.0 from the SOR_N RG was used.

r = Monetary discount rate. NUREG-1757 recommends 0.03/yr for doses associated with soil.

λ = Radiological decay constant. In this case, U-238 was chosen as the representative decay constant of 1.55×10^{-10} /yr because it would give the most conservative result (highest present worth factor).

N = Number of years over which the collective dose will be calculated. NUREG-1757 recommends 1,000 for soils.

$$B_{AD} = \$2000 \times 0.002 \times 33 \times 0.025 \times 1 \times \frac{1.15}{1} \times \frac{1 - e^{-(0.03 + 1.55 \times 10^{-10})1000}}{0.03 + 1.55 \times 10^{-10}} \approx \$127$$

CONSOLIDATED MATERIAL SURFACES

Similar to area-weighting for soil samples, ANSI 13.12 and the FSSP provide for area-weighting of fixed-point survey results for radioactivity on surfaces. The results are averaged over an area of 1 m². Only biased fixed-point surveys had results that exceeded the screening levels. Both gross alpha and gross beta radioactivity results are included in the calculation even though only the results for gross alpha radioactivity exceeded the screening level. Table A-6-2 contains the results of the area-weighted averages.

Table A-6-2. Calculation of Area-Weighted Average SOR_N

Survey ID	Effective Surface Area (m ²)	Alpha (dpm/100 cm ²)	Beta (dpm/100 cm ²)	Area-Weighted Alpha (dpm/100 cm ²)	Area-Weighted Beta (dpm/100 cm ²)
SU-4 Concrete					
SU1-2b-7	0.250	750	4308	187.50	1077.00
SU1-2b-7-1	0.250	300	2876	75.00	719.00
SU1-2b-7-2	0.250	550	3625	137.50	906.25
SU1-2b-7-3	0.250	100	1690	25.00	422.50
Totals	1	--	--	425	3125
SU-4 Concrete					
SU1-2b-8	0.333	625	2954	208.31	984.57
SU1-2b-8-1	0.333	550	3234	183.32	1077.89
SU1-2b-8-2	0.333	250	3290	83.33	1096.56
Totals	1	--	--	475	3159

Biased fixed-point measurements were taken within a 1 m² area of SLDSDT10SU57J1-8 since that measurement approached the screening level for clearance. These biased measurements were well below the screening levels.

ATTACHMENT A-7
FINAL STATUS SURVEY DATA FOR CONSOLIDATED MATERIAL SURFACES

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Table A-7-1. Final Status Survey Data For Consolidated Materials

SU-4 Concrete Surveys									
		Alpha Radiation				Beta Radiation			
		e_i 0.158	e_s 0.250	e_{total} 0.0395		e_i 0.303	e_s 0.250	e_{total} 0.0758	
Type	Survey ID	Gross (cpm)	Background (cpm)	Net (cpm)	$\frac{dpm}{100\text{ cm}^2}$	Gross (cpm)	Background (cpm)	Net (cpm)	$\frac{dpm}{100\text{ cm}^2}$
Systematic	SUIPI-01-1	2	2	0	6	346	238	108	1,141
Systematic	SUIPI-01-2	2	2	0	6	348	238	110	1,162
Systematic	SUIPI-01-3	5	2	3	67	330	238	92	972
Systematic	SUIPI-01-4	2	2	0	6	280	238	42	444
		e_i 0.118	e_s 0.250	e_{total} 0.0295		e_i 0.235	e_s 0.250	e_{total} 0.0588	
Type	Survey ID	Gross (cpm)	Background (cpm)	Net (cpm)	$\frac{dpm}{100\text{ cm}^2}$	Gross (cpm)	Background (cpm)	Net (cpm)	$\frac{dpm}{100\text{ cm}^2}$
Systematic	TPSU1c01-1	4	0	4	108	288	187	101	1,375
Systematic	TPSU1c01-2	0	0	0	0	260	187	73	994
Systematic	TPSU1c01-3	2	0	2	54	252	187	65	885
Systematic	TPSU1c01-4	2	0	2	54	264	187	77	1,049
Systematic	TPSU1c01-5	3	0	3	81	248	187	61	831
Systematic	TPSU1c01-6	6	0	6	163	292	187	105	1,430
		e_i 0.123	e_s 0.250	e_{total} 0.0308		e_i 0.259	e_s 0.250	e_{total} 0.0648	
Type	Survey ID	Gross (cpm)	Background (cpm)	Net (cpm)	$\frac{dpm}{100\text{ cm}^2}$	Gross (cpm)	Background (cpm)	Net (cpm)	$\frac{dpm}{100\text{ cm}^2}$
Systematic	TPSU1c01-7	0	0	0	0	397	236	161	1,989
Systematic	TPSU1c01-8	2	0	2	52	361	236	125	1,544
Systematic	TPSU1c01-9	0	0	0	0	403	236	167	2,063
		e_i 0.133	e_s 0.250	e_{total} 0.0333		e_i 0.273	e_s 0.250	e_{total} 0.0683	
Type	Survey ID	Gross (cpm)	Background (cpm)	Net (cpm)	$\frac{dpm}{100\text{ cm}^2}$	Gross (cpm)	Background (cpm)	Net (cpm)	$\frac{dpm}{100\text{ cm}^2}$
Systematic	DT10SU2C-1	3	2	1	17	407	415	0	0
Systematic	DT10SU2C-2	14	2	12	282	394	415	0	0
Systematic	DT10SU2C-3	10	2	8	185	447	415	32	375
Systematic	DT10SU2C-4	6	2	4	89	356	415	0	0
Systematic	DT10SU2C-5	4	2	2	41	369	415	0	0
Systematic	DT10SU2C-6	5	2	3	65	348	415	0	0
Systematic	DT10SU2C-7	14	2	12	282	497	415	82	961
Systematic	DT10SU2C-8	15	2	13	306	597	415	182	2,133
Systematic	DT10SU2F-9	2	1	1	32	439	315	124	1,453
Systematic	DT10SU2F-10	2	1	1	32	387	315	72	844
Systematic	DT10SU2G-3	5	0	5	120	436	232	204	2,391
Systematic	DT10SU2G-6	2	0	2	48	372	232	140	1,641
Systematic	DT10SU2G-9	3	0	3	72	393	232	161	1,887
Systematic	DT10SU2G-12	2	0	2	48	418	232	186	2,180
Systematic	SU1-2A-1	14	0	14	337	518	300	218	2,555
Systematic	SU1-2A-2	2	0	2	48	379	300	79	926
Systematic	SU1-2A-3	8	0	8	192	450	300	150	1,758
Biased	SU1-2A-4	15	0	15	361	503	300	203	2,379
Biased	SU1-2A-4a	12	0	12	289	530	300	230	2,696
Biased	SU1-2A-4b	5	0	5	120	448	300	148	1,735
Biased	SU1-2A-5	18	0	18	433	458	300	158	1,852
Biased	SU1-2A-6	3	0	3	72	426	300	126	1,477

Table A-7-1. Final Status Survey Data For Consolidated Materials (Continued)

Type	Survey ID	Alpha Radiation				Beta Radiation			
		e_i	e_s	e_{total}		e_i	e_s	e_{total}	
		0.128	0.250	0.0320		0.286	0.250	0.0715	
		Gross (cpm)	Background (cpm)	Net (cpm)	dpm 100 cm ²	Gross (cpm)	Background (cpm)	Net (cpm)	dpm 100 cm ²
Systematic	DT10SU1d-1	2	0	2	50	345	207	138	1,544
Systematic	DT10SU1d-2	0	0	0	0	287	207	80	895
Systematic	DT10SU1d-3	1	0	1	25	344	207	137	1,533
Systematic	DT10SU1e-1	0	0	0	0	339	224	115.3	1,291
Systematic	DT10SU1e-2	1	0	1	25	318	224	94.34	1,056
Systematic	DT10SU1H-1	0	0	0	0	296	220	76	850
Systematic	DT10SU1H-2	0	0	0	0	318	220	98	1,097
Systematic	DT10SU1H-3	1	0	1	25	261	220	41	459
Systematic	DT10SU2B-1	3	1	2	58	383	266	117	1,309
Systematic	DT10SU2B-2	8	1	7	183	395	266	129	1,443
Systematic	DT10SU2B-3	4	1	3	83	332	266	66	738
Systematic	DT10SU2B-4	2	1	1	33	329	266	63	705
Systematic	DT10SU2B-5	5	1	4	108	433	266	167	1,869
Systematic	DT10SU2B-6	6	1	5	133	427	266	161	1,801
Systematic	DT10SU2B-7	11	1	10	258	447	266	181	2,025
Systematic	DT10SU2B-8	5	1	4	108	387	266	121	1,354
Systematic	DT10SU2B-9	6	1	5	133	458	266	192	2,148
Systematic	DT10SU2B-10	5	1	4	108	426	266	160	1,790
Systematic	DT10SU2B-11	14	1	13	333	378	266	112	1,253
Systematic	DT10SU2B-12	7	1	6	158	394	266	128	1,432
Systematic	DT10SU2D-1	3	1	2	58	375	225	150	1,678
Systematic	DT10SU2E-1	2	0	2	42	329	253	76	850
Systematic	DT10SU2E-2	2	0	2	42	311	253	58	649
Systematic	DT10SU2F-1	5	0	5	117	331	256	75	839
Systematic	DT10SU2F-2	9	0	9	217	412	256	156	1,745
Systematic	DT10SU2F-3	2	0	2	42	458	256	202	2,260
Systematic	DT10SU2F-4	6	0	6	142	391	256	135	1,510
Systematic	DT10SU2F-5	2	0	2	42	332	256	76	850
Systematic	DT10SU2F-6	5	0	5	117	334	256	78	873
Systematic	DT10SU2F-7	3	0	3	67	331	256	75	839
Systematic	DT10SU2F-8	2	0	2	42	334	256	78	873
Systematic	DT10SU2F-11	4	0	4	92	362	256	106	1,186
Systematic	DT10SU2F-12	8	0	8	192	470	256	214	2,394
Systematic	DT10SU2F-13	10	0	10	242	433	256	177	1,980
Systematic	DT10SU2F-14	11	0	11	267	438	256	182	2,036
Systematic	DT10SU2F-15	14	0	14	342	420	256	164	1,835
Systematic	DT10SU2F-16	5	0	5	117	424	256	168	1,880
Systematic	DT10SU2F-17	13	0	13	317	463	256	207	2,316
Biased	SU1-2b-1	6	0	6	150	409	206	203	2,271
Biased	SU1-2b-2	7	0	7	175	415	206	209	2,338
Biased	SU1-2b-3	5	0	5	125	600	206	394	4,408
Biased	SU1-2b-4	5	0	5	125	391	206	185	2,070
Biased	SU1-2b-5	8	0	8	200	528	206	322	3,603
Biased	SU1-2b-6	12	0	12	300	468	206	262	2,931
Biased	SU1-2b-7	30	0	30	750	591	206	385	4,308
Biased	SU1-2b-7-1	12	0	12	300	463	206	257	2,876
Biased	SU1-2b-7-2	22	0	22	550	530	206	324	3,625
Biased	SU1-2b-7-3	4	0	4	100	357	206	151	1,690
Biased	SU1-2b-8	25	0	25	625	470	206	264	2,954
Biased	SU1-2b-8-1	22	0	22	550	495	206	289	3,234
Biased	SU1-2b-8-2	10	0	10	250	500	206	294	3,290
Biased	SU1-2b-9	2	0	2	50	550	206	344	3,849
Biased	SU1-2b-10	12	0	12	300	430	206	224	2,506

A-7-2

Table A-7-1. Final Status Survey Data For Consolidated Materials (Continued)

		Alpha Radiation				Beta Radiation			
		e _i	e _s	e _{total}		e _i	e _s	e _{total}	
		0.116	0.250	0.0290		0.292	0.250	0.0730	
Type	Survey ID	Gross (cpm)	Background (cpm)	Net (cpm)	<u>dpm</u> 100 cm ²	Gross (cpm)	Background (cpm)	Net (cpm)	<u>dpm</u> 100 cm ²
Systematic	DT10SU2H-1	3	0	3	83	314	197	117	1,282
Systematic	DT10SU2H-2	2	0	2	55	297	197	100	1,096

SU-4 Railroad Tie Surveys									
		Alpha Radiation				Beta Radiation			
		e _i	e _s	e _{total}		e _i	e _s	e _{total}	
		0.133	0.250	0.0333		0.273	0.250	0.0683	
Type	Survey ID	Gross (cpm)	Background (cpm)	Net (cpm)	<u>dpm</u> 100 cm ²	Gross (cpm)	Background (cpm)	Net (cpm)	<u>dpm</u> 100 cm ²
Systematic	DT10SU1D01-1	2	0	2	48	554	354	200	2,344
Systematic	DT10SU1D01-2	5	0	5	120	662	354	308	3,610
Systematic	DT10SU1D01-3	3	0	3	72	614	354	260	3,048
Systematic	SU1G-1	1	1	0	0	555	339	216	2,532
Systematic	SU1G-2	0	1	0	0	596	339	257	3,012
Systematic	SU1G-3	8	1	7	168	565	339	226	2,649
Systematic	SU1G-4	6	1	5	120	704	339	365	4,278
Systematic	SU1G-5	6	1	5	120	564	339	225	2,637

SU-5 Concrete Surveys									
		Alpha Radiation				Beta Radiation			
		e _i	e _s	e _{total}		e _i	e _s	e _{total}	
		0.23	0.250	0.0575		0.4	0.250	0.1000	
Type	Survey ID	Gross (cpm)	Background (cpm)	Net (cpm)	<u>dpm</u> 100 cm ²	Gross (cpm)	Background (cpm)	Net (cpm)	<u>dpm</u> 100 cm ²
Systematic	SLDSDT10SU57J1-1	3	0	3	42	328	243	85	680
Systematic	SLDSDT10SU57J1-2	5	0	5	70	329	243	86	688
Systematic	SLDSDT10SU57J1-3	5	0	5	70	304	243	61	488
Systematic	SLDSDT10SU57J1-4	4	0	4	56	393	243	150	1,200
Systematic	SLDSDT10SU57J1-5	19	0	19	264	390	243	147	1,176
Systematic	SLDSDT10SU57J1-6	6	0	6	83	307	243	64	512
Systematic	SLDSDT10SU57J1-7	7	0	7	97	457	243	214	1,712
Systematic	SLDSDT10SU57J1-8	40	0	40	557	530	243	287	2,296
Systematic	SLDSDT10SU57J1-9	23	0	23	320	434	243	191	1,528
Systematic	SLDSDT10SU57J1-10	15	0	15	209	358	243	115	920
Systematic	SLDSDT10SU57J1-11	12	0	12	167	407	243	164	1,312
Systematic	SLDSDT10SU57J1-12	5	0	5	70	369	243	126	1,008
Biased	SLDSDT10SU57J1-13	30	0	30	417	440	243	197	1,576
Biased	SLDSDT10SU57J1-14	21	0	21	292	407	243	164	1,312
Biased	SLDSDT10SU57J1-15	3	0	3	42	329	243	86	688

Table A-7-1. Final Status Survey Data For Consolidated Materials (Continued)

Quality Control Surveys									
		Alpha Radiation				Beta Radiation			
		e_i	e_s	e_{total}		e_i	e_s	e_{total}	
		0.123	0.250	0.0308		0.259	0.250	0.0648	
Type	Survey ID	Gross (cpm)	Background (cpm)	Net (cpm)	$\frac{dpm}{100\text{ cm}^2}$	Gross (cpm)	Background (cpm)	Net (cpm)	$\frac{dpm}{100\text{ cm}^2}$
Quality Control	TPSU1c01-2QC	4	0	4	104	297	236	61	754
		e_i	e_s	e_{total}		e_i	e_s	e_{total}	
		0.12	0.250	0.0300		0.254	0.250	0.0635	
Quality Control	DT10SU1eQC-1	3	1	2	53	305	234	71	894
Quality Control	DT10SU1eQC-2	1	1	0	0	319	234	85	1,071
		e_i	e_s	e_{total}		e_i	e_s	e_{total}	
		0.117	0.250	0.0293		0.254	0.250	0.0635	
Quality Control	DT10SU2B-3a	3	0	3	73	306	170	136	1,713
Quality Control	DT10SU2B-10a	4	0	4	100	244	170	74	932
Quality Control	DT10SU2B-8a	5	0	5	128	266	170	96	1,209
		e_i	e_s	e_{total}		e_i	e_s	e_{total}	
		0.128	0.250	0.0320		0.286	0.250	0.0715	
Quality Control	DT10SU2C-1QC	1	0	1	25	362	206	156	1,745
Quality Control	DT10SU2C-5QC	4	0	4	100	342	206	136	1,522
		e_i	e_s	e_{total}		e_i	e_s	e_{total}	
		0.116	0.250	0.0290		0.293	0.250	0.0733	
Quality Control	SU1G-1a	4	1	3	74	545	277	268	2,927
Quality Control	SU1G-2a	5	1	4	101	532	277	255	2,785
Quality Control	SU1G-3a	1	1	0	0	445	277	168	1,835
Quality Control	SU1G-4a	6	1	5	129	686	277	409	4,467
Quality Control	SU1G-5a	3	1	2	46	504	277	227	2,479
		e_i	e_s	e_{total}		e_i	e_s	e_{total}	
		0.12	0.250	0.0300		0.254	0.250	0.0635	
Quality Control	DT10SU1D01-1QC	3	0	3	71	515	274	241	3,036
Quality Control	DT10SU1D01-2QC	3	0	3	71	569	274	295	3,717
Quality Control	DT10SU1D01-3QC	6	0	6	151	623	274	349	4,397
		e_i	e_s	e_{total}		e_i	e_s	e_{total}	
		0.228	0.250	0.0570		0.422	0.250	0.1055	
Quality Control	SLDSDT10SU57J1-1a	3	0	3	42	272	245	27	205
Quality Control	SLDSDT10SU57J1-2a	5	0	5	70	294	245	49	372
Quality Control	SLDSDT10SU57J1-3a	7	0	7	98	316	245	71	538
Quality Control	SLDSDT10SU57J1-4a	5	0	5	70	329	245	84	637
Quality Control	SLDSDT10SU57J1-5a	14	0	14	196	320	245	75	569
Quality Control	SLDSDT10SU57J1-6a	8	0	8	112	394	245	149	1,130
Quality Control	SLDSDT10SU57J1-7a	10	0	10	140	310	245	65	493
Quality Control	SLDSDT10SU57J1-8a	33	0	33	463	440	245	195	1,479

Notes:

e_i = Instrument Efficiency

e_s = Surface Efficiency

e_{total} = Total Efficiency

Survey ID designations included the survey number, which generally corresponded to the soil SU subsections on Figure C.1-2. For survey IDs with SU5, 1-7 and 1a-7a are in the soil SU-2i and 8-15 and 8a are in soil SU-1i.

ATTACHMENT A-8
QUALITY CONTROL SUMMARY REPORT
(On the CDROM on the Back Cover of this Report)

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

This QCSR was performed on the soil samples taken for the Class 1 and 2 soil SUs within the SLDS VP Thomas and Proetz Lumber Company (DT-10).

1.2 PROJECT OBJECTIVES

The intent of the QCSR is to document the usability of the data based on project Data Quality Objectives, precision, accuracy, representativeness, comparability, completeness, and sensitivity.

1.3 PROJECT IMPLEMENTATION

The sampling was conducted from March 2001 until June 2006. Radiological analyses were conducted by the onsite FUSRAP laboratory at the Hazelwood Interim Storage Site (HISS) with QA split samples being analyzed by Test America (formerly Severn-Trent Laboratories). Non-radiological analyses were conducted offsite by Test America.

1.4 PURPOSE OF THIS REPORT

The primary intent of this assessment is to evaluate if data generated for these samples can withstand scientific scrutiny, are appropriate for their intended purpose, are technically defensible, and are of known and acceptable precision, accuracy, and sensitivity.

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2.0 QUALITY ASSURANCE PROGRAM

A Quality Assurance Project Plan was developed for this project and is part of the SAG for the St. Louis Sites. The Quality Assurance Project Plan established requirements for both field and laboratory QC procedures. An analytical laboratory QC duplicate sample, laboratory control sample, and a method blank were required for every 20 field samples of each matrix.

A primary goal of the QA program was to ensure that the quality of measurements is appropriate for the intended use of the results. To this end, a Quality Assurance Project Plan and standardized field procedures were compiled 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 defined by EPA, has been reported including the following basic information:

- Laboratory case narratives
- Sample results
- Laboratory method blank results
- Laboratory control standard results
- Laboratory duplicate sample results
- Tracer recoveries
- Sample extraction dates
- Sample analysis dates

This information provides the basis for an independent data evaluation relative to accuracy, precision, sensitivity, representativeness, comparability, and completeness, as discussed 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 SAIC.

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 Quality Systems Manual for Environmental Laboratories* (DOD 2006).
- *USACE Kansas City and St. Louis District Radionuclide Data Quality Evaluation Guidance for Alpha and Gamma Spectroscopy* (USACE 2002b).
- *Data Validation* (SAIC 2006).

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 had been reported and contract specified requirements were met (i.e., analytical holding times, contractual turnaround times, etc.).

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 above 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 affect the usability of the data. Data verification/validation included but was not necessarily limited to the following parameters for radiological and/or non-radiological methods, as appropriate:

- Holding time information and methods requested
- Discussion of laboratory analysis, including any laboratory problems
- Sample results
- Initial calibration
- Efficiency check
- Background determinations
- Spike recovery results
- Internal standard results (tracers or carriers)
- Duplicate sample results
- Self-absorption factor (for alpha and beta radioactivity)
- Cross-talk factor (during simultaneous detection of alpha and beta radioactivity)

- Laboratory control samples
- 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. Qualifiers were applied to each analytical result to indicate the usability of the data for its intended purpose with a reason code to explain the retention or the qualifier.

3.2 DEFINITION OF DATA QUALIFIERS

During the data validation process, all laboratory data were assigned appropriate data validation qualifiers (VQs) and reason codes, as follows:

- “=” Positive result was obtained.
- “U” When the material was analyzed for a COC, but it was not detected above the level of the associated value.
- “J” When the associated value is an estimated quantity, indicating a decreased knowledge of the accuracy or precision of the reported value.
- “UJ” When the analyte was analyzed for a COC, but it not detected above the associated value, and the reported value is an estimate, indicating a decreased knowledge of the accuracy or precision of the reported value.
- “R” When the analyte value reported is unusable. The integrity of the analyte's identification, accuracy, precision, or sensitivity have raised significant question as to the reality of the information presented.

A positive result is be flagged with a “J” qualifier and non-detect results is flagged “UJ”, when data quality is suspect due to QC issues, either blank contamination or analytical interference. None of the laboratory data were assigned an “R” code. SAIC VQs, reason codes, and copies of validation checklists and qualified data forms are filed with the analytical hard copy deliverable.

4.0 DATA EVALUATION

The data evaluation process considers precision, accuracy, representativeness, completeness, comparability, and sensitivity. The following sub sections will provide detail to 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 and non-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 Sample Result
 D = Field Split/Duplicate Parent Sample Result
 U_S = Parent Sample Uncertainty
 U_D = Field Split/Duplicate Parent Sample Uncertainty

The RPD is calculated for all radiological and non-radiological samples duplicate/split pairs, if a detectable result is reported for both the parent and the QA field split or field duplicate. For radiological samples, when the RPD is greater than 30 percent, 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 below a value of 1.96. Neither equation is used when the analyte in one or both of the samples is not detected. In cases where neither equation can be used, the comparison is counted as acceptable in the overall number of comparisons.

The USACE memorandum entitled *SAG Implementation Guidance for Interpretation of Quality Assurance Split Program* (USACE 2005b), states that a QA split sample should be collected and analyzed at a frequency of approximately one every twenty samples (5 percent). For radiological analyses, 11 split samples and 11 field duplicate samples were analyzed using both gamma and alpha spectrometry. These represent 4.2 percent of the 261 systematic, biased, and subsurface samples collected on the property which meets the requirement of approximately 5 percent.

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 samples through a comparison of the prime laboratory results versus the results of an independent laboratory.

4.1.1 Radiological Parameters

Individual sample chemical yields and laboratory control sample recoveries were within the 25 percent criterion for the verification samples, as stated in the SAG. Therefore, the data can be used for its intended purpose.

4.1.2 Inter-Laboratory Accuracy

As discussed above, RPD and NAD were used to measure the analytical accuracy of split sample pairs for two radiological analytical groups (i.e., alpha spectroscopy and gamma spectroscopy). The split sample pairs were analyzed by the FUSRAP laboratory at HISS and an independent contract laboratory, Test America. 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 gets close to the MDC, the relative uncertainty gets larger. Many of the sample results discussed 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 samples met the Data Quality Objectives. For radiological analysis, the sample results comparison must be less than the 30 percent criteria for RPD, or be less than or equal to 1.96 for NAD to be within the Data Quality Objectives. For radiological analysis, eleven sample pairs were compared for 12 analytes for a total of 132 comparisons. Ten comparisons, or 7.6 percent of the comparisons, exceeded the criteria, as demonstrated in Tables A-8-1 and A-8-2. This meets the SAG goal of 90 percent acceptance. The data are acceptable. There were no split samples collected for the two non-radiological samples.

Table A-8-1. Split Sample Accuracy Among Alpha Spectroscopy Analyses

Sample Name	Th-228		Th-230		Th-232	
	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a
SLD07233/SLD07233-2	N/A	1.62	NC	NC	NC	NC
SLD78051/SLD78051-2	N/A	0.50	45.5%	1.30	NC	NC
SLD79007/SLD79007-2	74.4%	1.68	NC	NC	NC	NC
SLD85158/SLD85158-2	N/A	0.93	50.7%	1.24	NC	NC
SLD85176/SLD85176-2	76.4%	1.37	18.4%	N/A	NC	NC
SLD85215/SLD85215-2	N/A	1.00	6.7%	N/A	NC	NC
SLD85225/SLD85225-2	N/A	0.03	NC	NC	NC	NC
SLD85235/SLD85235-2	N/A	0.35	34.7%	1.12	NC	NC
SLD85257/SLD85257-2	N/A	0.72	0.8%	N/A	NC	NC
SLD95119/SLD95119-2	58.6%	1.17 ¹	8.1%	N/A	NC	NC
SLD95122/SLD95122-2	N/A	0.58	7.6%	N/A	NC	NC

^a NAD calculated for additional information when RPD greater than 30 percent.

Boldface – Values exceed the control limits.

N/A – Not applicable. Value calculated by other method.

NC – Value not calculated since the radionuclide was not detected in one or both of the samples.

Table A-8-2. Split Sample Accuracy Among Gamma Spectroscopy Analyses

Sample Name	Ac-227		Am-241		Cs-137		K-40		Pa-231		Ra-226		Ra-228		U-235		U-238	
	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a
SLD07233/SLD07233-2	NC	NC	NC	NC	NC	NC	145.9%	3.30	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
SLD78051/SLD78051-2	NC	NC	NC	NC	NC	NC	N/A	0.38	NC	NC	39.6%	2.25	NC	NC	NC	NC	NC	NC
SLD79007/SLD79007-2	NC	NC	NC	NC	NC	NC	0.6%	N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
SLD85158/SLD85158-2	NC	NC	NC	NC	NC	NC	1.9%	N/A	NC	NC	0.7%	N/A	NC	NC	NC	NC	NC	NC
SLD85176/SLD85176-2	NC	NC	NC	NC	NC	NC	11.6%	N/A	NC	NC	29.3%	N/A	NC	NC	NC	NC	NC	NC
SLD85215/SLD85215-2	NC	NC	NC	NC	NC	NC	7.1%	N/A	NC	NC	13.2%	N/A	NC	NC	NC	NC	NC	NC
SLD85225/SLD85225-2	NC	NC	NC	NC	NC	NC	8.2%	N/A	NC	NC	34.1%	1.10	NC	NC	NC	NC	NC	NC
SLD85235/SLD85235-2	NC	NC	NC	NC	NC	NC	9.6%	N/A	NC	NC	19.6%	N/A	NC	NC	NC	NC	NC	NC
SLD85257/SLD85257-2	NC	NC	NC	NC	NC	NC	12.1%	N/A	NC	NC	12.4%	N/A	NC	NC	NC	NC	NC	NC
SLD95119/SLD95119-2	NC	NC	NC	NC	NC	NC	3.7%	N/A	NC	NC	1.6%	N/A	NC	NC	NC	NC	NC	NC
SLD95122/SLD95122-2	NC	NC	NC	NC	NC	NC	31.3%	0.18	NC	NC	0.1%	N/A	NC	NC	NC	NC	NC	NC

^a NAD calculated for additional information when RPD greater than 30 percent.

Boldface – Values exceed the control limits.

Ac – actinium.

Am – americium

Cs – cesium.

K – potassium

N/A – Not applicable. Value calculated by other method.

NC – Value not calculated since the radionuclide was not detected in one or both of the samples.

Pa – protactinium.

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 sample is submitted to the HISS laboratory along with the original sample. Both samples are analyzed under the same laboratory conditions. If any bias was introduced at the laboratory, that bias would affect both samples equally.

Field duplicate samples were employed at a frequency of one duplicate sample per 20 samples. As a measure of analytical precision, the RPDs for these field duplicate sample pairs for the two radiological analytical groups (i.e., alpha spectroscopy and gamma spectroscopy) were calculated at the time of verification and validation. RPD (and/or NAD) values for all analytes were within the 30 percent window (less than or equal to 1.96) of acceptance for the verification samples, except where noted.

4.2.2 System Precision

Field duplicate 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 samples. The field duplicate samples were collected from the same spatial and temporal conditions as the primary environmental sample. Soil samples were collected from the same sampling device, after homogenization for all analytes.

For the ten field duplicate samples taken for the verification activities, the NAD and RPD values indicated acceptable precision for the data. For radiological analysis, twelve analytes were compared for eleven duplicate pairs for a total of 132 comparisons. Seven comparisons, or 5.3 percent of the comparisons, exceeded the criteria, as demonstrated in Tables A-8-3 and A-8-4. This meets the SAG goal of 90 percent acceptance. The data are acceptable.

Table A-8-3. Duplicate Sample Precision Among Alpha Spectroscopy Analyses

Sample Name	Th-228		Th-230		Th-232	
	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a
SLD07233/SLD07233-1	NC	NC	NC	NC	NC	NC
SLD78051/SLD78051-1	N/A	0.07	4.3%	N/A	NC	NC
SLD79007/SLD79007-1	14.7%	N/A	NC	NC	NC	NC
SLD85158/SLD85158-1	N/A	0.60	26.2%	N/A	NC	NC
SLD85176/SLD85176-1	19.5%	N/A	5.1%	N/A	NC	NC
SLD85215/SLD85215-1	N/A	0.06	7.7%	N/A	NC	NC
SLD85225/SLD85225-1	N/A	0.15	31.6%	0.72	NC	NC
SLD85235/SLD85235-1	6.0%	N/A	46.6%	1.08	NC	NC
SLD85257/SLD85257-1	N/A	0.13	30.9%	0.81	NC	NC
SLD95119/SLD95119-1	73.7%	1.26	NC	NC	NC	NC
SLD95122/SLD95122-1	N/A	0.02	24.0%	N/A	NC	NC

^a NAD calculated for additional information when RPD greater than 30 percent.

Boldface – Values exceed the control limits.

N/A – Not applicable. Value calculated by other method.

NC – Value not calculated since the radionuclide was not detected in one or both of the samples.

Table A-8-4. Duplicate Sample Precision Among Gamma Spectroscopy Analyses

Sample Name	Ac-227		Am-241		Cs137		K-40		Pa-231		Ra-226		Ra-228		U-235		U-238	
	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a	RPD	NAD ^a
SLD07233/SLD07233-1	NC	NC	NC	NC	NC	NC	2.1%	N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
SLD78051/SLD78051-1	NC	NC	NC	NC	N/A	0.13	36.3%	1.95	NC	NC	29.5%	N/A	NC	NC	NC	NC	NC	NC
SLD79007/SLD79007-1	NC	NC	NC	NC	NC	NC	7.3%	N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
SLD85158/SLD85158-1	NC	NC	NC	NC	NC	NC	6.6%	N/A	NC	NC	6.2%	N/A	NC	NC	NC	NC	NC	NC
SLD85176/SLD85176-1	NC	NC	NC	NC	N/A	0.02	7.2%	N/A	NC	NC	3.3%	N/A	NC	NC	NC	NC	NC	NC
SLD85215/SLD85215-1	NC	NC	NC	NC	NC	NC	8.6%	N/A	NC	NC	1.8%	N/A	NC	NC	NC	NC	NC	NC
SLD85225/SLD85225-1	NC	NC	NC	NC	N/A	0.53	10.8%	N/A	NC	NC	35.1%	1.06	NC	NC	NC	NC	NC	NC
SLD85235/SLD85235-1	NC	NC	NC	NC	NC	NC	9.6%	N/A	NC	NC	6.0%	N/A	NC	NC	NC	NC	NC	NC
SLD85257/SLD85257-1	NC	NC	NC	NC	NC	NC	14.6%	N/A	NC	NC	43.9%	1.25	NC	NC	NC	NC	NC	NC
SLD95119/SLD95119-1	NC	NC	NC	NC	NC	NC	6.1%	N/A	NC	NC	1.6%	N/A	NC	NC	NC	NC	NC	NC
SLD95122/SLD95122-1	NC	NC	NC	NC	NC	NC	1.4%	N/A	NC	NC	15.5%	N/A	NC	NC	NC	NC	NC	NC

^a NAD calculated for additional information when RPD greater than 30 percent.

Notes:

Boldface – Values exceed the control limits.

N/A – Not applicable. Value calculated by other method.

NC – Value not calculated since the radionuclide was not detected in one or both of the samples.

4.3 SENSITIVITY

Determination of MDC values allows the investigation to assess the relative confidence that can be placed in a value in comparison to the magnitude or level of analyte concentration observed. For this report, MDC is a term generically used to represent both the method detection limit (MDL) for non-radiologicals and the minimum detectable activity for radiological analytes. The closer a measured value comes to the MDC, the less confidence and more variation the measurement will have. Project sensitivity goals were expressed as quantitation level goals in the FSSP. 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 radionuclides of concern, with additional analyses from alpha spectroscopy for thorium, ICP-AES for metals. The varying MDCs for the same radiological analyte reflects variability in the detection efficiencies and conversion factors due to factors such as individual sample aliquot, sample density, and variations in analyte background radioactivity for gamma and alpha spec, at the laboratory. Variations in MDLs for the same non-radiological analyte reflect variability in calibrations between laboratories, dilutions, and analytical methods. In order to complete the Data Evaluation (i.e. Precision, Accuracy, Representativeness, and Comparability), analytical results are desired that exceed the MDC of the analyte.

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. 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 data set 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 data sets. 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 A-8-5 and A-8-6 compare sample results from the duplicate and split samples to the associated parent sample for alpha spectroscopy and gamma spectroscopy, respectively. The Ra-226 results reported in these tables for the split samples have been adjusted upward by a factor of 1.5 to provide proper comparability. The adjustment is necessary since the Ra-226 results reported by the FUSRAP Laboratory automatically include a factor of 1.5 to conservatively account for Ra-226 in-growth. The independent laboratory does not include a factor to account for Ra-226 in-growth.

Table A-8-5. Alpha Spectroscopy Results for Parent Samples and the Associated Duplicate and Split Samples

Sample Name	Th-228			Th-230			Th-232		
	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC
SLD07233	0.39	0.27	0.29	1.24	0.48	0.11	0.23	0.19	0.11
SLD07233-1	0.23	0.25	0.38	1.63	0.63	0.38	0.40	0.30	0.32
SLD07233-2	1.13	0.37	0.14	3.33	0.88	0.10	1.09	0.35	0.08
SLD78051	0.97	0.48	0.27	3.84	1.04	0.15	0.31	0.27	0.27
SLD78051-1	0.92	0.56	0.39	3.68	1.20	0.39	0.39	0.35	0.21
SLD78051-2	0.70	0.25	0.11	6.10	1.40	0.04	0.56	0.21	0.08
SLD79007	2.12	0.68	0.23	3.64	0.94	0.23	0.85	0.42	0.28
SLD79007-1	1.83	0.63	0.13	2.87	0.82	0.28	1.35	0.53	0.13
SLD79007-2	0.97	0.00	0.06	2.16	0.00	0.05	1.13	0.00	0.05
SLD85158	1.86	0.83	0.50	5.14	1.58	0.37	1.99	0.86	0.20
SLD85158-1	1.25	0.59	0.30	3.95	1.21	0.30	1.50	0.66	0.16
SLD85158-2	1.02	0.34	0.28	3.06	0.58	0.15	1.30	0.35	0.16
SLD85176	2.64	1.02	0.37	3.26	1.17	0.20	1.48	0.72	0.20
SLD85176-1	2.17	0.84	0.17	3.43	1.13	0.32	0.94	0.52	0.32
SLD85176-2	1.18	0.30	0.17	3.92	0.60	0.12	1.04	0.26	0.08
SLD85215	1.59	0.66	0.33	4.01	1.17	0.15	0.33	0.28	0.15
SLD85215-1	1.53	0.68	0.17	4.33	1.31	0.17	0.57	0.40	0.17
SLD85215-2	0.87	0.28	0.21	3.75	0.60	0.12	0.95	0.26	0.12
SLD85225	0.84	0.47	0.35	4.44	1.28	0.29	0.58	0.38	0.16
SLD85225-1	0.94	0.52	0.32	3.23	1.09	0.38	0.94	0.52	0.32
SLD85225-2	0.82	0.27	0.22	2.47	0.45	0.10	0.84	0.24	0.11
SLD85235	1.38	0.59	0.27	3.31	1.01	0.27	0.75	0.42	0.15
SLD85235-1	1.30	0.64	0.19	5.32	1.56	0.35	1.09	0.58	0.19
SLD85235-2	1.14	0.33	0.23	4.70	0.73	0.12	0.93	0.27	0.12
SLD85257	1.41	0.56	0.23	5.01	1.25	0.13	0.95	0.45	0.23
SLD85257-1	1.52	0.63	0.39	3.67	1.08	0.27	1.46	0.61	0.27
SLD85257-2	0.95	0.31	0.24	5.05	0.77	0.10	1.08	0.29	0.12
SLD95119	2.45	0.90	0.16	3.68	1.19	0.34	2.45	0.90	0.15
SLD95119-1	1.13	0.53	0.14	1.96	0.74	0.14	1.08	0.52	0.14
SLD95119-2	1.34	0.31	0.07	3.99	0.68	0.06	1.37	0.31	0.05
SLD95122	1.18	0.62	0.33	3.78	1.29	0.18	0.60	0.42	0.18
SLD95122-1	1.16	0.54	0.14	2.97	0.97	0.26	0.96	0.48	0.14
SLD95122-2	0.80	0.22	0.03	4.08	0.68	0.03	1.35	0.30	0.06

Notes:

Results are expressed in pCi/g.

Samples ending in "-1" are duplicate samples. Samples ending in "-2" are split samples.

A – Alpha spectroscopy analysis not conducted.

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Table A-8-6. Gamma Spectroscopy Results for Parent Samples and the Associated Duplicate and Split Samples

Sample Name	Ac-227			Am-241			Cs-137			K-40			Pa-231			Ra-226			Ra-228			U-235			U-238		
	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC
SLD07233	0.10	0.06	0.11	0.05	0.04	0.07	0.02	0.01	0.02	1.91	0.35	0.17	0.07	0.27	0.45	0.70	0.05	0.03	0.16	0.04	0.05	0.10	0.08	0.12	0.68	0.53	2.51
SLD07233-1	-0.03	0.07	0.11	0.05	0.04	0.07	0.02	0.01	0.02	1.87	0.34	0.20	-0.18	0.27	0.47	0.73	0.05	0.03	0.14	0.03	0.05	0.04	0.08	0.12	0.99	0.58	2.57
SLD07233-2	0.10	0.39	0.61	-0.10	0.14	0.23	0.01	0.08	0.15	12.20	3.10	0.90	-0.70	1.80	3.10	3.24 ^a	0.69 ^a	0.95 ^a	0.85	0.49	0.83	0.43	0.14	0.11	0.90	1.40	1.70
SLD78051	-0.02	0.13	0.19	0.03	0.04	0.06	0.10	0.03	0.03	5.01	0.62	0.33	0.44	0.55	0.86	4.01	0.15	0.07	0.44	0.07	0.08	0.27	0.26	0.43	3.44	0.65	0.61
SLD78051-1	0.23	0.10	0.16	0.04	0.03	0.05	0.10	0.02	0.02	3.47	0.49	0.25	0.31	0.47	0.73	2.98	0.12	0.06	0.34	0.05	0.06	0.21	0.21	0.35	2.78	0.60	0.49
SLD78051-2	0.31	0.27	0.44	0.07	0.10	0.15	0.04	0.06	0.11	4.40	1.50	0.90	0.27	0.95	1.70	2.69 ^a	0.57 ^a	0.35 ^a	0.27	0.26	0.50	-0.27	0.51	0.84	1.60	1.30	1.30
SLD79007	0.18	0.13	0.19	0.03	0.04	0.06	-0.01	0.02	0.03	17.10	1.24	0.31	0.23	0.52	0.82	2.53	0.11	0.08	1.07	0.09	0.08	0.10	0.23	0.40	4.31	0.75	0.57
SLD79007-1	0.03	0.12	0.18	-0.02	0.04	0.06	0.01	0.02	0.03	18.40	1.32	0.25	0.16	0.47	0.73	2.64	0.11	0.07	1.12	0.09	0.07	0.36	0.24	0.38	3.48	0.68	0.59
SLD79007-2	0.02	0.00	0.52	0.08	0.00	0.25	-0.03	0.00	0.12	17.20	0.00	1.10	-0.50	0.00	2.00	2.34 ^a	0.00 ^a	0.51 ^a	0.68	0.00	0.63	-0.64	0.00	1.10	2.80	0.00	2.10
SLD85158	0.23	0.18	0.28	0.01	0.05	0.07	0.00	0.02	0.02	10.20	0.73	0.25	0.12	0.54	0.77	4.20	0.13	0.07	0.99	0.07	0.07	0.37	0.24	0.40	4.13	0.82	0.62
SLD85158-1	0.05	0.25	0.40	-0.02	0.06	0.09	0.01	0.02	0.03	10.90	0.92	0.29	0.91	0.91	1.15	4.47	0.16	0.09	1.03	0.11	0.08	0.12	0.34	0.57	3.69	0.85	0.91
SLD85158-2	0.74	0.36	0.64	-0.03	0.14	0.23	0.01	0.07	0.12	10.40	2.20	1.20	-0.60	1.50	2.50	4.17 ^a	0.77 ^a	0.32 ^a	0.90	0.47	0.47	-0.11	0.80	1.40	3.74	0.80	1.10
SLD85176	0.14	0.37	0.65	0.02	0.17	0.27	0.07	0.04	0.06	8.65	1.21	0.42	0.66	1.01	1.77	4.01	0.20	0.17	0.93	0.16	0.15	0.67	0.43	0.80	9.80	2.29	2.39
SLD85176-1	-0.14	0.28	0.39	0.02	0.07	0.10	0.07	0.03	0.03	9.30	0.84	0.28	0.45	0.67	1.00	3.88	0.15	0.09	0.93	0.10	0.09	0.29	0.33	0.56	9.14	1.21	0.90
SLD85176-2	-0.26	0.31	0.41	-0.05	0.13	0.20	0.01	0.06	0.12	7.70	1.70	0.70	0.04	1.60	2.60	2.99 ^a	0.54 ^a	0.29 ^a	0.84	0.41	0.34	0.68	0.72	1.20	6.80	1.30	1.00
SLD85215	0.05	0.22	0.31	0.01	0.04	0.06	-0.01	0.02	0.03	8.70	0.68	0.26	0.24	0.52	0.80	3.39	0.11	0.08	0.73	0.07	0.10	0.24	0.30	0.40	2.69	0.76	0.56
SLD85215-1	-0.21	0.20	0.30	0.00	0.04	0.06	-0.01	0.02	0.03	7.98	0.72	0.32	0.18	0.55	0.84	3.45	0.12	0.08	0.78	0.07	0.10	0.02	0.24	0.39	3.02	0.66	0.58
SLD85215-2	0.22	0.30	0.48	-0.02	0.09	0.16	-0.04	0.06	0.10	8.10	1.60	0.70	0.90	1.30	2.40	3.87 ^a	0.65 ^a	0.23 ^a	0.97	0.29	0.22	0.23	0.60	1.10	3.13	0.65	0.82
SLD85225	0.21	0.21	0.31	0.06	0.05	0.07	0.03	0.02	0.02	8.20	0.66	0.25	0.13	0.56	0.80	4.76	1.09	0.07	0.71	0.06	0.09	0.45	0.23	0.40	5.36	0.78	0.68
SLD85225-1	0.08	0.19	0.27	0.02	0.04	0.06	0.05	0.02	0.02	7.36	0.63	0.21	-0.10	0.52	0.72	3.34	0.78	0.06	0.75	0.06	0.07	0.22	0.22	0.38	3.94	0.74	0.59
SLD85225-2	0.37	0.37	0.62	0.06	0.13	0.24	-0.03	0.07	0.12	8.90	2.20	0.80	1.80	1.80	3.40	3.38 ^a	0.63 ^a	0.30 ^a	0.59	0.32	0.70	-0.08	0.74	1.30	4.90	1.20	1.20
SLD85235	0.12	0.24	0.35	0.06	0.06	0.08	0.02	0.02	0.03	9.54	0.79	0.24	0.19	0.64	0.92	4.83	1.11	0.08	0.95	0.07	0.09	0.43	0.26	0.45	5.57	0.90	0.76
SLD85235-1	0.31	0.21	0.34	-0.01	0.05	0.08	0.00	0.02	0.03	10.50	0.79	0.25	0.10	0.62	0.87	5.13	1.18	0.08	0.97	0.07	0.10	0.50	0.28	0.48	6.34	0.90	0.72
SLD85235-2	-0.02	0.42	0.61	0.04	0.14	0.23	-0.02	0.07	0.13	10.50	2.30	0.90	1.70	2.00	3.40	5.88 ^a	0.93 ^a	0.30 ^a	1.02	0.38	0.80	0.34	0.83	1.50	4.89	0.94	1.10
SLD85257	-0.20	0.38	0.54	0.03	0.14	0.22	-0.02	0.03	0.05	9.59	1.28	0.49	0.08	1.40	1.52	5.25	1.26	0.15	1.22	0.13	0.20	0.12	0.48	0.79	4.61	1.77	1.84
SLD85257-1	-0.18	0.29	0.48	0.06	0.12	0.19	-0.03	0.03	0.05	11.10	1.11	0.40	1.15	1.01	1.37	3.36	0.83	0.13	1.30	0.13	0.17	0.39	0.42	0.66	5.94	1.51	1.69
SLD85257-2	0.44	0.42	0.73	0.03	0.14	0.24	-0.07	0.08	0.13	8.50	2.30	1.10	1.30	1.80	3.50	4.64 ^a	0.81 ^a	0.35 ^a	0.76	0.34	0.50	0.30	0.85	1.60	3.03	0.88	1.40
SLD95119	-0.01	0.27	0.41	0.00	0.11	0.16	0.03	0.03	0.04	8.72	0.79	0.32	0.39	0.76	1.16	3.08	0.76	0.11	1.47	0.11	0.11	0.15	0.33	0.54	3.41	1.42	1.37
SLD95119-1	-0.01	0.26	0.39	0.00	0.11	0.16	0.01	0.03	0.04	8.20	0.80	0.31	0.17	0.72	1.09	3.03	0.74	0.10	1.12	0.10	0.15	0.25	0.33	0.55	2.83	1.23	1.36
SLD95119-2	0.46	0.30	0.49	-0.02	0.11	0.18	0.01	0.06	0.10	8.40	1.60	0.80	-0.70	1.40	2.00	3.03 ^a	0.45 ^a	0.26 ^a	1.02	0.20	0.34	0.26	0.26	0.47	2.16	0.49	1.10
SLD95122	-0.11	0.23	0.37	0.06	0.09	0.15	-0.02	0.02	0.04	6.58	0.72	0.28	0.43	0.71	1.09	3.68	0.89	0.10	0.73	0.09	0.13	0.58	0.53	0.53	2.79	1.12	1.28
SLD95122-1	-0.16	0.28	0.41	0.09	0.10	0.16	0.01	0.03	0.04	6.49	0.74	0.30	0.16	0.77	1.16	4.30	1.03	0.11	0.77	0.09	0.13	0.26	0.33	0.55	3.15	1.19	1.35
SLD95122-2	0.38	0.23	0.38	0.09	0.08	0.14	-0.01	0.05	0.07	4.80	1.10	0.80	-0.84	0.96	1.60	3.68 ^a	0.50 ^a	0.21 ^a	0.57	0.14	0.26	0.30	0.14	0.33	1.91	0.38	0.75

^a Value corrected by a factor of 1.5 for comparability.

Notes:

Results are expressed in pCi/g.

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

Samples ending in "-1" are duplicate samples. Samples ending in "-2" are split samples.

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4.5 COMPLETENESS

Usable data are defined as those data, which pass individual scrutiny during the verification and validation process and are accepted for their intended use. The data quality objective of achieving 90 percent completeness, as defined in the FSSP, was satisfied with the project producing valid results for 100 percent of the sample analyses performed and successfully collected.

A total of 261 systematic, biased, and their associated subsurface samples were collected with approximately 3,900 discrete analyses being obtained, reviewed, and integrated into the assessment. The project produced acceptable results for 100 percent of the sample analyses performed.

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5.0 DATA QUALITY ASSESSMENT FOR SCAN AND FIXED-POINT SURVEYS

5.1 DATA QUALITY OBJECTIVES

The *Final Status Survey Plan for Structures and Other Consolidated Material Left in Place at the St. Louis Sites* (USACE 2003b) identifies the following QC provisions for scan and fixed-point surveys of consolidated materials:

- Detector with active probe area of about 100 cm² is held within about 0.4 inches of the clean, dry surface being surveyed. The audible output of the survey instrument should be used during scanning due to its faster response than the meter.
- The detector should be frequently checked for proper operation during surveys, calibrated annually, undergo a daily source check (with results within 20 percent of readings obtained at calibration), and undergo a daily background check (with results within three σ s from the background value determined at calibration).
- Instrument efficiency (ϵ_i) is generally greater than or equal to 0.15 to aid in achieving the desired limit of detection.
- The fixed-point MDC must be less than or equal to the screening level for clearance, with a target of 10 to 50 percent of the screening level.
- The MDC_{scan} for beta radiation should be less than the screening level for clearance.
- The probability for detecting alpha radiation by scan should generally be greater than or equal to 85 percent. (When scanning for alpha contamination, the basic assumptions behind calculating a scanning MDC do not hold true because the normal alpha background count rate is near zero. As a result, the limit of detection for alpha scans is calculated and expressed in terms of the "alpha scan probability" of detecting a single alpha count during the survey. Methods for calculating MDC_{scan} and probabilities are provided in USACE 2003b.)

5.2 DATA EVALUATION

The survey design and data collection documentation was reviewed for consistency with the objectives of the survey. As required for Class 1 consolidated material areas, 100 percent of the accessible surfaces were surveyed by scan. Descriptions of the consolidated materials surveyed were entered onto survey maps. Instruments of the same model were used in the survey, and were verified to have the appropriate accuracy, sensitivity, representativeness, and comparability for the objectives of the survey. The survey results are in Attachment A-7. Documentation is on file as part of the Contractor's FUSRAP project records.

- The instruments used for the scan and fixed-point surveys met the above provisions for active probe area, audible output, calibration, source check, and background check.
- The instruments were used as described above by trained operators.
- The instrument efficiencies ranged from 0.235 to 0.4 for beta radiation. The instrument efficiencies for alpha radiation ranged from 0.116 to 0.23, which was sufficient to achieve the desired limit of detection.

- The MDCs for fixed point surveys were less than 50 percent of the screening levels for clearance, with an average of 15 and 20 percent of the screening levels for alpha and beta radiation, respectively.
- The alpha scan probability was above 85 percent for the instruments, except for one instance with a probability of 83 percent.
- The MDCs for beta scan surveys were less than the screening level for clearance, with an average of 27 percent of the screening level.
- The results were inspected for obvious outliers, trends, values that exceeded the screening levels for clearance, and indicators of inconsistent results. No problems were noted.
- The FSSP data quality objective of achieving ninety percent completeness was satisfied with the project producing valid results for 100 percent of the surveys performed.

The survey results were converted from cpm to the units of the survey RGs for ease of comparison.

$$Result \left(\frac{dpm}{100 \text{ cm}^2} \right) = \frac{R_g - R_b}{(\epsilon_i)(\epsilon_s)(Probe \text{ Area}/100)}$$

Where: R_g is the static data point gross count rate (cpm)
 R_b is the field background count rate (cpm)
 ϵ_i is the instrument efficiency (cpm/dpm)
 ϵ_s is the surface efficiency
 $Probe \text{ Area}$ is the open area of the detector face (cm^2)

6.0 DATA QUALITY ASSESSMENT SUMMARY

The overall quality of this data meets or exceeds the established project objectives. Through proper implementation of the project data verification, validation, and assessment process, project information has been determined to be acceptable for use.

Sample data, as presented, have been qualified as usable, but estimated when necessary. Data that have been estimated 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. There are numerous possibilities for these anomalies:

- Dilution of samples due to high analyte concentration that exceeds analytical calibration(s);
- Excessive dilution for sample turbidity or other matrix issues that was deemed necessary for a laboratory analysis;
- Incomplete sample homogenization either at the laboratory or during the field sampling;
- Matrix interferences within the sample itself that caused inadequate analytical quantitation;
- Different preparation methods for associated split sample at different laboratories;
- Different analytical methods for associated split samples at different laboratories; and
- Concentration of an analyte being below the calibration range, or near the MDL for that analyte; etc.

Further analysis of the data can display trends or even randomness within the data set that could be explained with one or more of the above mentioned contributors to anomalies. For instance, a single split 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 sample, use of different preparation methods, dilutions that were required to overcome sample concentration, or analyte concentrations approaching the MDL. Precision and/or accuracy anomalies occurring for some analytes, but not for others, could be the results of a simple matrix effect causing poor quantitation of a sample, or perhaps low concentrations of those analytes. When considering split 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 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 *Department of Defense Quality Systems Manual for Environmental Laboratories* defines allowable marginal exceedances as 10 percent of the total analysis for random anomalies that occur during regular laboratory analysis. As presented in this report, there are 261 total comparisons with 17 exceedances, resulting in a marginal exceedance rate of 6.5 percent. This is well within the *Department of Defense Quality Systems Manual for Environmental Laboratories* 10 percent allowance for marginal exceedances. The allowable marginal exceedance requirements for the project have been met, with over 90 percent of the data being within

acceptance limits, while allowing for some noticeable trends and randomness of anomalous exceedances between laboratories.

Data produced for this QCSR demonstrates that it can withstand scientific scrutiny, are appropriate for its intended purpose, are technically defensible, and are of known and acceptable sensitivity, precision, and accuracy. Data integrity has been documented through proper implementation of QA/QC measures. The environmental information presented has an established confidence, which allows utilization for the project objectives and provides data for future needs.

ATTACHMENT A-9
RISK AND DOSE ASSESSMENT

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RESIDUAL RISK, DOSE, AND TOXICITY ASSESSMENT

RADIOLOGICAL

RADIOLOGICAL RISK AND DOSE ASSESSMENT MODEL

RESRAD (RESidual RADioactivity) is a computer model developed by the Argonne National Laboratory for the DOE. RESRAD calculates site-specific risk and dose to various future hypothetical on-site receptors at sites that are contaminated with residual radioactive materials. The use of RESRAD for modeling risk and dose has become an acceptable regulatory standard. For example:

- The EPA used RESRAD in its “Reassessment of Radium and Thorium Soil Concentrations and Annual Dose Rates” that demonstrated the protectiveness of the Uranium Mill Tailing Radiation Control Act soil criteria and in its rulemaking for cleanup of sites contaminated with radioactivity.
- The EPA was also a signatory to both the ROD and the *Record of Decision for the North St. Louis County Sites* (USACE 2005b), both of which used RESRAD in their development. EPA has participated in many other CERCLA actions involving RESRAD.
- Seven U.S. Cabinet-level agencies including EPA, DOE, NRC, and DoD, functioning as the Interagency Steering Committee on Radiation Standards formally accepted RESRAD-BIOTA.

Version 6.3 was used to calculate potential risk and dose to the scenario receptor. Residual risk and dose assessments for the ROD were performed using RESRAD Version 5.62. RESRAD 5.62 incorporates the morbidity slope factors from the *Health Effects Assessment Summary Tables (HEAST)*: Table 4 (USEPA 1995), whereas RESRAD 6.3 incorporates updated morbidity slope factors from the *Cancer Risk Coefficients for Environmental Exposure to Radionuclides, Federal Guidance Report 13* (USEPA 1999) that are pathway specific.

RESRAD Receptor Scenario

The input parameters selected for the utility and industrial worker scenarios are those defined in the FS. The exposure parameters selected for the onsite residential receptor scenario are those defined for the onsite residential receptor in the *Post-Remedial Action Report for the St. Louis Downtown Site Plant 2 Property* (USACE 2002c). Input parameters for the hydrological data (site soil and water properties) for all scenarios were selected or determined from the *Baseline Risk Assessment for Exposure to Contaminants at the St. Louis Site* (DOE 1993), FS, and RESRAD guidance.

Each receptor scenario is summarized as follows:

- **Industrial Worker:** The industrial worker is modeled as a typical site worker who spends most of their time indoors. The worker is at the property for 250 days per year for 25 years. During a standard year, the industrial worker is assumed to spend 1600 hours indoors and 400 hours outdoors plus 125 hours (0.5 hours per day) indoors to account for the possibility of eating lunch on-site, early daily arrival, and late daily departure.
- **Utility Worker:** The utility worker may participate in utility work or other intrusive outdoor activities at the property. It is assumed that the utility worker is exposed in a single event that takes place over an 80-hour period.

- The on-site residential receptor is modeled as a potential future receptor in case the current land use changes to residential. The standard default assumption for a residential receptor, as presented in the *Risk Assessment Guidance for Superfund: Volume 1 – Human Health Evaluation Manual* (USEPA 1989), is that an adult individual will live on site and be potentially exposed to contaminants for 350 days per year for a total of 30 years. The 30 year exposure duration assumes that the individual will live on the site as a young child for 6 years (i.e., from ages 0 to 6 years), and continues to live at the same location for another 24 years until age 30. The resident is assumed to spend 16.4 hours indoors and 2.0 hours outdoors each day per the *Exposure Factors Handbook, Volumes 1, 2, and 3* (USEPA 1997b). Because child and adult ingestion rates, body weights, and exposure durations vary, exposure to the resident via ingestion of soil/sediment is based on a weighted average of the respective child and adult parameters. The assumptions used in this weighted average are:
 - The child weighs 50 kg and ingests 200 mg of soil or sediment per day, over 6 years; and
 - The adult weighs 70 kg and ingests 100 mg of soil or sediment per day, over 24 years.
- This resident also is assumed to breathe at a rate of 0.552 m³ of air per hour (USEPA 1997b). A shielding factor of 0.4 is assumed for indoor exposures. A dust loading value of 100 micrograms per m³ is also assumed.

The exposure pathways applicable to the radiological risk and dose assessment for the receptor scenarios are external gamma, inhalation, and soil ingestion for the three scenarios, with plant ingestion added for the on-site resident scenario. Since ground water is not a potential source of drinking water for SLDS, the drinking water pathway is not considered a potential pathway for the property (USACE 1998a). The non-default RESRAD input parameters for the receptor scenarios are presented in Table A-9-2.

Table A-9-2. RESRAD Non-Default Input Parameters

Category	Parameter	Values	
Physical Parameters	Area of Contaminated Zone (m ²)	SU-1	994
		SU-2	1,380
		SU-3	8,918
		Combined Area	11,292
	Thickness of the Contaminated Zone (m)	2	
Cover Parameters	Cover Depth (m)	0	
	Density of the Cover Material (g/cm ³)	Not Applicable	
	Cover Erosion Rate (m/yr)	Not Applicable	
Hydrological Data for Contaminated Zone	Density of Contaminated Zone (g/cm ³)	1.28 (Clay Loam)	
	Contaminated Zone Total Porosity (unitless)	0.42 (Clay Soil)	
	Contaminated Zone Field Capacity (unitless)	0.36	
	Contaminated Zone Hydraulic Conductivity (m/yr)	3.048	
	Contaminated Zone b parameter (unitless)	10.4	
	Wind Speed (m/s)	4.17	
	Precipitation (m/yr)	0.92	
	Irrigation (m/yr)	0	
	Run-off Coefficient (unitless)	0.8 (Built-Up Area)	
	Contaminated zone Erosion Rate (m/yr)	0.00006	

Table A-9-2. RESRAD Non-Default Input Parameters (Continued)

Exposure Parameters	On-Site Resident	Utility Worker	Industrial Worker
Inhalation Rate (m ³ /yr)	8,400	10,550	10,550
Mass Loading for Inhalation (g/m ³)	5.9x10 ⁻⁶	0.0002	0.0002
Exposure Duration (yr)	30	1	25
Indoor Dust Filtration Factor (unitless)	0.5	0.5	0.5
External Gamma Shielding Factor (unitless)	0.7	0.7	0.7
Indoor Time Fraction (unitless)	0.655	0	0.1969
Outdoor Time Fraction (unitless)	0.0799	0.0091	0.04566
Fruit, Vegetable, and Grain Consumption (kg/yr)	42.7	Not Applicable	Not Applicable
Leafy Vegetable Consumption (kg/yr)	4.66	Not Applicable	Not Applicable
Soil Ingestion (g/yr)	43.8	175.2	49.64

DETERMINATION OF RADIOLOGICAL EXPOSURE POINT CONCENTRATIONS

Risk and dose are determined by developing a source term for each SU, and applying that source term to each receptor scenario using RESRAD. For these properties, the source terms are based upon EPCs calculated from SU data. The following discussion summarizes the process for calculating each COC's EPC for each SU.

For each SU, the sample results were weighted by area. The weighting was done by giving each systematic or random sample station a representative area value by dividing the SU area by the number of systematic or random stations in the SU. Then, the area of each biased sample was identified from an on-site evaluation and/or GWS data. The area-weighted average concentration for each radionuclide COC was determined for each representative area by the following equation:

$$C_{RA} = \frac{\sum \left(\frac{C_S \times (R_A - \sum A_B)}{N_S} \right) + \sum (C_B \times A_B)}{R_A}$$

Where: C_{RA} = Concentration of the representative area
 C_S = Concentration of the systematic, random, or subsurface sample
 R_A = Representative area value
 C_B = Concentration of the biased sample
 A_B = Area of the biased sample
 N_S = Number of samples per systematic or random sample station (e.g., total number of samples taken at different depths)

For each SU, the C_{RA} values were inserted into the EPA-designed software ProUCL (Version 3.0) to calculate the 95 percent upper confidence limit (UCL_{95}) of the arithmetic mean for each radionuclide COC. ProUCL determined both the distribution (i.e., normal, lognormal, etc.) and the UCL_{95} value of the sample results.

The EPC for each radionuclide COC was calculated by subtracting its average background concentration from the smaller of its UCL_{95} results or its maximum detected concentration. The EPCs for all of the SUs combined were calculated by using area-weighted EPCs from each SU. Since the sample results did not include lead-210 (Pb-210) and U-234, the EPCs for these radionuclides were calculated from established ratios to other radionuclides for which an EPC was calculated. From Table 2.15 of the *Baseline Risk Assessment for Exposure to Contaminants*

at the St. Louis Site, the ratio of Pb-210 to Ra-226 is 1.3 and the ratio of U-234 to U-238 is 1.0. The EPCs for each SU and all of the SUs combined are in Table A-9-3.

Table A-9-3. Radiological Exposure Point Concentrations for Each Survey Unit and All Survey Units Combined

Survey Unit	Area (m ²)	Statistic	Radionuclide Concentration (pCi/g)										
			Ra-226	Pb-210 ^a	Th-230	U-238	U-234 ^a	U-235	Th-232	Ra-228	Th-228	Ac-227	Pa-231
Class 1 SU 1	994	Background	2.78	-	1.94	1.44	-	0.09	1.09	0.95	1.16	0.14	0.89
		Maximum	6.42	-	5.44	14.45	-	0.89	2.07	2.25	2.63	0.42	0.46
		Distribution	N	-	N	G	-	G	N	X	G	G	N
		UCL ₉₅	3.91	-	3.77	6.11	-	0.38	1.30	1.14	1.57	0.15	0.29
		EPC	1.13	-	1.83	4.67	-	0.29	0.21	0.19	0.41	0.01	0.00
Class 1 SU 2	1,380	Background	2.78	-	1.94	1.44	-	0.09	1.09	0.95	1.16	0.14	0.89
		Maximum	5.42	-	5.07	13.97	-	0.81	1.33	1.16	1.86	0.25	0.56
		Distribution	N	-	N	X	-	N	N	N	N	N	N
		UCL ₉₅	4.08	-	3.81	6.66	-	0.44	1.05	0.96	1.41	0.10	0.24
		EPC	1.30	-	1.87	5.22	-	0.35	0.00	0.01	0.25	0.00	0.00
Class 2 SU 3	8,918	Background	2.78	-	1.94	1.44	-	0.09	1.09	0.95	1.16	0.14	0.89
		Maximum	4.98	-	6.06	12.87	-	0.65	1.46	1.08	1.42	0.83	0.67
		Distribution	N	-	N	G	-	G	N	N	N	G	N
		UCL ₉₅	2.69	-	3.84	5.06	-	0.30	0.91	0.71	1.09	0.25	0.23
		EPC	0.00	-	1.90	3.62	-	0.21	0.00	0.00	0.00	0.11	0.00
Combined SUs	11,292	EPC	0.26	0.34	1.89	3.91	3.91	0.23	0.02	0.02	0.07	0.09	0.00

^a EPCs were determined based on the relationship presented in Table 2.15 of *Baseline Risk Assessment for Exposure to Contaminants at the St. Louis Site* (DOE 1993).

Note: G= Gamma, L=Lognormal, N= Normal, X=Non Parametric

RADIOLOGICAL RISK AND DOSE ASSESSMENT RESULTS

For the scenarios assessed, the highest residential risk and dose were 1×10^{-4} and 6 mrem/yr total effective dose equivalent (TEDE), respectively. These results met the CERCLA risk range and were below the dose criteria of 25 mrem/yr TEDE. EPC calculations (including Pro-UCL output files) and RESRAD output files are on file as part of the St. Louis FUSRAP records/files.

NON-RADIOLOGICAL DATA EVALUATION

The ROD identified uranium, arsenic and cadmium as non-radiological COCs for the portion of SLDS. Risk-based RGs have been established for arsenic (60 mg/kg) and cadmium (17 mg/kg) in the ROD targeting a noncarcinogenic HQ of 1.0 for protection of an industrial worker. Noncarcinogenic and carcinogenic RGs were also established in the ROD for both the non-radiological and radiological forms of uranium, respectively, assuming industrial land use. However, because soil samples collected at DT-10 were not analyzed for the non-radiological form of uranium, the carcinogenic RG of 150 pCi/g can be applied in this evaluation to demonstrate health protectiveness of the non-radiological effects of uranium exposures. The ROD describes the risk basis for the radiological uranium RG in Section 7.3.7.1, which states that "A guideline of 150 pCi/g for U-238 represents a mid-point (5.7×10^{-5}) between 10^{-5} and 10^{-4} based on the assumption of no clean cover. The health protectiveness of noncarcinogenic effects from application of the radiological uranium RG is noted in Section 7.3.7.2 of the ROD, which states that "Cleanup of uranium to 150 pCi/g will result in a non-carcinogenic HQ of less

than 0.1. Therefore, addressing uranium as a radiological threat reduces the non-carcinogenic effects of uranium to negligible values.”

Both uranium and cadmium exposures affect the kidneys; whereas arsenic affects the cardiovascular system. The ROD considers the potential for cumulative health effects from combined exposures to uranium and cadmium by stating that achieving the cadmium RG of 17 mg/kg will ensure “that the residual combined cadmium and uranium concentrations will not exceed a Hazard Index (HI) of 1.0.” Although the uranium RG of 150 pCi/g is based on radiological cancer risk, the protectiveness of the non-carcinogenic HQ of 0.1, as stated in the ROD, is being assumed in a conservative evaluation for DT-10 that demonstrates there is no cumulative non-cancer risk from combined exposures to uranium and cadmium. This approach is health-conservative because radiological cancer risk and non-radiological non-cancer risk are considered to be non-additive.

Methodology

The non-radionuclide toxicity assessment generally consists of a two-tiered approach that involves 1) the comparisons of site concentrations of COCs to corresponding RGs and if needed, 2) calculations of cumulative noncarcinogenic risks, or HIs for COCs with site concentrations exceeding RGs. The site concentration of a COC is represented by the EPC, which is determined using the same methodology discussed previously for radionuclides. The RGs for non-radionuclide COCs listed in the ROD (USACE 2005a) were developed to ensure that the cumulative toxicity effects would result in an HI less than one. All RGs were calculated based on noncarcinogenic, rather than carcinogenic effects. The FS (USACE 1998b) explains RG development. The following is the overall, stepwise procedure that is used to implement the two-tiered approach:

Tier 1 – Quantitative Comparison of COC EPCs to ROD (USACE 2005a) RGs

- Step 1 – Calculate an EPC for the COC.
- Step 2 – Quantitatively compare the EPC to the RG by calculation of a hazard ratio (HR) (Equation 1 below). An $HR > 1.0$ indicates that the $EPC > RG$; an $HR < 1.0$ indicates that the $EPC < RG$.
- Step 3 – If an HR for at least one COC exceeds a value of 1.0, then a Tier 2 evaluation is performed. Additionally, if the sum of the HRs for two or more chemicals affecting the same target organ exceeds a value of 1.0, even if all individual HRs are less than 1.0, then the Tier 2 evaluation is performed as discussed below. If no individual HR, or no summed HR (i.e., for chemicals affecting the same target organ) exceeds 1.0, then the Tier 1 evaluation is complete.

Tier 2 – Calculation of a Target Organ/Organ System Hazard Index (Toxicity Assessment)

- Step 1 – If at least one HR exceeds 1.0 (per Tier 1, Step 3 above), then calculate an HQ for all COCs.
- Step 2 – For each group of COCs affecting the same target organ/organ system, sum all HQs to determine a cumulative HI for that target organ/organ system.
- Step 3 – If $HI < 1.0$ for a target organ/organ system, then no further action is warranted and the risk basis for the RG has been met. If $HI > 1$, then further evaluation/actions may be considered as needed.

DT-10 Evaluation Approach: To comply with the requirement to perform a post-remedial action risk assessment in section 9.0 of the ROD, EPCs were developed for each of the chemical COCs as part of the Tier 1 evaluation. The individual EPCs were then compared to the corresponding COC RGs through the calculations of HRs. Additionally, to ensure that there are no cumulative effects to the kidneys from exposures to uranium and cadmium, the cancer and non-cancer risk-based HRs for uranium and cadmium, respectively, were summed and compared to a value of 1.0. If all individual HRs and the kidney HR were less than 1.0, then the site met the non-radiological cleanup criteria and the post-remedial risk objectives set forth in the ROD. However, because the individual HRs and the kidney HR estimated for the COCs did not exceed a value of 1, a Tier 2 evaluation to determine HQs and a cumulative kidney HI (i.e., for uranium and cadmium) for DT-10 was not required. The following text discusses the Tier 1 evaluation and results for non-radiological COCs detected in DT-10 soil.

Determination of EPC: The EPC for the three Uranium radionuclides was determined in Section 2.4.2 and listed in Table 3. Those results and the calculation of a total uranium EPC is provided in Table A-9-4.

Table A-9-4. Total Uranium EPC Calculation

Uranium Constituent	EPC
U-238	3.91 pCi/g
U-234	3.91 pCi/g
U-235	0.23 pCi/g
Total-U	8.05 pCi/g

EPCs are typically calculated by selecting the lesser of the UCL₉₅ and the maximum detected concentration. However, because only two non-radiological soil samples were collected from the property, a statistical evaluation of those samples would likely yield non-defensible results. Therefore on this property, the statistical UCL₉₅ evaluation was not conducted and the maximum detected concentrations were selected as the EPCs for both arsenic and cadmium as presented in Table A-9-5.

Table A-9-5. Arsenic and Cadmium EPCs

Sample Name	Arsenic (mg/kg) (RG is 60)			Cadmium (mg/kg) (RG is 17)		
	Result	Detection Limit	VQ	Result	Detection Limit	VQ
SLD77213	46.7	0.33	=	1.4	0.054	=
SLD78997	4.4	0.25	=	0.22	0.041	U
EPC	46.7	NA	NA	1.4	NA	NA

NA: not applicable

Comparison of EPCs and RGs: As presented in Table A-9-6, all COC EPCs were less than the corresponding RGs; therefore, all HRs are less than 1.0. (Note: All HRs are based upon a relationship to the RG. Therefore, the HRs are based upon the same exposure pathways and parameters as those used in determining the RGs for the ROD).

Table A-9-6. EPC and RG Comparison

COC	EPC (mg/kg)	RG (mg/kg)	HR
Arsenic	46.7	60	0.8
Cadmium	1.4	17	< 0.1
Uranium	8.05	150	< 0.1

Conclusion

Since all COC EPCs were less than the corresponding RGs and the HR was less than 1.0, the site met the non-radiological cleanup criteria and the post-remedial risk objectives set forth in the ROD.

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ATTACHMENT A-9-1
EPC CALCULATIONS (PRO-UCL OUTPUT FILES)
(On the CDROM on the Back Cover of this Report)

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Table 3: Results of ProUCL Runs for DT-10 Class 1 SU 1

Data File		Variable: Ra-226	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	19	Shapiro-Wilk Test Statistic	0.9718824
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.901
Minimum	1.16	Data are normal at 5% significance level	
Maximum	6.42	95% UCL (Assuming Normal Distribution)	
Mean	3.3652632	Student's-t UCL	3.909585
Median	3.32	Gamma Distribution Test	
Standard Deviation	1.3682567	A-D Test Statistic	0.1287977
Variance	1.8721263	A-D 5% Critical Value	0.7420899
Coefficient of Variation	0.4065824	K-S Test Statistic	0.0795584
Skewness	0.5326335	K-S 5% Critical Value	0.19887
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	6.1255099	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	5.1934119	Approximate Gamma UCL	4.0046441
Theta hat	0.549385	Adjusted Gamma UCL	4.0665012
Theta star	0.647987	Lognormal Distribution Test	
nu hat	232.76938	Shapiro-Wilk Test Statistic	0.9800163
nu star	197.34965	Shapiro-Wilk 5% Critical Value	0.901
Approx.Chi Square Value (.05)	165.84083	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03687	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	163.31816	95% H-UCL	4.153992
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	4.8914255
Minimum of log data	0.14842	97.5% Chebyshev (MVUE) UCL	5.5443692
Maximum of log data	1.8594181	99% Chebyshev (MVUE) UCL	6.8269507
Mean of log data	1.1296652	95% Non-parametric UCLs	
Standard Deviation of log data	0.4342491	CLT UCL	3.8815821
Variance of log data	0.1885723	Adj-CLT UCL (Adjusted for skewness)	3.9225669
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	3.9159778
Data are normal (0.05)		Jackknife UCL	3.909585
Use Student's-t UCL		Standard Bootstrap UCL	3.8803872
		Bootstrap-t UCL	3.97378
		Hall's Bootstrap UCL	3.9955688
		Percentile Bootstrap UCL	3.8815789
		B/C/A Bootstrap UCL	3.8831579
		95% Chebyshev (Mean, Sd) UCL	4.7335198
		97.5% Chebyshev (Mean, Sd) UCL	5.3255656
		99% Chebyshev (Mean, Sd) UCL	6.4885248
		Actual UCL-95 Distribution	3.91 N

Data File**Variable: Th-230****Raw Statistics**

Number of Valid Samples	19
Number of Unique Samples	19
Minimum	1.15
Maximum	5.44
Mean	3.3242105
Median	3.42
Standard Deviation	1.1287472
Variance	1.2740702
Coefficient of Variation	0.3395535
Skewness	0.3106563

Gamma Statistics

k hat	8.4294783
k star (bias corrected)	7.1335958
Theta hat	0.3943554
Theta star	0.4659937
nu hat	320.32018
nu star	271.07664
Approx.Chi Square Value (.05)	233.94028
Adjusted Level of Significance	0.03687
Adjusted Chi Square Value	230.92786

Log-transformed Statistics

Minimum of log data	0.1397619
Maximum of log data	1.6937791
Mean of log data	1.1407454
Standard Deviation of log data	0.3728336
Variance of log data	0.1390049

RECOMMENDATION
Data are normal (0.05)

Use Student's-t UCL

Normal Distribution Test

Shapiro-Wilk Test Statistic	0.9656011
Shapiro-Wilk 5% Critical Value	0.901
Data are normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	3.7732503

Gamma Distribution Test

A-D Test Statistic	0.2385904
A-D 5% Critical Value	0.7415369
K-S Test Statistic	0.1046841
K-S 5% Critical Value	0.1986856

Data follow gamma distribution
at 5% significance level

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	3.8519054
Adjusted Gamma UCL	3.9021529

Lognormal Distribution Test

Shapiro-Wilk Test Statistic	0.9430746
Shapiro-Wilk 5% Critical Value	0.901
Data are lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	3.965272
95% Chebyshev (MVUE) UCL	4.6126275
97.5% Chebyshev (MVUE) UCL	5.1627105
99% Chebyshev (MVUE) UCL	6.243242

95% Non-parametric UCLs

CLT UCL	3.7501493
Adj-CLT UCL (Adjusted for skewness)	3.7698691
Mod-t UCL (Adjusted for skewness)	3.7763262
Jackknife UCL	3.7732503
Standard Bootstrap UCL	3.7326488
Bootstrap-t UCL	3.8295262
Hall's Bootstrap UCL	3.7903603
Percentile Bootstrap UCL	3.7273684
BCA Bootstrap UCL	3.7547368
95% Chebyshev (Mean, Sd) UCL	4.4529577
97.5% Chebyshev (Mean, Sd) UCL	4.9413675
99% Chebyshev (Mean, Sd) UCL	5.900754

Actual UCL-95
Distribution **N**

Data File

Variable: U-238

Raw Statistics

Number of Valid Samples	19
Number of Unique Samples	19
Minimum	1.34
Maximum	14.45
Mean	4.6863158
Median	4.07
Standard Deviation	3.4341621
Variance	11.793469
Coefficient of Variation	0.7328064
Skewness	2.0038484

Gamma Statistics

k hat	2.7343202
k star (bias corrected)	2.3376732
Theta hat	1.713887
Theta star	2.0046925
nu hat	103.90417
nu star	88.83158
Approx.Chi Square Value (.05)	68.097715
Adjusted Level of Significance	0.03687
Adjusted Chi Square Value	66.511534

Log-transformed Statistics

Minimum of log data	0.2926696
Maximum of log data	2.6706944
Mean of log data	1.3507806
Standard Deviation of log data	0.6165716
Variance of log data	0.3801605

RECOMMENDATION

Data follow gamma distribution (0.05)

Use Approximate Gamma UCL

Normal Distribution Test

Shapiro-Wilk Test Statistic	0.7550327
Shapiro-Wilk 5% Critical Value	0.901
Data not normal at 5% significance level	
95% UCL (Assuming Normal Distribution)	
Student's-t UCL	6.0524991

Gamma Distribution Test

A-D Test Statistic	0.6247081
A-D 5% Critical Value	0.7491177
K-S Test Statistic	0.19908
K-S 5% Critical Value	0.2002205
Data follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)

Approximate Gamma UCL	6.1131689
Adjusted Gamma UCL	6.2589571

Lognormal Distribution Test

Shapiro-Wilk Test Statistic	0.9566621
Shapiro-Wilk 5% Critical Value	0.901
Data are lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)

95% H-UCL	6.3669268
95% Chebyshev (MVUE) UCL	7.6081745
97.5% Chebyshev (MVUE) UCL	8.9034079
99% Chebyshev (MVUE) UCL	11.447643

95% Non-parametric UCLs

CLT UCL	5.982215
Adj-CLT UCL (Adjusted for skewness)	6.3692164
Mod-t UCL (Adjusted for skewness)	6.1128635
Jackknife UCL	6.0524991
Standard Bootstrap UCL	5.9606792
Bootstrap-t UCL	7.5328654
Hall's Bootstrap UCL	13.62506
Percentile Bootstrap UCL	6.1063158
BCA Bootstrap UCL	6.4384211
95% Chebyshev (Mean, Sd) UCL	8.1204778
97.5% Chebyshev (Mean, Sd) UCL	9.6064425
99% Chebyshev (Mean, Sd) UCL	12.525332

Actual UCL-95
Distribution

6.11
G

Data File**Variable: mU-235**

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	19	Shapiro-Wilk Test Statistic	0.8745522
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.901
Minimum	1	Data not normal at 5% significance level	
Maximum	1.91	95% UCL (Assuming Normal Distribution)	
Mean	1.3026316	Student's-t UCL	1.4001122
Median	1.25	Gamma Distribution Test	
Standard Deviation	0.2450361	A-D Test Statistic	0.6787288
Variance	0.0600427	A-D 5% Critical Value	0.7403558
Coefficient of Variation	0.1881085	K-S Test Statistic	0.1490321
Skewness	1.2760302	K-S 5% Critical Value	0.1981005
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	33.166784	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	27.965011	Approximate Gamma UCL	1.4011114
Theta hat	0.0392752	Adjusted Gamma UCL	1.41008
Theta star	0.0465808	Lognormal Distribution Test	
nu hat	1260.3378	Shapiro-Wilk Test Statistic	0.9196268
nu star	1062.6704	Shapiro-Wilk 5% Critical Value	0.901
Approx.Chi Square Value (.05)	987.97855	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03687	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	981.69467	95% H-UCL	1.4011954
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	1.5301383
Minimum of log data	0	97.5% Chebyshev (MVUE) UCL	1.6289803
Maximum of log data	0.6471032	99% Chebyshev (MVUE) UCL	1.8231361
Mean of log data	0.2492354	95% Non-parametric UCLs	
Standard Deviation of log data	0.1746725	CLT UCL	1.3950973
Variance of log data	0.0305105	Adj-CLT UCL (Adjusted for skewness)	1.4126813
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	1.4028549
Data follow gamma distribution (0.05)		Jackknife UCL	1.4001122
Use Approximate Gamma UCL		Standard Bootstrap UCL	1.3901101
		Bootstrap-t UCL	1.4304953
		Hall's Bootstrap UCL	1.4424106
		Percentile Bootstrap UCL	1.3989474
		BCA Bootstrap UCL	1.4042105
		95% Chebyshev (Mean, Sd) UCL	1.5476677
		97.5% Chebyshev (Mean, Sd) UCL	1.653695
		99% Chebyshev (Mean, Sd) UCL	1.8619651
		Actual UCL-95 Distribution	1.40-1.02 0.38 G

Data File

Variable: Th-232

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	19	Shapiro-Wilk Test Statistic	0.9177048
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.901
Minimum	0.67	Data are normal at 5% significance level	
Maximum	2.07	95% UCL (Assuming Normal Distribution)	
Mean	1.1626316	Student's-t UCL	1.2961693
Median	1.04	Gamma Distribution Test	
Standard Deviation	0.3356725	A-D Test Statistic	0.4078318
Variance	0.112676	A-D 5% Critical Value	0.7408442
Coefficient of Variation	0.2887179	K-S Test Statistic	0.1490806
Skewness	0.9745306	K-S 5% Critical Value	0.1984076
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	13.629678	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	11.512711	Approximate Gamma UCL	1.3042437
Theta hat	0.0853015	Adjusted Gamma UCL	1.3174694
Theta star	0.1009868	Lognormal Distribution Test	
nu hat	517.92776	Shapiro-Wilk Test Statistic	0.9651255
nu star	437.48303	Shapiro-Wilk 5% Critical Value	0.901
Approx.Chi Square Value (.05)	389.98202	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03687	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	386.06708	95% H-UCL	1.3125734
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	1.4879477
Minimum of log data	-0.400478	97.5% Chebyshev (MVUE) UCL	1.6290733
Maximum of log data	0.7275486	99% Chebyshev (MVUE) UCL	1.906287
Mean of log data	0.113553	95% Non-parametric UCLs	
Standard Deviation of log data	0.2775185	CLT UCL	1.2892994
Variance of log data	0.0770165	Adj-CLT UCL (Adjusted for skewness)	1.307696
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	1.2990388
Data are normal (0.05)		Jackknife UCL	1.2961693
Use Student's-t UCL		Standard Bootstrap UCL	1.2831044
		Bootstrap-t UCL	1.3202827
		Hall's Bootstrap UCL	1.332168
		Percentile Bootstrap UCL	1.2836842
		BCA Bootstrap UCL	1.3036842
		95% Chebyshev (Mean, Sd) UCL	1.4983041
		97.5% Chebyshev (Mean, Sd) UCL	1.6435498
		99% Chebyshev (Mean, Sd) UCL	1.93
		Actual UCL-95 Distribution	1.30
			N

Data File**Variable: Ra-228****Raw Statistics**

Number of Valid Samples	19
Number of Unique Samples	16
Minimum	0.68
Maximum	2.25
Mean	1.0042105
Median	0.96
Standard Deviation	0.3262807
Variance	0.1064591
Coefficient of Variation	0.3249126
Skewness	3.3441793

Gamma Statistics

k hat	14.993912
k star (bias corrected)	12.66154
Theta hat	0.0669746
Theta star	0.0793119
nu hat	569.76866
nu star	481.13852
Approx.Chi Square Value (.05)	431.26594
Adjusted Level of Significance	0.03687
Adjusted Chi Square Value	427.14444

Log-transformed Statistics

Minimum of log data	-0.385662
Maximum of log data	0.8109302
Mcan of log data	-0.029516
Standard Deviation of log data	0.2442025
Variance of log data	0.0596349

RECOMMENDATION

Data are Non-parametric (0.05)

Use Student's-t UCL
or Modified-t UCL**Normal Distribution Test**

Shapiro-Wilk Test Statistic	0.6095292
Shapiro-Wilk 5% Critical Value	0.901
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	1.134012

Gamma Distribution Test

A-D Test Statistic	1.5314686
A-D 5% Critical Value	0.7407255
K-S Test Statistic	0.2233351
K-S 5% Critical Value	0.1983503

Data do not follow gamma distribution
at 5% significance level

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	1.1203397
Adjusted Gamma UCL	1.1311498

Lognormal Distribution Test

Shapiro-Wilk Test Statistic	0.7810265
Shapiro-Wilk 5% Critical Value	0.901
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	1.110207
95% Chebyshev (MVUE) UCL	1.2447738
97.5% Chebyshev (MVUE) UCL	1.3512529
99% Chebyshev (MVUE) UCL	1.5604106

95% Non-parametric UCLs

CLT UCL	1.1273343
Adj-CLT UCL (Adjusted for skewness)	1.1886974
Mod-t UCL (Adjusted for skewness)	1.1435834
Jackknife UCL	1.134012
Standard Bootstrap UCL	1.1195666
Bootstrap-t UCL	1.2802642
Hall's Bootstrap UCL	1.6492424
Percentile Bootstrap UCL	1.1347368
BCA Bootstrap UCL	1.2136842
95% Chebyshev (Mean, Sd) UCL	1.3304912
97.5% Chebyshev (Mean, Sd) UCL	1.4716731
99% Chebyshev (Mean, Sd) UCL	1.75

Actual UCL-95	1.14
Distribution	X

Data File

Variable: Th-228

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	19	Shapiro-Wilk Test Statistic	0.8115445
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.901
Minimum	0.99	Data not normal at 5% significance level	
Maximum	2.63	95% UCL (Assuming Normal Distribution)	
Mean	1.4210526	Student's-t UCL	1.5693113
Median	1.32	Gamma Distribution Test	
Standard Deviation	0.3726764	A-D Test Statistic	0.6502146
Variance	0.1388877	A-D 5% Critical Value	0.7403879
Coefficient of Variation	0.2622538	K-S Test Statistic	0.1862155
Skewness	2.0606406	K-S 5% Critical Value	0.1981873
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	18.874475	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	15.929382	Approximate Gamma UCL	1.5661599
Theta hat	0.0752897	Adjusted Gamma UCL	1.5795692
Theta star	0.0892095	Lognormal Distribution Test	
nu hat	717.23004	Shapiro-Wilk Test Statistic	0.9163254
nu star	605.31652	Shapiro-Wilk 5% Critical Value	0.901
Approx.Chi Square Value (.05)	549.23295	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03687	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	544.57041	95% H-UCL	1.5639396
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	1.7432722
Minimum of log data	-0.01005	97.5% Chebyshev (MVUE) UCL	1.8840499
Maximum of log data	0.9669838	99% Chebyshev (MVUE) UCL	2.1605804
Mean of log data	0.3246732	95% Non-parametric UCLs	
Standard Deviation of log data	0.2276657	CLT UCL	1.5616841
Variance of log data	0.0518316	Adj-CLT UCL (Adjusted for skewness)	1.6048718
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	1.5760477
Data follow gamma distribution (0.05)		Jackknife UCL	1.5693113
Use Approximate Gamma UCL		Standard Bootstrap UCL	1.5567515
		Bootstrap-t UCL	1.648793
		Hall's Bootstrap UCL	2.3132303
		Percentile Bootstrap UCL	1.5789474
		BCA Bootstrap UCL	1.6168421
		95% Chebyshev (Mean, Sd) UCL	1.7937291
		97.5% Chebyshev (Mean, Sd) UCL	1.95
		99% Chebyshev (Mean, Sd) UCL	2.2717454
		Actual UCL-95 Distribution	1.57
			G

Data File**Variable: mAc-227**

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	19	Shapiro-Wilk Test Statistic	0.9004091
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.901
Minimum	1	Data not normal at 5% significance level	
Maximum	1.45	95% UCL (Assuming Normal Distribution)	
Mean	1.1373684	Student's-t UCL	1.1800268
Median	1.11	Gamma Distribution Test	
Standard Deviation	0.1072299	A-D Test Statistic	0.4053217
Variance	0.0114982	A-D 5% Critical Value	0.73794
Coefficient of Variation	0.0942789	K-S Test Statistic	0.1223714
Skewness	1.3743873	K-S 5% Critical Value	0.19793
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	126.50827	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	106.56837	Approximate Gamma UCL	1.1801843
Theta hat	0.0089905	Adjusted Gamma UCL	1.1840003
Theta star	0.0106727	Lognormal Distribution Test	
nu hat	4807.3143	Shapiro-Wilk Test Statistic	0.931787
nu star	4049.598	Shapiro-Wilk 5% Critical Value	0.901
Approx.Chi Square Value (.05)	3902.6829	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03687	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	3890.1044	95% H-UCL	N/A
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	1.2398236
Minimum of log data	0	97.5% Chebyshev (MVUE) UCL	1.2842118
Maximum of log data	0.3715636	99% Chebyshev (MVUE) UCL	1.371404
Mean of log data	0.1247597	95% Non-parametric UCLs	
Standard Deviation of log data	0.0900924	CLT UCL	1.1778322
Variance of log data	0.0081166	Adj-CLT UCL (Adjusted for skewness)	1.1861202
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	1.1813195
Data follow gamma distribution (0.05)		Jackknife UCL	1.1800268
Use Approximate Gamma UCL		Standard Bootstrap UCL	1.1761329
		Bootstrap-t UCL	1.1925119
		Hall's Bootstrap UCL	1.2069286
		Percentile Bootstrap UCL	1.1810526
		BCA Bootstrap UCL	1.1826316
		95% Chebyshev (Mean, Sd) UCL	1.24
		97.5% Chebyshev (Mean, Sd) UCL	1.2909967
		99% Chebyshev (Mean, Sd) UCL	1.3821375
		Actual UCL-95 Distribution	1.18-1.03 0.15 G

Data File

Variable: mPa-231

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	19	Shapiro-Wilk Test Statistic	0.9265394
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.901
Minimum	1	Data are normal at 5% significance level	
Maximum	1.53	95% UCL (Assuming Normal Distribution)	
Mean	1.2963158	Student's-t UCL	1.363779
Median	1.31	Gamma Distribution Test	
Standard Deviation	0.1695815	A-D Test Statistic	0.5916512
Variance	0.0287579	A-D 5% Critical Value	0.739918
Coefficient of Variation	0.1308181	K-S Test Statistic	0.1716511
Skewness	-0.119436	K-S 5% Critical Value	0.1980249
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	60.439038	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	50.93112	Approximate Gamma UCL	1.3678447
Theta hat	0.0214483	Adjusted Gamma UCL	1.3742844
Theta star	0.0254523	Lognormal Distribution Test	
nu hat	2296.6835	Shapiro-Wilk Test Statistic	0.9259145
nu star	1935.3826	Shapiro-Wilk 5% Critical Value	0.901
Approx.Chi Square Value (.05)	1834.1753	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03687	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	1825.5807	95% H-UCL	1.3701424
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	1.4695114
Minimum of log data	0	97.5% Chebyshev (MVUE) UCL	1.5443989
Maximum of log data	0.4252677	99% Chebyshev (MVUE) UCL	1.6915009
Mean of log data	0.2512306	95% Non-parametric UCLs	
Standard Deviation of log data	0.133135	CLT UCL	1.3603083
Variance of log data	0.0177249	Adj-CLT UCL (Adjusted for skewness)	1.3591692
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	1.3636013
Data are normal (0.05)		Jackknife UCL	1.363779
Use Student's-t UCL		Standard Bootstrap UCL	1.3584846
		Bootstrap-t UCL	1.3583214
		Hall's Bootstrap UCL	1.3586314
		Percentile Bootstrap UCL	1.3584211
		BCA Bootstrap UCL	1.36
		95% Chebyshev (Mean, Sd) UCL	1.4658973
		97.5% Chebyshev (Mean, Sd) UCL	1.5392754
		99% Chebyshev (Mean, Sd) UCL	1.6834124
		Actual UCL-95 Distribution	1.36-1.07 0.29 N

Table 3: Results of ProUCL Runs for DT-10 Class 1 SU 2

Data File		Variable: Ra-226	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9537262
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.897
Minimum	2.1	Data are normal at 5% significance level	
Maximum	5.42		
Mean	3.6494444	95% UCL (Assuming Normal Distribution)	
Median	3.49	Student's-t UCL	4.0773599
Standard Deviation	1.0436219	Gamma Distribution Test	
Variance	1.0891467	A-D Test Statistic	0.2702311
Coefficient of Variation	0.2859673	A-D 5% Critical Value	0.7392504
Skewness	0.181731	K-S Test Statistic	0.1193859
Gamma Statistics		K-S 5% Critical Value	0.2034023
k hat	12.511301	Data follow gamma distribution at 5% significance level	
k star (bias corrected)	10.463121		
Theta hat	0.2916918	95% UCLs (Assuming Gamma Distribution)	
Theta star	0.3487912	Approximate Gamma UCL	4.1320072
nu hat	450.40685	Adjusted Gamma UCL	4.1818476
nu star	376.67237	Lognormal Distribution Test	
Approx.Chi Square Value (.05)	332.68212	Shapiro-Wilk Test Statistic	0.9508759
Adjusted Level of Significance	0.03574	Shapiro-Wilk 5% Critical Value	0.897
Adjusted Chi Square Value	328.71712	Data are lognormal at 5% significance level	
Log-transformed Statistics			
Minimum of log data	0.7419373	95% UCLs (Assuming Lognormal Distribution)	
Maximum of log data	1.6900958	95% H-UCL	4.187454
Mean of log data	1.254079	95% Chebyshev (MVUE) UCL	4.78411
Standard Deviation of log data	0.2973341	97.5% Chebyshev (MVUE) UCL	5.2732464
Variance of log data	0.0884076	99% Chebyshev (MVUE) UCL	6.2340602
		95% Non-parametric UCLs	
		CLT UCL	4.0540522
		Adj-CLT UCL (Adjusted for skewness)	4.0653107
		Mod-t UCL (Adjusted for skewness)	4.079116
		Jackknife UCL	4.0773599
		Standard Bootstrap UCL	4.0434035
		Bootstrap-t UCL	4.0955396
		Hall's Bootstrap UCL	4.0507936
		Percentile Bootstrap UCL	4.0405556
		BCA Bootstrap UCL	4.0322222
		95% Chebyshev (Mean, Sd) UCL	4.7216641
		97.5% Chebyshev (Mean, Sd) UCL	5.1856143
		99% Chebyshev (Mean, Sd) UCL	6.0969548
RECOMMENDATION			
Data are normal (0.05)			
Use Student's-t UCL			
		Actual UCL-95 Distribution	4.08 N

Data File

Variable: Th-230

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9219598
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.897
Minimum	2.42	Data are normal at 5% significance level	
Maximum	5.07	95% UCL (Assuming Normal Distribution)	
Mean	3.4666667	Student's-t UCL	3.8060612
Median	3.345	Gamma Distribution Test	
Standard Deviation	0.8277326	A-D Test Statistic	0.4833184
Variance	0.6851412	A-D 5% Critical Value	0.739464
Coefficient of Variation	0.238769	K-S Test Statistic	0.1322058
Skewness	0.4879949	K-S 5% Critical Value	0.2032754
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	19.188872	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	16.027764	Approximate Gamma UCL	3.8299336
Theta hat	0.1806603	Adjusted Gamma UCL	3.8669006
Theta star	0.2162914	Lognormal Distribution Test	
nu hat	690.79939	Shapiro-Wilk Test Statistic	0.9364628
nu star	576.99949	Shapiro-Wilk 5% Critical Value	0.897
Approx.Chi Square Value (.05)	522.27143	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03574	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Squarc Value	517.27859	95% H-UCL	3.848066
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	4.3078574
Minimum of log data	0.8837675	97.5% Chebyshev (MVUE) UCL	4.6723121
Maximum of log data	1.6233408	99% Chebyshev (MVUE) UCL	5.3882129
Mean of log data	1.2169105	95% Non-parametric UCLs	
Standard Deviation of log data	0.2346667	CLT UCL	3.787575
Variance of log data	0.0550685	Adj-CLT UCL (Adjusted for skewness)	3.811553
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	3.8098013
Data are normal (0.05)		Jackknife UCL	3.8060612
Use Student's-t UCL		Standard Bootstrap UCL	3.7768244
		Bootstrap-t UCL	3.8310745
		Hall's Bootstrap UCL	3.8056851
		Percentile Bootstrap UCL	3.7872222
		BCA Bootstrap UCL	3.815
		95% Chebyshev (Mean, Sd) UCL	4.317081
		97.5% Chebyshev (Mean, Sd) UCL	4.685056
		99% Chebyshev (Mean, Sd) UCL	5.4078716
		Actual UCL-95 Distribution	3.81
			N

Data File

Variable: U-238

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.6920279
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.897
Minimum	2.51	Data not normal at 5% significance level	
Maximum	13.97	95% UCL (Assuming Normal Distribution)	
Mean	5.2483333	Student's-t UCL	6.5997843
Median	4.055	Gamma Distribution Test	
Standard Deviation	3.2959873	A-D Test Statistic	1.5559915
Variance	10.863532	A-D 5% Critical Value	0.7425769
Coefficient of Variation	0.6280065	K-S Test Statistic	0.2446394
Skewness	1.9838056	K-S 5% Critical Value	0.2045918
Gamma Statistics		Data do not follow gamma distribution at 5% significance level	
k hat	4.0160412	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	3.383738	Approximate Gamma UCL	6.5691493
Theta hat	1.3068425	Adjusted Gamma UCL	6.7140581
Theta star	1.551046	Lognormal Distribution Test	
nu hat	144.57748	Shapiro-Wilk Test Statistic	0.8464832
nu star	121.81457	Shapiro-Wilk 5% Critical Value	0.897
Approx.Chi Square Value (.05)	97.322108	Data not lognormal at 5% significance level	
Adjusted Level of Significance	0.03574	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	95.221615	95% H-UCL	6.5372377
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	7.7523125
Minimum of log data	0.9202828	97.5% Chebyshev (MVUE) UCL	8.8838417
Maximum of log data	2.6369122	99% Chebyshev (MVUE) UCL	11.106512
Mean of log data	1.5282742	95% Non-parametric UCLs	
Standard Deviation of log data	0.4801405	CLT UCL	6.5261735
Variance of log data	0.2305349	Adj-CLT UCL (Adjusted for skewness)	6.9143172
		Mod-t UCL (Adjusted for skewness)	6.6603269
		Jackknife UCL	6.5997843
		Standard Bootstrap UCL	6.5103587
		Bootstrap-t UCL	7.657324
		Hall's Bootstrap UCL	7.1681645
		Percentile Bootstrap UCL	6.5722222
		BCA Bootstrap UCL	6.965
		95% Chebyshev (Mean, Sd) UCL	8.6346384
		97.5% Chebyshev (Mean, Sd) UCL	10.099895
		99% Chebyshev (Mean, Sd) UCL	12.978109
RECOMMENDATION		Actual UCL-95 Distribution	6.66
Data are Non-parametric (0.05)			X
Use Student's-t UCL or Modified-t UCL			

Data File

Variable: U-235

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9314807
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.897
Minimum	0.06	Data are normal at 5% significance level	
Maximum	0.81	95% UCL (Assuming Normal Distribution)	
Mean	0.3544444	Student's-t UCL	0.4355435
Median	0.345	Gamma Distribution Test	
Standard Deviation	0.1977884	A-D Test Statistic	0.2657604
Variance	0.0391203	A-D 5% Critical Value	0.7454289
Coefficient of Variation	0.5580238	K-S Test Statistic	0.1377995
Skewness	0.8934203	K-S 5% Critical Value	0.2049752
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	3.1065992	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	2.6258697	Approximate Gamma UCL	0.45834
Theta hat	0.114094	Adjusted Gamma UCL	0.4699634
Theta star	0.1349817	Lognormal Distribution Test	
nu hat	111.83757	Shapiro-Wilk Test Statistic	0.9404657
nu star	94.531311	Shapiro-Wilk 5% Critical Value	0.897
Approx.Chi Square Value (.05)	73.10315	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03574	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	71.295123	95% H-UCL	0.5207946
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	0.6200762
Minimum of log data	-2.813411	97.5% Chebyshev (MVUE) UCL	0.7308106
Maximum of log data	-0.210721	99% Chebyshev (MVUE) UCL	0.9483268
Mean of log data	-1.206701	95% Non-parametric UCLs	
Standard Deviation of log data	0.6484579	CLT UCL	0.4311262
Variance of log data	0.4204977	Adj-CLT UCL (Adjusted for skewness)	0.4416159
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	0.4371797
Data are normal (0.05)		Jackknife UCL	0.4355435
Use Student's-t UCL		Standard Bootstrap UCL	0.4288359
		Bootstrap-t UCL	0.4533215
		Hall's Bootstrap UCL	0.4619477
		Percentile Bootstrap UCL	0.4333333
		BCA Bootstrap UCL	0.4461111
		95% Chebyshev (Mean, Sd) UCL	0.5576527
		97.5% Chebyshev (Mean, Sd) UCL	0.6455811
		99% Chebyshev (Mean, Sd) UCL	0.8182994
		Actual UCL-95 Distribution	0.44
			N

Data File**Variable: Th-232****Raw Statistics**

Number of Valid Samples	18
Number of Unique Samples	17
Minimum	0.61
Maximum	1.33
Mean	0.9788889
Median	0.985
Standard Deviation	0.1684144
Variance	0.0283634
Coefficient of Variation	0.1720465
Skewness	-0.049994

Gamma Statistics

k hat	34.094291
k star (bias corrected)	28.448947
Theta hat	0.0287112
Theta star	0.0344086
nu hat	1227.3945
nu star	1024.1621
Approx.Chi Square Value (.05)	950.85745
Adjusted Level of Significance	0.03574
Adjusted Chi Square Value	944.08585

Log-transformed Statistics

Minimum of log data	-0.494296
Maximum of log data	0.2851789
Mcan of log data	-0.036074
Standard Deviation of log data	0.1798163
Variance of log data	0.0323339

RECOMMENDATION
Data are normal (0.05)

Use Student's-t UCL

Normal Distribution Test

Shapiro-Wilk Test Statistic	0.9894225
Shapiro-Wilk 5% Critical Value	0.897
Data are normal at 5% significance level	
95% UCL (Assuming Normal Distribution)	
Student's-t UCL	1.0479437

Gamma Distribution Test

A-D Test Statistic	0.1817897
A-D 5% Critical Value	0.7389168
K-S Test Statistic	0.0989614
K-S 5% Critical Value	0.2031613

Data follow gamma distribution
at 5% significance level

95% UCLs (Assuming Gamma Distribution)

Approximate Gamma UCL	1.0543546
Adjusted Gamma UCL	1.0619171

Lognormal Distribution Test

Shapiro-Wilk Test Statistic	0.9674977
Shapiro-Wilk 5% Critical Value	0.897
Data are lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)

95% H-UCL	1.0593259
95% Chebyshev (MVUE) UCL	1.1611984
97.5% Chebyshev (MVUE) UCL	1.2398637
99% Chebyshev (MVUE) UCL	1.3943864

95% Non-parametric UCLs

CLT UCL	1.0441824
Adj-CLT UCL (Adjusted for skewness)	1.0436826
Mod-t UCL (Adjusted for skewness)	1.0478657
Jackknife UCL	1.0479437
Standard Bootstrap UCL	1.0418085
Bootstrap-t UCL	1.0443316
Hall's Bootstrap UCL	1.0487168
Percentile Bootstrap UCL	1.0422222
BCA Bootstrap UCL	1.0416667
95% Chebyshev (Mean, Sd) UCL	1.1519182
97.5% Chebyshev (Mean, Sd) UCL	1.2267881
99% Chebyshev (Mean, Sd) UCL	1.3738556

**Actual UCL-95
Distribution**

**1.05
N**

Data File

Variable: Ra-228

Raw Statistics

Number of Valid Samples	18
Number of Unique Samples	15
Minimum	0.6
Maximum	1.16
Mean	0.9022222
Median	0.92
Standard Deviation	0.1471516
Variance	0.0216536
Coefficient of Variation	0.1630991
Skewness	-0.521673

Gamma Statistics

k hat	36.599125
k star (bias corrected)	30.536308
Theta hat	0.0246515
Theta star	0.0295459
nu hat	1317.5685
nu star	1099.3071
Approx.Chi Square Value (.05)	1023.3186
Adjusted Level of Significance	0.03574
Adjusted Chi Square Value	1016.2899

Log-transformed Statistics

Minimum of log data	-0.510826
Maximum of log data	0.14842
Mean of log data	-0.116618
Standard Deviation of log data	0.1747211
Variance of log data	0.0305275

RECOMMENDATION

Data are normal (0.05)

Use Student's-t UCL

Normal Distribution Test

Shapiro-Wilk Test Statistic	0.9566719
Shapiro-Wilk 5% Critical Value	0.897
Data are normal at 5% significance level	

95% UCL (Assuming Normal Distribution)

Student's-t UCL	0.9625587

Gamma Distribution Test

A-D Test Statistic	0.5329809
A-D 5% Critical Value	0.738815
K-S Test Statistic	0.2114001
K-S 5% Critical Value	0.2031438

Data follow approximate gamma distribution at 5% significance level

95% UCLs (Assuming Gamma Distribution)

Approximate Gamma UCL	0.9692185
Adjusted Gamma UCL	0.9759216

Lognormal Distribution Test

Shapiro-Wilk Test Statistic	0.9202466
Shapiro-Wilk 5% Critical Value	0.897
Data are lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)

95% H-UCL	0.9742016
95% Chebyshev (MVUE) UCL	1.0656345
97.5% Chebyshev (MVUE) UCL	1.1360772
99% Chebyshev (MVUE) UCL	1.2744482

95% Non-parametric UCLs

CLT UCL	0.9592723
Adj-CLT UCL (Adjusted for skewness)	0.9547154
Mod-t UCL (Adjusted for skewness)	0.9618479
Jackknife UCL	0.9625587
Standard Bootstrap UCL	0.9588528
Bootstrap-t UCL	0.9574456
Hall's Bootstrap UCL	0.9547054
Percentile Bootstrap UCL	0.9583333
BCA Bootstrap UCL	0.9538889
95% Chebyshev (Mean, Sd) UCL	1.0534061
97.5% Chebyshev (Mean, Sd) UCL	1.1188235
99% Chebyshev (Mean, Sd) UCL	1.2473233

Actual UCL-95
Distribution

0.96
N

Data File

Variable: Th-228

Raw Statistics

Number of Valid Samples	18
Number of Unique Samples	14
Minimum	0.78
Maximum	1.86
Mean	1.2961111
Median	1.315
Standard Deviation	0.2816577
Variance	0.079331
Coefficient of Variation	0.2173098
Skewness	0.2123056

Gamma Statistics

k hat	21.795801
k star (bias corrected)	18.200204
Theta hat	0.0594661
Theta star	0.0712141
nu hat	784.64882
nu star	655.20735
Approx.Chi Square Value (.05)	596.81057
Adjusted Level of Significance	0.03574
Adjusted Chi Square Value	591.46648

Log-transformed Statistics

Minimum of log data	-0.248461
Maximum of log data	0.6205765
Mean of log data	0.2362527
Standard Deviation of log data	0.224345
Variance of log data	0.0503307

RECOMMENDATION

Data are normal (0.05)

Use Student's-t UCL

Normal Distribution Test

Shapiro-Wilk Test Statistic	0.96
Shapiro-Wilk 5% Critical Value	0.897
Data are normal at 5% significance level	
95% UCL (Assuming Normal Distribution)	
Student's-t UCL	1.411599

Gamma Distribution Test

A-D Test Statistic	0.3396701
A-D 5% Critical Value	0.739417
K-S Test Statistic	0.1593698
K-S 5% Critical Value	0.2032474

Data follow gamma distribution at 5% significance level

95% UCLs (Assuming Gamma Distribution)

Approximate Gamma UCL	1.4229331
Adjusted Gamma UCL	1.4357898

Lognormal Distribution Test

Shapiro-Wilk Test Statistic	0.9604409
Shapiro-Wilk 5% Critical Value	0.897

Data are lognormal at 5% significance level

95% UCLs (Assuming Lognormal Distribution)

95% H-UCL	1.4328192
95% Chebyshev (MVUE) UCL	1.5980542
97.5% Chebyshev (MVUE) UCL	1.7283562
99% Chebyshev (MVUE) UCL	1.9843093

95% Non-parametric UCLs

CLT UCL	1.4053086
Adj-CLT UCL (Adjusted for skewness)	1.4088583
Mod-t UCL (Adjusted for skewness)	1.4121527
Jackknife UCL	1.411599
Standard Bootstrap UCL	1.4022264
Bootstrap-t UCL	1.4175804
Hall's Bootstrap UCL	1.4215423
Percentile Bootstrap UCL	1.41
BCA Bootstrap UCL	1.4133333
95% Chebyshev (Mean, Sd) UCL	1.5854869
97.5% Chebyshev (Mean, Sd) UCL	1.7107
99% Chebyshev (Mean, Sd) UCL	1.9566569

Actual UCL-95
Distribution

1.41
N

Data File

Variable: mAc-227

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9847624
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.897
Minimum	1	Data are normal at 5% significance level	
Maximum	1.38	95% UCL (Assuming Normal Distribution)	
Mean	1.195	Student's-t UCL	1.2334449
Median	1.21	Gamma Distribution Test	
Standard Deviation	0.0937613	A-D Test Statistic	0.2222735
Variance	0.0087912	A-D 5% Critical Value	0.73725
Coefficient of Variation	0.0784613	K-S Test Statistic	0.1243114
Skewness	-0.132711	K-S 5% Critical Value	0.20311
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	169.77917	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	141.51968	Approximate Gamma UCL	1.2349789
Theta hat	0.0070386	Adjusted Gamma UCL	1.238886
Theta star	0.0084441	Lognormal Distribution Test	
nu hat	6112.05	Shapiro-Wilk Test Statistic	0.9793068
nu star	5094.7083	Shapiro-Wilk 5% Critical Value	0.897
Approx.Chi Square Value (.05)	4929.7819	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03574	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	4914.2345	95% H-UCL	N/A
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	1.2925186
Minimum of log data	0	97.5% Chebyshev (MVUE) UCL	1.3347029
Maximum of log data	0.3220835	99% Chebyshev (MVUE) UCL	1.4175657
Mean of log data	0.1751983	95% Non-parametric UCLs	
Standard Deviation of log data	0.07933	CLT UCL	1.2313508
Variance of log data	0.0062933	Adj-CLT UCL (Adjusted for skewness)	1.2306122
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	1.2333296
Data are normal (0.05)		Jackknife UCL	1.2334449
Use Student's-t UCL		Standard Bootstrap UCL	1.2300504
		Bootstrap-t UCL	1.2350324
		Hall's Bootstrap UCL	1.2305154
		Percentile Bootstrap UCL	1.2294444
		BCA Bootstrap UCL	1.2294444
		95% Chebyshev (Mean, Sd) UCL	1.2913306
		97.5% Chebyshev (Mean, Sd) UCL	1.3330129
		99% Chebyshev (Mean, Sd) UCL	1.4148897
		Actual UCL-95 Distribution	1.23-1.13 0.10 N

Data File**Variable: mPa-231**

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9325802
Number of Unique Samples	16	Shapiro-Wilk 5% Critical Value	0.90
Minimum	1	Data are normal at 5% significance level	
Maximum	1.85	95% UCL (Assuming Normal Distribution)	
Mean	1.4433333	Student's-t UCL	1.5292382
Median	1.49	Gamma Distribution Test	
Standard Deviation	0.2095092	A-D Test Statistic	0.789741
Variance	0.0438941	A-D 5% Critical Value	0.7384171
Coefficient of Variation	0.1451565	K-S Test Statistic	0.1986909
Skewness	-0.591851	K-S 5% Critical Value	0.2030753
Gamma Statistics		Data follow approximate gamma distribution at 5% significance level	
k hat	46.383417	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	38.689884	Approximate Gamma UCL	1.5379403
Theta hat	0.0311174	Adjusted Gamma UCL	1.5473593
Theta star	0.0373052	Lognormal Distribution Test	
nu hat	1669.803	Shapiro-Wilk Test Statistic	0.8986446
nu star	1392.8358	Shapiro-Wilk 5% Critical Value	0.897
Approx.Chi Square Value (.05)	1307.1551	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03574	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	1299.1982	95% H-UCL	1.5440392
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	1.6747045
Minimum of log data	0	97.5% Chebyshev (MVUE) UCL	1.7745027
Maximum of log data	0.6151856	99% Chebyshev (MVUE) UCL	1.970537
Mean of log data	0.3561368	95% Non-parametric UCLs	
Standard Deviation of log data	0.1549063	CLT UCL	1.5245592
Variance of log data	0.023996	Adj-CLT UCL (Adjusted for skewness)	1.5171984
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	1.5280901
Data are normal (0.05)		Jackknife UCL	1.5292382
Use Student's-t UCL		Standard Bootstrap UCL	1.5215473
		Bootstrap-t UCL	1.518375
		Hall's Bootstrap UCL	1.5231287
		Percentile Bootstrap UCL	1.5194444
		BCA Bootstrap UCL	1.5094444
		95% Chebyshev (Mean, Sd) UCL	1.6585836
		97.5% Chebyshev (Mean, Sd) UCL	1.7517226
		99% Chebyshev (Mean, Sd) UCL	1.934676
		Actual UCL-95 Distribution	1.53-1.29 0.24 N

Table 3: Results of ProUCL Runs for DT-10 Class 2 SU 3

Data File		Variable: Ra-226	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9409191
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.897
Minimum	0.65	Data are normal at 5% significance level	
Maximum	4.98		
Mean	2.262222	95% UCL (Assuming Normal Distribution)	
Median	2.385	Student's-t UCL	2.6906668
Standard Deviation	1.0449124		
Variance	1.0918418	Gamma Distribution Test	
Coefficient of Variation	0.4618964	A-D Test Statistic	0.3476767
Skewness	0.8278493	A-D 5% Critical Value	0.7428749
Gamma Statistics		K-S Test Statistic	0.1528129
k hat	4.7089542	K-S 5% Critical Value	0.2042384
k star (bias corrected)	3.9611656	Data follow gamma distribution at 5% significance level	
Theta hat	0.4804086		
Theta star	0.5711001	95% UCLs (Assuming Gamma Distribution)	
nu hat	169.52235	Approximate Gamma UCL	2.7809866
nu star	142.60196	Adjusted Gamma UCL	2.8372886
Approx.Chi Square Value (.05)	116.00104		
Adjusted Level of Significance	0.03574	Lognormal Distribution Test	
Adjusted Chi Square Value	113.69916	Shapiro-Wilk Test Statistic	0.9504812
Log-transformed Statistics		Shapiro-Wilk 5% Critical Value	0.897
Minimum of log data	-0.430783	Data are lognormal at 5% significance level	
Maximum of log data	1.6054299		
Mean of log data	0.7064254	95% UCLs (Assuming Lognormal Distribution)	
Standard Deviation of log data	0.5062613	95% H-UCL	2.957683
Variance of log data	0.2563005	95% Chebyshev (MVUE) UCL	3.5164729
		97.5% Chebyshev (MVUE) UCL	4.0490051
		99% Chebyshev (MVUE) UCL	5.0950615
		95% Non-parametric UCLs	
		CLT UCL	2.6673303
		Adj-CLT UCL (Adjusted for skewness)	2.7186801
		Mod-t UCL (Adjusted for skewness)	2.6986763
		Jackknife UCL	2.6906668
		Standard Bootstrap UCL	2.6564357
		Bootstrap-t UCL	2.751138
		Hall's Bootstrap UCL	2.8450595
		Percentile Bootstrap UCL	2.67
		BCA Bootstrap UCL	2.7138889
		95% Chebyshev (Mean, Sd) UCL	3.3357676
		97.5% Chebyshev (Mean, Sd) UCL	3.8002916
		99% Chebyshev (Mean, Sd) UCL	4.7127589
		Actual UCL-95 Distribution	2.69
			N
RECOMMENDATION			
Data are normal (0.05)			
Use Student's-t UCL			

Data File

Variable: **Th-230**

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9251983
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.897
Minimum	1.55	Data are normal at 5% significance level	
Maximum	6.06		
Mean	3.3416667	95% UCL (Assuming Normal Distribution)	
Median	3.385	Student's-t UCL	3.8401461
Standard Deviation	1.2157169		
Variance	1.4779676	Gamma Distribution Test	
Coefficient of Variation	0.3638056	A-D Test Statistic	0.2789748
Skewness	0.8761171	A-D 5% Critical Value	0.7404092
		K-S Test Statistic	0.1139942
		K-S 5% Critical Value	0.2036571
		Data follow gamma distribution at 5% significance level	
		95% UCLs (Assuming Gamma Distribution)	
k hat	8.3822577	Approximate Gamma UCL	3.8933451
k star (bias corrected)	7.0222518	Adjusted Gamma UCL	3.9513163
Theta hat	0.3986595		
Theta star	0.4758682		
nu hat	301.76128		
nu star	252.80107		
Approx.Chi Square Value (.05)	216.97971		
Adjusted Level of Significance	0.03574		
Adjusted Chi Square Value	213.79632		
		Lognormal Distribution Test	
		Shapiro-Wilk Test Statistic	0.9721414
		Shapiro-Wilk 5% Critical Value	0.897
		Data are lognormal at 5% significance level	
		95% UCLs (Assuming Lognormal Distribution)	
		95% H-UCL	3.9637348
		95% Chebyshev (MVUE) UCL	4.6044961
		97.5% Chebyshev (MVUE) UCL	5.1503761
		99% Chebyshev (MVUE) UCL	6.2226515
		95% Non-parametric UCLs	
		CLT UCL	3.8129949
		Adj-CLT UCL (Adjusted for skewness)	3.8762219
		Mod-t UCL (Adjusted for skewness)	3.8500082
		Jackknife UCL	3.8401461
		Standard Bootstrap UCL	3.8028125
		Bootstrap-t UCL	3.9431206
		Hall's Bootstrap UCL	3.9789175
		Percentile Bootstrap UCL	3.8038889
		BCA Bootstrap UCL	3.8244444
		95% Chebyshev (Mean, Sd) UCL	4.5906971
		97.5% Chebyshev (Mean, Sd) UCL	5.1311535
		99% Chebyshev (Mean, Sd) UCL	6.1927756

RECOMMENDATION
Data are normal (0.05)

Use Student's-t UCL

Actual UCL-95
Distribution **N**

Data File

Variable: U-238

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.82512
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.897
Minimum	0.5	Data not normal at 5% significance level	
Maximum	12.87		
Mean	3.6355556	95% UCL (Assuming Normal Distribution)	
Median	3.13	Student's-t UCL	4.8298222
Standard Deviation	2.9126382		
Variance	8.4834614	Gamma Distribution Test	
Coefficient of Variation	0.8011535	A-D Test Statistic	0.1823621
Skewness	1.9499988	A-D 5% Critical Value	0.7531521
		K-S Test Statistic	0.0923408
		K-S 5% Critical Value	0.2064512
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	1.9278854	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	1.6436082	Approximate Gamma UCL	5.0638849
Theta hat	1.8857737	Adjusted Gamma UCL	5.2309296
Theta star	2.2119357		
nu hat	69.403873	Lognormal Distribution Test	
nu star	59.169894	Shapiro-Wilk Test Statistic	0.9824187
Approx. Chi Square Value (.05)	42.480317	Shapiro-Wilk 5% Critical Value	0.897
Adjusted Level of Significance	0.03574	Data are lognormal at 5% significance level	
Adjusted Chi Square Value	41.12375		
Log-transformed Statistics		95% UCLs (Assuming Lognormal Distribution)	
Minimum of log data	-0.693147	95% H-UCL	6.0067891
Maximum of log data	2.554899	95% Chebyshev (MVUE) UCL	6.9851314
Mean of log data	1.0095306	97.5% Chebyshev (MVUE) UCL	8.4067204
Standard Deviation of log data	0.801558	99% Chebyshev (MVUE) UCL	11.199157
Variance of log data	0.6424952	95% Non-parametric UCLs	
		CLT UCL	4.7647729
		Adj-CLT UCL (Adjusted for skewness)	5.1019273
		Mod-t UCL (Adjusted for skewness)	4.8824115
		Jackknife UCL	4.8298222
		Standard Bootstrap UCL	4.7452914
		Bootstrap-t UCL	5.3585819
		Hall's Bootstrap UCL	9.3967738
		Percentile Bootstrap UCL	4.8111111
		BCA Bootstrap UCL	5.0122222
		95% Chebyshev (Mean, Sd) UCL	6.6280069
		97.5% Chebyshev (Mean, Sd) UCL	7.9228429
		99% Chebyshev (Mean, Sd) UCL	10.466298
RECOMMENDATION		Actual UCL-95 Distribution	5.06 G
Data follow gamma distribution (0.05)			
Use Approximate Gamma UCL			

Data File

Variable: **U-235**

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.8493366
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.897
Minimum	0.09	Data not normal at 5% significance level	
Maximum	0.65	95% UCL (Assuming Normal Distribution)	
Mean	0.2366667	Student's-t UCL	0.2946024
Median	0.205	Gamma Distribution Test	
Standard Deviation	0.1412965	A-D Test Statistic	0.3061976
Variance	0.0199647	A-D 5% Critical Value	0.743554
Coefficient of Variation	0.5970275	K-S Test Statistic	0.1188296
Skewness	1.6605834	K-S 5% Critical Value	0.2047292
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	3.6924908	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	3.1141127	Approximate Gamma UCL	0.2992516
Theta hat	0.064094	Adjusted Gamma UCL	0.3061599
Theta star	0.0759981	Lognormal Distribution Test	
nu hat	132.92967	Shapiro-Wilk Test Statistic	0.975058
nu star	112.10806	Shapiro-Wilk 5% Critical Value	0.897
Approx. Chi Square Value (.05)	88.661973	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03574	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	86.661382	95% H-UCL	0.3095648
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	0.3687796
Minimum of log data	-2.407946	97.5% Chebyshev (MVUE) UCL	0.4267246
Maximum of log data	-0.430783	99% Chebyshev (MVUE) UCL	0.5405463
Mean of log data	-1.582581	95% Non-parametric UCLs	
Standard Deviation of log data	0.5342366	CLT UCL	0.2914467
Variance of log data	0.2854088	Adj-CLT UCL (Adjusted for skewness)	0.3053751
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	0.2967749
Data follow gamma distribution (0.05)		Jackknife UCL	0.2946024
Use Approximate Gamma UCL		Standard Bootstrap UCL	0.2887945
		Bootstrap-t UCL	0.3141842
		Hall's Bootstrap UCL	0.3394197
		Percentile Bootstrap UCL	0.2927778
		BCA Bootstrap UCL	0.3072222
		95% Chebyshev (Mean, Sd) UCL	0.381835
		97.5% Chebyshev (Mean, Sd) UCL	0.4446495
		99% Chebyshev (Mean, Sd) UCL	0.5680364
		Actual UCL-95 Distribution	0.30 G

Data File

Variable: **Th-232**

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9712475
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.897
Minimum	0.27	Data are normal at 5% significance level	
Maximum	1.46		
Mean	0.7922222	95% UCL (Assuming Normal Distribution)	
Median	0.8	Student's-t UCL	0.9066988
Standard Deviation	0.2791912		
Variance	0.0779477	Gamma Distribution Test	
Coefficient of Variation	0.3524152	A-D Test Statistic	0.2912868
Skewness	0.4582712	A-D 5% Critical Value	0.7408095
		K-S Test Statistic	0.1144633
		K-S 5% Critical Value	0.203724
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	7.8596079		
k star (bias corrected)	6.5867103		
Theta hat	0.1007967		
Theta star	0.1202759	95% UCLs (Assuming Gamma Distribution)	
ru hat	282.94588	Approximate Gamma UCL	0.9278206
nu star	237.12157	Adjusted Gamma UCL	0.9421142
Approx.Chi Square Value (.05)	202.46691		
Adjusted Level of Significance	0.03574	Lognormal Distribution Test	
Adjusted Chi Square Value	199.39511	Shapiro-Wilk Test Statistic	0.9465401
		Shapiro-Wilk 5% Critical Value	0.897
		Data are lognormal at 5% significance level	
Log-transformed Statistics			
Minimum of log data	-1.309333		
Maximum of log data	0.3784364	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.297877	95% H-UCL	0.9595843
Standard Deviation of log data	0.3880715	95% Chebyshev (MVUE) UCL	1.1214231
Variance of log data	0.1505995	97.5% Chebyshev (MVUE) UCL	1.2618438
		99% Chebyshev (MVUE) UCL	1.5376731
		95% Non-parametric UCLs	
		CLT UCL	0.9004634
		Adj-CLT UCL (Adjusted for skewness)	0.9080585
		Mod-t UCL (Adjusted for skewness)	0.9078834
		Jackknife UCL	0.9066988
		Standard Bootstrap UCL	0.899908
		Bootstrap-t UCL	0.9190696
		Hall's Bootstrap UCL	0.9330984
		Percentile Bootstrap UCL	0.9005556
		BCA Bootstrap UCL	0.9111111
		95% Chebyshev (Mean, Sd) UCL	1.0790639
		97.5% Chebyshev (Mean, Sd) UCL	1.2031805
		99% Chebyshev (Mean, Sd) UCL	1.4469836
		Actual UCL-95 Distribution	0.91 N

RECOMMENDATION

Data are normal (0.05)

Use Student's-t UCL

Data File

Variable: **Ra-228**

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9376317
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.897
Minimum	0.34	Data are normal at 5% significance level	
Maximum	1.08	95% UCL (Assuming Normal Distribution)	
Mean	0.6411111	Student's-t UCL	0.7124344
Median	0.665	Gamma Distribution Test	
Standard Deviation	0.1739469	A-D Test Statistic	0.5929476
Variance	0.0302575	A-D 5% Critical Value	0.7392879
Coefficient of Variation	0.271321	K-S Test Statistic	0.1700083
Skewness	0.3698522	K-S 5% Critical Value	0.20338
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	13.685464	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	11.44159	Approximate Gamma UCL	0.7218205
Theta hat	0.0468461	Adjusted Gamma UCL	0.7301281
Theta star	0.0560334	Lognormal Distribution Test	
nu hat	492.6767	Shapiro-Wilk Test Statistic	0.9247035
nu star	411.89725	Shapiro-Wilk 5% Critical Value	0.897
Approx.Chi Square Value (.05)	365.84154	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03574	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	361.67886	95% H-UCL	0.7322597
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	0.8340507
Minimum of log data	-1.07881	97.5% Chebyshev (MVUE) UCL	0.9170167
Maximum of log data	0.076961	99% Chebyshev (MVUE) UCL	1.0799873
Mean of log data	-0.481532	95% Non-parametric UCLs	
Standard Deviation of log data	0.2871188	CLT UCL	0.7085496
Variance of log data	0.0824372	Adj-CLT UCL (Adjusted for skewness)	0.7123686
		Mod-t UCL (Adjusted for skewness)	0.7130301
		Jackknife UCL	0.7124344
		Standard Bootstrap UCL	0.7052622
		Bootstrap-t UCL	0.7137763
		Hall's Bootstrap UCL	0.7269984
		Percentile Bootstrap UCL	0.7038889
		BCA Bootstrap UCL	0.71
		95% Chebyshev (Mean, Sd) UCL	0.8198245
		97.5% Chebyshev (Mean, Sd) UCL	0.897154
		99% Chebyshev (Mean, Sd) UCL	1.0490527
RECOMMENDATION		Actual UCL-95 Distribution	0.71
Data are normal (0.05)			N
Use Student's-t UCL			

Data File

Variable: **Th-228**

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9302532
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.897
Minimum	0.51	Data are normal at 5% significance level	
Maximum	1.42	95% UCL (Assuming Normal Distribution)	
Mean	0.9655556	Student's-t UCL	1.0943398
Median	0.955	Gamma Distribution Test	
Standard Deviation	0.3140855	A-D Test Statistic	0.4275313
Variance	0.0986497	A-D 5% Critical Value	0.7397393
Coefficient of Variation	0.3252899	K-S Test Statistic	0.1202778
Skewness	-0.001862	K-S 5% Critical Value	0.2035451
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	9.2568186	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	7.7510526	Approximate Gamma UCL	1.1163656
Theta hat	0.1043075	Adjusted Gamma UCL	1.1321398
Theta star	0.1245709	Lognormal Distribution Test	
nu hat	333.24547	Shapiro-Wilk Test Statistic	0.917822
nu star	279.03789	Shapiro-Wilk 5% Critical Value	0.897
Approx.Chi Square Value (.05)	241.34261	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03574	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	237.97996	95% H-UCL	1.1416602
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	1.3230113
Minimum of log data	-0.673345	97.5% Chebyshev (MVUE) UCL	1.476502
Maximum of log data	0.3506569	99% Chebyshev (MVUE) UCL	1.7780046
Mean of log data	-0.090037	95% Non-parametric UCLs	
Standard Deviation of log data	0.3504119	CLT UCL	1.0873251
Variance of log data	0.1227885	Adj-CLT UCL (Adjusted for skewness)	1.0872904
RECOMMENDATION		Mod-t UCL (Adjusted for skewness)	1.0943343
Data are normal (0.05)		Jackknife UCL	1.0943398
Use Student's-t UCL		Standard Bootstrap UCL	1.084645
		Bootstrap-t UCL	1.0962839
		Hall's Bootstrap UCL	1.0869244
		Percentile Bootstrap UCL	1.0788889
		BCA Bootstrap UCL	1.0872222
		95% Chebyshev (Mean, Sd) UCL	1.2882477
		97.5% Chebyshev (Mean, Sd) UCL	1.4278768
		99% Chebyshev (Mean, Sd) UCL	1.7021512

Actual UCL-95 **1.09**
Distribution **N**

Data File

Variable: **Ac-227**

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.5784069
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.897
Minimum	0.06	Data not normal at 5% significance level	
Maximum	0.83		
Mean	0.1855556	95% UCL (Assuming Normal Distribution)	
Median	0.145	Student's-t UCL	0.2559905
Standard Deviation	0.1717804		
Variance	0.0295085	Gamma Distribution Test	
Coefficient of Variation	0.9257625	A-D Test Statistic	0.9353659
Skewness	3.4215569	A-D 5% Critical Value	0.7491223
		K-S Test Statistic	0.1762434
		K-S 5% Critical Value	0.2056553
Gamma Statistics		Data follow approximate gamma distribution at 5% significance level	
k hat	2.5113193	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	2.1298032	Approximate Gamma UCL	0.2474308
Theta hat	0.0738877	Adjusted Gamma UCL	0.2544815
Theta star	0.0871233		
nu hat	90.407496		
nu star	76.672914		
Approx.Chi Square Value (.05)	57.499256		
Adjusted Level of Significance	0.03574	Lognormal Distribution Test	
Adjusted Chi Square Value	55.906177	Shapiro-Wilk Test Statistic	0.9170587
		Shapiro-Wilk 5% Critical Value	0.897
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-2.813411	95% UCLs (Assuming Lognormal Distribution)	
Maximum of log data	-0.18633	95% H-UCL	0.2436602
Mean of log data	-1.896517	95% Chebyshev (MVUE) UCL	0.290686
Standard Deviation of log data	0.5954019	97.5% Chebyshev (MVUE) UCL	0.3397976
Variance of log data	0.3545034	99% Chebyshev (MVUE) UCL	0.436268
		95% Non-parametric UCLs	
		CLT UCL	0.2521541
		Adj-CLT UCL (Adjusted for skewness)	0.2870444
		Mod-t UCL (Adjusted for skewness)	0.2614327
		Jackknife UCL	0.2559905
		Standard Bootstrap UCL	0.2509782
		Bootstrap-t UCL	0.3673674
		Hall's Bootstrap UCL	0.5243426
		Percentile Bootstrap UCL	0.2605556
		BCA Bootstrap UCL	0.2905556
RECOMMENDATION		95% Chebyshev (Mean, Sd) UCL	0.3620431
Assuming gamma distribution (0.05)		97.5% Chebyshev (Mean, Sd) UCL	0.4384094
Use Approximate Gamma UCL		99% Chebyshev (Mean, Sd) UCL	0.5884162
		Actual UCL-95 Distribution	0.25 G

Data File

Variable: **mPa-231**

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statistic	0.9537932
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.897
Minimum	1	Data are normal at 5% significance level	
Maximum	1.9	95% UCL (Assuming Normal Distribution)	
Mean	1.3777778	Student's-t UCL	1.4649688
Median	1.33	Gamma Distribution Test	
Standard Deviation	0.212646	A-D Test Statistic	0.3146526
Variance	0.0452183	A-D 5% Critical Value	0.7384371
Coefficient of Variation	0.1543398	K-S Test Statistic	0.13024
Skewness	0.6732309	K-S 5% Critical Value	0.2030788
Gamma Statistics		Data follow gamma distribution at 5% significance level	
k hat	45.891403	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	38.279873	Approximate Gamma UCL	1.4685948
Theta hat	0.0300226	Adjusted Gamma UCL	1.4776384
Theta star	0.0359922	Lognormal Distribution Test	
nu hat	1652.0905	Shapiro-Wilk Test Statistic	0.9726194
nu star	1378.0754	Shapiro-Wilk 5% Critical Value	0.897
Approx.Chi Square Value (.05)	1292.8561	Data are lognormal at 5% significance level	
Adjusted Level of Significance	0.03574	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	1284.9434	95% H-UCL	1.4707192
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	1.5927885
Minimum of log data	0	97.5% Chebyshev (MVUE) UCL	1.6858853
Maximum of log data	0.6418539	99% Chebyshev (MVUE) UCL	1.8687559
Mean of log data	0.309537	95% Non-parametric UCLs	
Standard Deviation of log data	0.1514954	CLT UCL	1.4602197
Variance of log data	0.0229509	Adj-CLT UCL (Adjusted for skewness)	1.4687179
		Mod-t UCL (Adjusted for skewness)	1.4662944
		Jackknife UCL	1.4649688
		Standard Bootstrap UCL	1.4590964
		Bootstrap-t UCL	1.4745999
		Hall's Bootstrap UCL	1.4902315
		Percentile Bootstrap UCL	1.4544444
		BCA Bootstrap UCL	1.4633333
		95% Chebyshev (Mean, Sd) UCL	1.5962507
		97.5% Chebyshev (Mean, Sd) UCL	1.6907841
		99% Chebyshev (Mean, Sd) UCL	1.8764767
RECOMMENDATION		Actual UCL-95	1.46-1.23
Data are normal (0.05)		Distribution	N
Use Student's-t UCL			

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ATTACHMENT A-9-2

RESRAD OUTPUT SUMMARY REPORTS

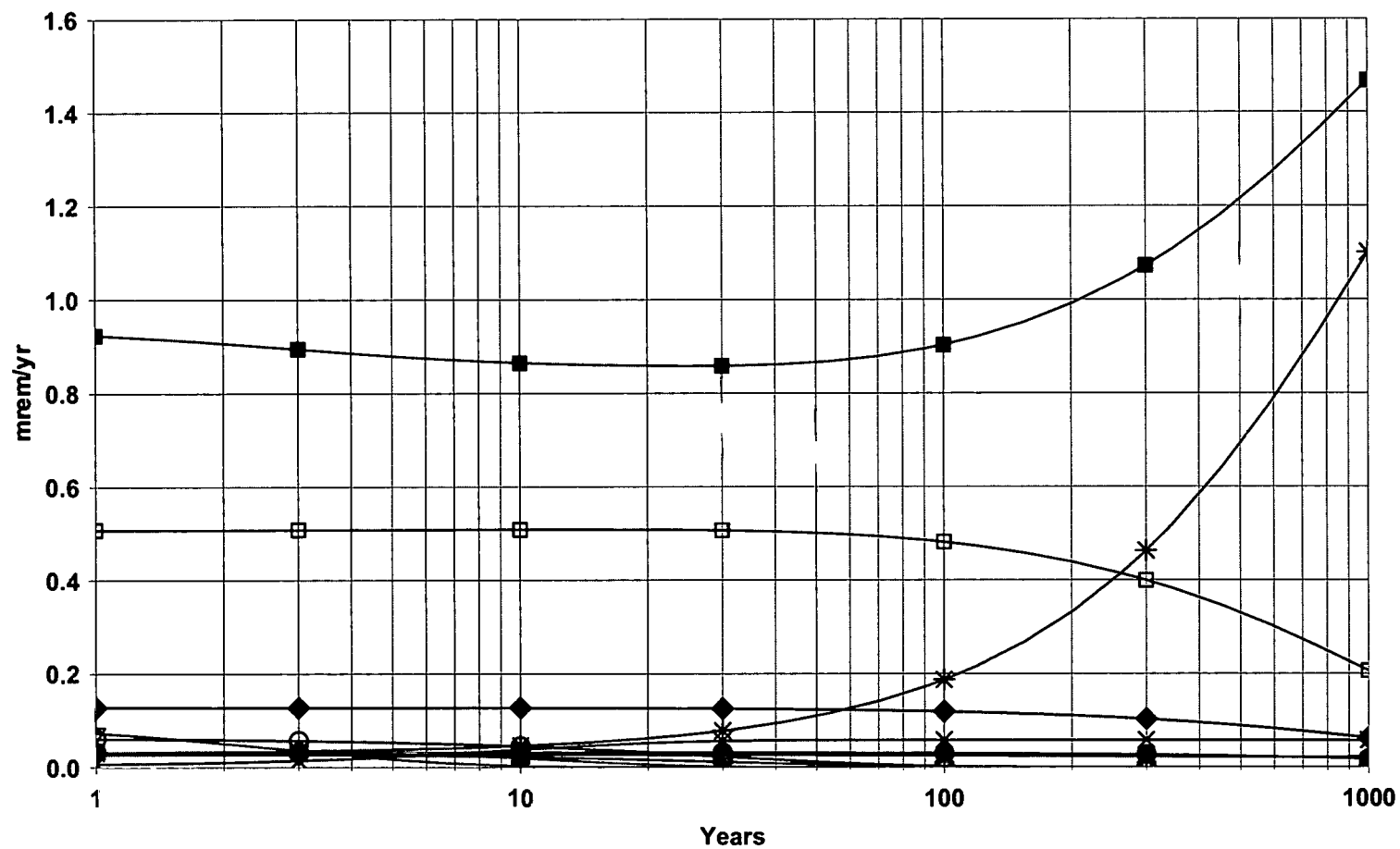
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RESRAD SUMMARY REPORT

Industrial Worker

DOSE: All Nuclides Summed, All Pathways Summed



○ Ac-227
 ◇ Pb-210
 □ Ra-226
 △ Ra-228
 ▽ Th-228
 * Th-230
 × Th-232
 + U-234
 ● U-235
 ◆ U-238
 ■ Total

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Dose Conversion Factor (and Related) Parameter Summary
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(3)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(4)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(5)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238	1.180E-01	1.180E-01	DCF2(11)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(12)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(3)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(4)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(10)
D-1	U-238	2.550E-04	2.550E-04	DCF3(11)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(12)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34				

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(12,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(12,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(12,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+0 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				

Dose Conversion Factor (and Related) Parameter Summary (continued)
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Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(12,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(12,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.129E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+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): Ac-227	9.000E-02	0.000E+00	---	S1 (1)
R012	Initial principal radionuclide (pCi/g): Pb-210	3.400E-01	0.000E+00	---	S1 (3)
R012	Initial principal radionuclide (pCi/g): Ra-226	2.600E-01	0.000E+00	---	S1 (4)
R012	Initial principal radionuclide (pCi/g): Ra-228	2.000E-02	0.000E+00	---	S1 (5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.000E-02	0.000E+00	---	S1 (6)
R012	Initial principal radionuclide (pCi/g): Th-230	1.890E+00	0.000E+00	---	S1 (7)
R012	Initial principal radionuclide (pCi/g): Th-232	2.000E-02	0.000E+00	---	S1 (8)
R012	Initial principal radionuclide (pCi/g): U-234	3.910E+00	0.000E+00	---	S1 (9)
R012	Initial principal radionuclide (pCi/g): U-235	2.300E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	3.910E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1 (1)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1 (3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1 (4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1 (5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1 (6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1 (7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1 (8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1 (9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
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)	1.280E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.200E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	3.600E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	3.048E+00	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.040E+01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.170E+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)	9.200E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Runoff coefficient	8.000E-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
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	---	FCHZ(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 Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.772E-03	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.584E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.113E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.113E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC (6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU (6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS (6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.990E-07	ALEACH (6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC (7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU (7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS (7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.990E-07	ALEACH (7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC (8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU (8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS (8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.990E-07	ALEACH (8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU (9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS (9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU (10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS (10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (10)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU (11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS (11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (11)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (2)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU (2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS (2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (2)
R017	Inhalation rate (m**3/yr)	1.055E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Exposure duration	2.500E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	5.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	1.969E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	4.566E-02	2.500E-01	---	FOTD
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)	4.964E+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

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
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
C14	DCF correction factor for gaseous forms of C14	not used	0.000E+00	---	CO2F
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)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
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	---	HMX
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	active

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	11292.00 square meters	Ac-227	9.000E-02
Thickness:	2.00 meters	Pb-210	3.400E-01
Cover Depth:	0.00 meters	Ra-226	2.600E-01
		Ra-228	2.000E-02
		Th-228	7.000E-02
		Th-230	1.890E+00
		Th-232	2.000E-02
		U-234	3.910E+00
		U-235	2.300E-01
		U-238	3.910E+00

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+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):	9.479E-01	9.239E-01	8.946E-01	8.651E-01	8.586E-01	9.033E-01	1.073E+00	1.468E+00
M(t):	3.792E-02	3.695E-02	3.578E-02	3.460E-02	3.434E-02	3.613E-02	4.290E-02	5.871E-02

Maximum TDOSE(t): 1.468E+00 mrem/yr at t = 1.000E+03 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.
Ac-227	3.098E-02	0.0327	1.548E-02	0.0163	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.577E-02	0.0166
Pb-210	3.601E-04	0.0004	2.019E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.932E-02	0.0309
Ra-226	5.022E-01	0.5298	6.050E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.483E-03	0.0047
Ra-228	2.494E-02	0.0263	3.027E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.572E-04	0.0004
Th-228	1.036E-01	0.1093	5.274E-04	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.717E-04	0.0006
Th-230	1.193E-03	0.0013	1.602E-02	0.0169	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.248E-02	0.0132
Th-232	1.428E-03	0.0015	8.544E-04	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.788E-04	0.0007
U-234	2.780E-04	0.0003	1.342E-02	0.0142	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.332E-02	0.0141
U-235	3.047E-02	0.0321	7.356E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.404E-04	0.0008
U-238	1.027E-01	0.1084	1.200E-02	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.265E-02	0.0133
Total	7.982E-01	0.8421	5.933E-02	0.0626	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.037E-02	0.0953

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.
Ac-227	0.000E+00	0.0000	0.000E+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-02	0.0656
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	2.989E-02	0.0315
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	5.067E-01	0.5346
Ra-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	2.532E-02	0.0267
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	1.047E-01	0.1105
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	2.969E-02	0.0313
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.961E-03	0.0031
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.702E-02	0.0285
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.194E-02	0.0337
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.274E-01	0.1344
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	9.479E-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.
Ac-227	2.996E-02	0.0324	1.497E-02	0.0162	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.525E-02	0.0165
Pb-210	3.489E-04	0.0004	1.957E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.842E-02	0.0308
Ra-226	5.017E-01	0.5431	6.516E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.165E-03	0.0056
Ra-228	3.054E-02	0.0331	6.979E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.631E-04	0.0004
Th-228	7.214E-02	0.0781	3.671E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.979E-04	0.0004
Th-230	2.774E-03	0.0030	1.602E-02	0.0173	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.249E-02	0.0135
Th-232	4.811E-03	0.0052	8.606E-04	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.224E-04	0.0008
U-234	2.778E-04	0.0003	1.341E-02	0.0145	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.331E-02	0.0144
U-235	3.045E-02	0.0330	7.352E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.406E-04	0.0008
U-238	1.027E-01	0.1111	1.199E-02	0.0130	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.264E-02	0.0137
Total	7.757E-01	0.8396	5.868E-02	0.0635	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.949E-02	0.0969

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.017E-02	0.0651
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	2.896E-02	0.0313
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	5.070E-01	0.5487
Ra-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	3.097E-02	0.0335
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	7.291E-02	0.0789
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	3.129E-02	0.0339
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.394E-03	0.0069
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.700E-02	0.0292
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.192E-02	0.0346
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.273E-01	0.1378
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	9.239E-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.
Ac-227	2.801E-02	0.0313	1.399E-02	0.0156	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.426E-02	0.0159
Pb-210	3.277E-04	0.0004	1.837E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.669E-02	0.0298
Ra-226	5.008E-01	0.5598	7.405E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.463E-03	0.0072
Ra-228	3.327E-02	0.0372	1.021E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.363E-04	0.0004
Th-228	3.495E-02	0.0391	1.779E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.928E-04	0.0002
Th-230	5.931E-03	0.0066	1.602E-02	0.0179	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.253E-02	0.0140
Th-232	1.267E-02	0.0142	8.823E-04	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.074E-04	0.0009
U-234	2.776E-04	0.0003	1.339E-02	0.0150	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.329E-02	0.0149
U-235	3.040E-02	0.0340	7.346E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.409E-04	0.0008
U-238	1.025E-01	0.1146	1.197E-02	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.262E-02	0.0141
Total	7.492E-01	0.8374	5.753E-02	0.0643	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.792E-02	0.0983

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.626E-02	0.0629
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	2.720E-02	0.0304
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	5.073E-01	0.5671
Ra-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	3.371E-02	0.0377
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	3.532E-02	0.0395
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	3.448E-02	0.0385
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.436E-02	0.0161
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.696E-02	0.0301
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.188E-02	0.0356
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.271E-01	0.1421
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	8.946E-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.
Ac-227	2.214E-02	0.0256	1.106E-02	0.0128	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.127E-02	0.0130
Pb-210	2.629E-04	0.0003	1.474E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.141E-02	0.0248
Ra-226	4.975E-01	0.5751	1.009E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.039E-02	0.0120
Ra-228	1.950E-02	0.0225	7.042E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.730E-04	0.0002
Th-228	2.767E-03	0.0032	1.408E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.526E-05	0.0000
Th-230	1.693E-02	0.0196	1.603E-02	0.0185	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.272E-02	0.0147
Th-232	3.554E-02	0.0411	9.604E-04	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.021E-03	0.0012
U-234	2.777E-04	0.0003	1.333E-02	0.0154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.323E-02	0.0153
U-235	3.026E-02	0.0350	7.333E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.427E-04	0.0009
U-238	1.020E-01	0.1179	1.191E-02	0.0138	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.256E-02	0.0145
Total	7.272E-01	0.8406	5.435E-02	0.0628	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.352E-02	0.0965

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.447E-02	0.0514
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	2.182E-02	0.0252
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	5.080E-01	0.5873
Ra-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	1.974E-02	0.0228
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	2.796E-03	0.0032
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	4.567E-02	0.0528
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.752E-02	0.0434
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.683E-02	0.0310
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.173E-02	0.0367
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.265E-01	0.1462
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	8.651E-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.
Ac-227	1.131E-02	0.0132	5.647E-03	0.0066	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.754E-03	0.0067
Pb-210	1.402E-04	0.0002	7.862E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.142E-02	0.0133
Ra-226	4.883E-01	0.5687	1.505E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.768E-02	0.0206
Ra-228	1.836E-03	0.0021	6.787E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.594E-05	0.0000
Th-228	1.972E-06	0.0000	1.004E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.088E-08	0.0000
Th-230	4.797E-02	0.0559	1.603E-02	0.0187	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.362E-02	0.0159
Th-232	5.392E-02	0.0628	1.028E-03	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.181E-03	0.0014
U-234	2.858E-04	0.0003	1.314E-02	0.0153	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.304E-02	0.0152
U-235	2.985E-02	0.0348	7.338E-04	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.522E-04	0.0009
U-238	1.006E-01	0.1171	1.175E-02	0.0137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.238E-02	0.0144
Total	7.342E-01	0.8551	4.856E-02	0.0566	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.584E-02	0.0883

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.271E-02	0.0264
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	1.164E-02	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	5.062E-01	0.5895
Ra-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	1.859E-03	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	1.993E-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	7.763E-02	0.0904
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.613E-02	0.0654
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.647E-02	0.0308
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.133E-02	0.0365
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.247E-01	0.1452
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	8.586E-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.
Ac-227	1.075E-03	0.0012	5.372E-04	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.473E-04	0.0006
Pb-210	1.552E-05	0.0000	8.704E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.264E-03	0.0014
Ra-226	4.572E-01	0.5061	1.915E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.389E-02	0.0264
Ra-228	3.836E-07	0.0000	1.418E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.330E-09	0.0000
Th-228	1.907E-17	0.0000	9.704E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.052E-19	0.0000
Th-230	1.521E-01	0.1684	1.606E-02	0.0178	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.849E-02	0.0205
Th-232	5.574E-02	0.0617	1.034E-03	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.197E-03	0.0013
U-234	4.003E-04	0.0004	1.252E-02	0.0139	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.242E-02	0.0138
U-235	2.849E-02	0.0315	7.544E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.027E-04	0.0009
U-238	9.566E-02	0.1059	1.117E-02	0.0124	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.178E-02	0.0130
Total	7.906E-01	0.8753	4.228E-02	0.0468	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.039E-02	0.0779

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.160E-03	0.0024
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	1.288E-03	0.0014
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	4.813E-01	0.5328
Ra-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	3.884E-07	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	1.927E-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	1.866E-01	0.2066
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.797E-02	0.0642
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.534E-02	0.0281
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.005E-02	0.0333
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.186E-01	0.1313
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	9.033E-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.
Ac-227	1.296E-06	0.0000	6.473E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.595E-07	0.0000
Pb-210	2.884E-08	0.0000	1.617E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.349E-06	0.0000
Ra-226	3.785E-01	0.3529	1.641E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.059E-02	0.0192
Ra-228	1.172E-17	0.0000	4.332E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.017E-19	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	4.139E-01	0.3859	1.614E-02	0.0150	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.262E-02	0.0304
Th-232	5.574E-02	0.0520	1.034E-03	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.197E-03	0.0011
U-234	1.354E-03	0.0013	1.090E-02	0.0102	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.085E-02	0.0101
U-235	2.499E-02	0.0233	8.117E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.297E-04	0.0009
U-238	8.292E-02	0.0773	9.692E-03	0.0090	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.021E-02	0.0095
Total	9.574E-01	0.8926	3.874E-02	0.0361	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.641E-02	0.0712

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.603E-06	0.0000
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	2.394E-06	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	3.992E-01	0.3722
Ra-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	1.186E-17	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	4.627E-01	0.4314
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.797E-02	0.0540
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.311E-02	0.0215
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.673E-02	0.0249
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.028E-01	0.0959
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	1.073E+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+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.
Ac-227	7.867E-17	0.0000	3.930E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.004E-17	0.0000
Pb-210	7.974E-18	0.0000	4.471E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.494E-16	0.0000
Ra-226	1.954E-01	0.1331	8.472E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.063E-02	0.0072
Ra-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-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	1.019E+00	0.6944	1.630E-02	0.0111	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.549E-02	0.0446
Th-232	5.571E-02	0.0380	1.034E-03	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.196E-03	0.0008
U-234	8.764E-03	0.0060	6.763E-03	0.0046	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.103E-03	0.0048
U-235	1.576E-02	0.0107	8.252E-04	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.057E-03	0.0007
U-238	5.029E-02	0.0343	5.890E-03	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.207E-03	0.0042
Total	1.345E+00	0.9165	3.089E-02	0.0210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.168E-02	0.0625

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.580E-16	0.0000
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	6.618E-16	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	2.061E-01	0.1404
Ra-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-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	1.101E+00	0.7502
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.794E-02	0.0395
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.263E-02	0.0154
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.764E-02	0.0120
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.238E-02	0.0425
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	1.468E+00	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

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
Ac-227+D	Ac-227+D	1.000E+00	6.914E-01	6.686E-01	6.251E-01	4.941E-01	2.523E-01	2.400E-02	2.892E-05	1.756E-15
Pb-210+D	Pb-210+D	1.000E+00	8.790E-02	8.518E-02	7.999E-02	6.419E-02	3.423E-02	3.789E-03	7.040E-06	1.947E-15
Ra-226+D	Ra-226+D	1.000E+00	1.948E+00	1.946E+00	1.942E+00	1.929E+00	1.893E+00	1.772E+00	1.467E+00	7.573E-01
Ra-226+D	Pb-210+D	1.000E+00	1.373E-03	4.060E-03	9.180E-03	2.469E-02	5.354E-02	7.890E-02	6.851E-02	3.537E-02
Ra-226+D	ΣDSR(j)		1.949E+00	1.950E+00	1.951E+00	1.954E+00	1.947E+00	1.851E+00	1.536E+00	7.927E-01
Ra-228+D	Ra-228+D	1.000E+00	9.904E-01	8.775E-01	6.888E-01	2.952E-01	2.622E-02	5.474E-06	1.672E-16	0.000E+00
Ra-228+D	Th-228+D	1.000E+00	2.758E-01	6.711E-01	9.968E-01	6.919E-01	6.674E-02	1.394E-05	4.260E-16	0.000E+00
Ra-228+D	ΣDSR(j)		1.266E+00	1.549E+00	1.686E+00	9.871E-01	9.295E-02	1.942E-05	5.932E-16	0.000E+00
Th-228+D	Th-228+D	1.000E+00	1.496E+00	1.042E+00	5.046E-01	3.995E-02	2.847E-05	2.753E-16	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	1.529E-02	1.529E-02	1.529E-02	1.529E-02	1.529E-02	1.527E-02	1.525E-02	1.514E-02
Th-230	Ra-226+D	1.000E+00	4.219E-04	1.265E-03	2.950E-03	8.819E-03	2.538E-02	8.089E-02	2.205E-01	5.433E-01
Th-230	Pb-210+D	1.000E+00	1.988E-07	1.379E-06	7.138E-06	5.938E-05	4.120E-04	2.578E-03	9.048E-03	2.413E-02
Th-230	ΣDSR(j)		1.571E-02	1.656E-02	1.825E-02	2.417E-02	4.107E-02	9.875E-02	2.448E-01	5.826E-01
Th-232	Th-232	1.000E+00	7.562E-02	7.562E-02	7.562E-02	7.561E-02	7.561E-02	7.561E-02	7.560E-02	7.557E-02
Th-232	Ra-228+D	1.000E+00	6.090E-02	1.733E-01	3.612E-01	7.532E-01	1.021E+00	1.047E+00	1.047E+00	1.046E+00
Th-232	Th-228+D	1.000E+00	1.153E-02	7.074E-02	2.811E-01	1.047E+00	1.710E+00	1.776E+00	1.776E+00	1.775E+00
Th-232	ΣDSR(j)		1.480E-01	3.197E-01	7.180E-01	1.876E+00	2.806E+00	2.899E+00	2.898E+00	2.897E+00
U-234	U-234	1.000E+00	6.909E-03	6.904E-03	6.894E-03	6.860E-03	6.762E-03	6.431E-03	5.571E-03	3.371E-03
U-234	Th-230	1.000E+00	6.880E-08	2.063E-07	4.811E-07	1.440E-06	4.152E-06	1.334E-05	3.715E-05	9.773E-05
U-234	Ra-226+D	1.000E+00	1.266E-09	8.857E-09	4.677E-08	4.168E-07	3.475E-06	3.629E-05	2.907E-04	2.223E-03
U-234	Pb-210+D	1.000E+00	4.480E-13	6.673E-12	7.664E-11	1.922E-09	4.040E-08	9.271E-07	1.083E-05	9.597E-05
U-234	ΣDSR(j)		6.909E-03	6.904E-03	6.895E-03	6.862E-03	6.770E-03	6.481E-03	5.910E-03	5.788E-03
U-235+D	U-235+D	1.000E+00	1.389E-01	1.388E-01	1.386E-01	1.379E-01	1.359E-01	1.293E-01	1.121E-01	6.796E-02
U-235+D	Pa-231	1.000E+00	2.052E-06	6.151E-06	1.433E-05	4.278E-05	1.225E-04	3.836E-04	9.920E-04	1.988E-03
U-235+D	Ac-227+D	1.000E+00	7.825E-08	5.423E-07	2.803E-06	2.318E-05	1.584E-04	9.535E-04	3.128E-03	6.763E-03
U-235+D	ΣDSR(j)		1.389E-01	1.388E-01	1.386E-01	1.380E-01	1.362E-01	1.306E-01	1.162E-01	7.671E-02
U-238	U-238	5.400E-05	3.324E-07	3.322E-07	3.317E-07	3.300E-07	3.254E-07	3.095E-07	2.683E-07	1.627E-07
U-238+D	U-238+D	9.999E-01	3.258E-02	3.256E-02	3.251E-02	3.235E-02	3.189E-02	3.033E-02	2.629E-02	1.594E-02
U-238+D	U-234	9.999E-01	9.792E-09	2.936E-08	6.840E-08	2.042E-07	5.847E-07	1.832E-06	4.748E-06	9.575E-06
U-238+D	Th-230	9.999E-01	6.500E-14	4.548E-13	2.402E-12	2.142E-11	1.789E-10	1.878E-09	1.527E-08	1.225E-07
U-238+D	Ra-226+D	9.999E-01	8.971E-16	1.345E-14	1.567E-13	4.139E-12	1.001E-10	3.433E-09	8.152E-08	2.005E-06
U-238+D	Pb-210+D	9.999E-01	2.543E-19	7.837E-18	1.949E-16	1.456E-14	9.106E-13	7.360E-11	2.780E-09	8.409E-08
U-238+D	ΣDSR(j)		3.258E-02	3.256E-02	3.251E-02	3.235E-02	3.189E-02	3.033E-02	2.630E-02	1.595E-02

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Nuclide								
(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
Ac-227	3.616E+01	3.739E+01	3.999E+01	5.060E+01	9.909E+01	1.042E+03	8.645E+05	*7.232E+13
Pb-210	2.844E+02	2.935E+02	3.125E+02	3.895E+02	7.304E+02	6.598E+03	3.551E+06	*7.634E+13
Ra-226	1.283E+01	1.282E+01	1.281E+01	1.279E+01	1.284E+01	1.351E+01	1.628E+01	3.154E+01
Ra-228	1.974E+01	1.614E+01	1.483E+01	2.533E+01	2.690E+02	1.287E+06	*2.726E+14	*2.726E+14
Th-228	1.671E+01	2.400E+01	4.954E+01	6.258E+02	8.780E+05	*8.195E+14	*8.195E+14	*8.195E+14
Th-230	1.591E+03	1.510E+03	1.370E+03	1.034E+03	6.087E+02	2.532E+02	1.021E+02	4.291E+01
Th-232	1.689E+02	7.820E+01	3.482E+01	1.332E+01	8.909E+00	8.625E+00	8.625E+00	8.629E+00
U-234	3.618E+03	3.621E+03	3.626E+03	3.643E+03	3.693E+03	3.857E+03	4.230E+03	4.320E+03
U-235	1.800E+02	1.801E+02	1.804E+02	1.812E+02	1.835E+02	1.914E+02	2.151E+02	3.259E+02
U-238	7.673E+02	7.679E+02	7.690E+02	7.728E+02	7.839E+02	8.241E+02	9.506E+02	1.567E+03

*At specific activity limit

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 = 1.000E+03 years

Nuclide	Initial	tmin	DSR(i,tmin)	G(i,tmin)	DSR(i,tmax)	G(i,tmax)
(i)	(pCi/g)	(years)		(pCi/g)		(pCi/g)
Ac-227	9.000E-02	0.000E+00	6.914E-01	3.616E+01	1.756E-15	*7.232E+13
Pb-210	3.400E-01	0.000E+00	8.790E-02	2.844E+02	1.947E-15	*7.634E+13
Ra-226	2.600E-01	12.49 ± 0.02	1.954E+00	1.279E+01	7.927E-01	3.154E+01
Ra-228	2.000E-02	2.691 ± 0.005	1.689E+00	1.480E+01	0.000E+00	*2.726E+14
Th-228	7.000E-02	0.000E+00	1.496E+00	1.671E+01	0.000E+00	*8.195E+14
Th-230	1.890E+00	1.000E+03	5.826E-01	4.291E+01	5.826E-01	4.291E+01
Th-232	2.000E-02	102.3 ± 0.2	2.899E+00	8.625E+00	2.897E+00	8.629E+00
U-234	3.910E+00	0.000E+00	6.909E-03	3.618E+03	5.788E-03	4.320E+03
U-235	2.300E-01	0.000E+00	1.389E-01	1.800E+02	7.671E-02	3.259E+02
U-238	3.910E+00	0.000E+00	3.258E-02	7.673E+02	1.595E-02	1.567E+03

*At specific activity limit

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr								
			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
Ac-227	Ac-227	1.000E+00	6.223E-02	6.017E-02	5.626E-02	4.447E-02	2.271E-02	2.160E-03	2.603E-06	1.580E-16	
Ac-227	U-235	1.000E+00	1.800E-08	1.247E-07	6.447E-07	5.332E-06	3.643E-05	2.193E-04	7.195E-04	1.555E-03	
Ac-227	ΣDOSE(j)		6.223E-02	6.017E-02	5.626E-02	4.447E-02	2.274E-02	2.379E-03	7.221E-04	1.555E-03	
Pb-210	Pb-210	1.000E+00	2.989E-02	2.896E-02	2.720E-02	2.182E-02	1.164E-02	1.288E-03	2.394E-06	6.618E-16	
Pb-210	Ra-226	1.000E+00	3.569E-04	1.056E-03	2.387E-03	6.419E-03	1.392E-02	2.052E-02	1.781E-02	9.197E-03	
Pb-210	Th-230	1.000E+00	3.757E-07	2.606E-06	1.349E-05	1.122E-04	7.787E-04	4.873E-03	1.710E-02	4.561E-02	
Pb-210	U-234	1.000E+00	1.752E-12	2.609E-11	2.997E-10	7.516E-09	1.580E-07	3.625E-06	4.233E-05	3.753E-04	
Pb-210	U-238	9.999E-01	9.943E-19	3.064E-17	7.622E-16	5.692E-14	3.560E-12	2.878E-10	1.087E-08	3.288E-07	
Pb-210	ΣDOSE(j)		3.024E-02	3.002E-02	2.960E-02	2.836E-02	2.634E-02	2.668E-02	3.496E-02	5.519E-02	
Ra-226	Ra-226	1.000E+00	5.064E-01	5.059E-01	5.049E-01	5.016E-01	4.922E-01	4.607E-01	3.814E-01	1.969E-01	
Ra-226	Th-230	1.000E+00	7.975E-04	2.391E-03	5.575E-03	1.667E-02	4.796E-02	1.529E-01	4.168E-01	1.027E+00	
Ra-226	U-234	1.000E+00	4.950E-09	3.463E-08	1.829E-07	1.630E-06	1.359E-05	1.419E-04	1.137E-03	8.691E-03	
Ra-226	U-238	9.999E-01	3.508E-15	5.259E-14	6.128E-13	1.619E-11	3.912E-10	1.342E-08	3.188E-07	7.839E-06	
Ra-226	ΣDOSE(j)		5.072E-01	5.083E-01	5.105E-01	5.183E-01	5.402E-01	6.138E-01	7.993E-01	1.232E+00	
Ra-228	Ra-228	1.000E+00	1.981E-02	1.755E-02	1.370E-02	5.903E-03	5.243E-04	1.095E-07	3.344E-18	0.000E+00	
Ra-228	Th-232	1.000E+00	1.218E-03	3.467E-03	7.225E-03	1.506E-02	2.042E-02	2.094E-02	2.094E-02	2.093E-02	
Ra-228	ΣDOSE(j)		2.103E-02	2.102E-02	2.100E-02	2.097E-02	2.094E-02	2.094E-02	2.094E-02	2.093E-02	
Th-220	Ra-228	1.000E+00	5.516E-03	1.342E-02	1.994E-02	1.384E-02	1.335E-03	2.789E-07	8.519E-18	0.000E+00	
Th-228	Th-228	1.000E+00	1.047E-01	7.291E-02	3.532E-02	2.796E-03	1.993E-06	1.927E-17	0.000E+00	0.000E+00	
Th-228	Th-232	1.000E+00	2.306E-04	1.415E-03	5.622E-03	2.095E-02	3.419E-02	3.552E-02	3.552E-02	3.550E-02	
Th-228	ΣDOSE(j)		1.105E-01	8.774E-02	6.088E-02	3.758E-02	3.553E-02	3.552E-02	3.552E-02	3.550E-02	
Th-230	Th-230	1.000E+00	2.890E-02	2.890E-02	2.890E-02	2.889E-02	2.889E-02	2.887E-02	2.881E-02	2.862E-02	
Th-230	U-234	1.000E+00	2.690E-07	8.068E-07	1.881E-06	5.629E-06	1.623E-05	5.215E-05	1.453E-04	3.821E-04	
Th-230	U-238	9.999E-01	2.542E-13	1.778E-12	9.392E-12	8.374E-11	6.993E-10	7.342E-09	5.969E-08	4.789E-07	
Th-230	ΣDOSE(j)		2.890E-02	2.890E-02	2.890E-02	2.890E-02	2.891E-02	2.892E-02	2.896E-02	2.900E-02	
Th-232	Th-232	1.000E+00	1.512E-03	1.512E-03	1.512E-03	1.512E-03	1.512E-03	1.512E-03	1.512E-03	1.511E-03	
U-234	U-234	1.000E+00	2.701E-02	2.700E-02	2.696E-02	2.682E-02	2.644E-02	2.514E-02	2.178E-02	1.318E-02	
U-234	U-238	9.999E-01	3.829E-08	1.148E-07	2.675E-07	7.984E-07	2.286E-06	7.165E-06	1.856E-05	3.744E-05	
U-234	ΣDOSE(j)		2.701E-02	2.700E-02	2.696E-02	2.682E-02	2.644E-02	2.515E-02	2.180E-02	1.322E-02	
U-235	U-235	1.000E+00	3.194E-02	3.192E-02	3.188E-02	3.172E-02	3.127E-02	2.974E-02	2.578E-02	1.563E-02	
Pa-231	U-235	1.000E+00	4.719E-07	1.415E-06	3.296E-06	9.839E-06	2.817E-05	8.822E-05	2.282E-04	4.572E-04	
U-238	U-238	5.400E-05	1.300E-06	1.299E-06	1.297E-06	1.290E-06	1.272E-06	1.210E-06	1.049E-06	6.360E-07	
U-238	U-238	9.999E-01	1.274E-01	1.273E-01	1.271E-01	1.265E-01	1.247E-01	1.186E-01	1.028E-01	6.234E-02	
U-238	ΣDOSE(j)		1.274E-01	1.273E-01	1.271E-01	1.265E-01	1.247E-01	1.186E-01	1.028E-01	6.234E-02	

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
 Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g							
			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
Ac-227	Ac-227	1.000E+00	9.000E-02	8.703E-02	8.137E-02	6.431E-02	3.284E-02	3.124E-03	3.764E-06	2.285E-16
Ac-227	U-235	1.000E+00	0.000E+00	7.656E-08	6.733E-07	6.912E-06	5.038E-05	3.099E-04	1.022E-03	2.212E-03
Ac-227	ΣS(j):		9.000E-02	8.703E-02	8.137E-02	6.432E-02	3.289E-02	3.434E-03	1.026E-03	2.212E-03
Pb-210	Pb-210	1.000E+00	3.400E-01	3.295E-01	3.094E-01	2.483E-01	1.324E-01	1.466E-02	2.723E-05	7.529E-15
Pb-210	Ra-226	1.000E+00	0.000E+00	7.952E-03	2.310E-02	6.900E-02	1.544E-01	2.297E-01	1.996E-01	1.030E-01
Pb-210	Th-230	1.000E+00	0.000E+00	1.259E-05	1.109E-04	1.145E-03	8.476E-03	5.421E-02	1.912E-01	5.107E-01
Pb-210	U-234	1.000E+00	0.000E+00	7.834E-11	2.081E-09	7.284E-08	1.689E-06	4.011E-05	4.725E-04	4.199E-03
Pb-210	U-238	9.999E-01	0.000E+00	5.561E-17	4.444E-15	5.239E-13	3.742E-11	3.166E-09	1.211E-07	3.677E-06
Pb-210	ΣS(j):		3.400E-01	3.374E-01	3.326E-01	3.184E-01	2.953E-01	2.986E-01	3.913E-01	6.179E-01
Ra-226	Ra-226	1.000E+00	2.600E-01	2.598E-01	2.593E-01	2.576E-01	2.527E-01	2.366E-01	1.958E-01	1.011E-01
Ra-226	Th-230	1.000E+00	0.000E+00	8.184E-04	2.453E-03	8.149E-03	2.422E-02	7.809E-02	2.136E-01	5.268E-01
Ra-226	U-234	1.000E+00	0.000E+00	7.620E-09	6.850E-08	7.582E-07	6.748E-06	7.212E-05	5.816E-04	4.457E-03
Ra-226	U-238	9.999E-01	0.000E+00	7.200E-15	1.942E-13	7.161E-12	1.911E-10	6.788E-09	1.628E-07	4.018E-06
Ra-226	ΣS(j):		2.600E-01	2.606E-01	2.617E-01	2.657E-01	2.770E-01	3.147E-01	4.100E-01	6.324E-01
Ra-228	Ra-228	1.000E+00	2.000E-02	1.772E-02	1.391E-02	5.960E-03	5.294E-04	1.105E-07	3.377E-18	0.000E+00
Ra-228	Th-232	1.000E+00	0.000E+00	2.271E-03	6.065E-03	1.398E-02	1.939E-02	1.991E-02	1.991E-02	1.990E-02
Ra-228	ΣS(j):		2.000E-02	1.999E-02	1.997E-02	1.994E-02	1.992E-02	1.991E-02	1.991E-02	1.990E-02
Th-228	Ra-228	1.000E+00	0.000E+00	5.704E-03	1.076E-02	8.149E-03	7.945E-04	1.660E-07	5.071E-18	0.000E+00
Th-228	Th-228	1.000E+00	7.000E-02	4.872E-02	2.361E-02	1.889E-02	1.332E-02	1.388E-17	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	0.000E+00	3.728E-04	2.485E-03	1.127E-02	1.912E-02	1.991E-02	1.991E-02	1.990E-02
Th-228	ΣS(j):		7.000E-02	5.480E-02	3.685E-02	2.129E-02	1.992E-02	1.991E-02	1.991E-02	1.990E-02
Th-230	Th-230	1.000E+00	1.890E+00	1.890E+00	1.890E+00	1.890E+00	1.889E+00	1.888E+00	1.885E+00	1.872E+00
Th-230	U-234	1.000E+00	0.000E+00	3.518E-05	1.055E-04	3.507E-04	1.044E-03	3.395E-03	9.486E-03	2.498E-02
Th-230	U-238	9.999E-01	0.000E+00	4.987E-11	4.484E-10	4.965E-09	4.426E-08	4.755E-07	3.892E-06	3.130E-05
Th-230	ΣS(j):		1.890E+00	1.890E+00	1.890E+00	1.890E+00	1.891E+00	1.892E+00	1.894E+00	1.897E+00
Th-232	Th-232	1.000E+00	2.000E-02	2.000E-02	2.000E-02	2.000E-02	2.000E-02	2.000E-02	2.000E-02	1.999E-02
U-234	U-234	1.000E+00	3.910E+00	3.907E+00	3.902E+00	3.882E+00	3.827E+00	3.639E+00	3.153E+00	1.908E+00
U-234	U-238	9.999E-01	0.000E+00	1.108E-05	3.318E-05	1.100E-04	3.255E-04	1.032E-03	2.682E-03	5.416E-03
U-234	ΣS(j):		3.910E+00	3.907E+00	3.902E+00	3.882E+00	3.827E+00	3.640E+00	3.155E+00	1.913E+00
U-235	U-235	1.000E+00	2.300E-01	2.298E-01	2.295E-01	2.284E-01	2.251E-01	2.141E-01	1.856E-01	1.125E-01
Pa-231	U-235	1.000E+00	0.000E+00	4.863E-06	1.457E-05	4.831E-05	1.429E-04	4.526E-04	1.174E-03	2.356E-03
U-238	U-238	5.400E-05	2.111E-04	2.110E-04	2.107E-04	2.096E-04	2.067E-04	1.966E-04	1.704E-04	1.033E-04
U-238	U-238	9.999E-01	3.910E+00	3.907E+00	3.901E+00	3.882E+00	3.827E+00	3.640E+00	3.155E+00	1.913E+00
U-238	ΣS(j):		3.910E+00	3.907E+00	3.902E+00	3.882E+00	3.827E+00	3.640E+00	3.155E+00	1.913E+00

THF(i) is the thread fraction of the parent nuclide.

RESRAD.EXE execution time = 3.06 seconds

EXCESS CANCER RISK: All Nuclides Summed, All Pathways Summed

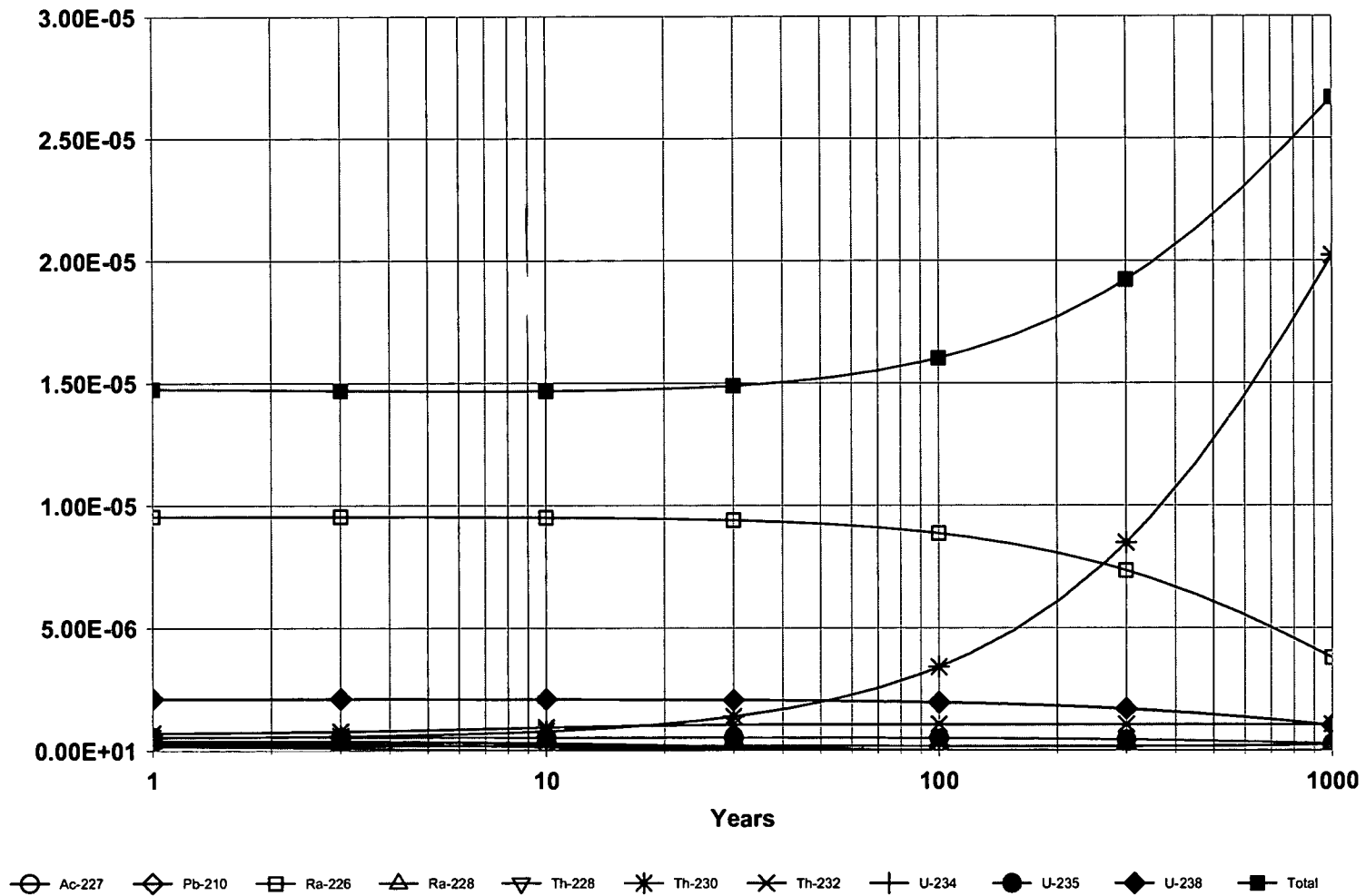


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Part III: Intake Quantities and Health Risk Factors

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Amount of Intake Quantities and Excess Cancer Risks	
Time= 0.000E+00	5
Time= 1.000E+00	9
Time= 3.000E+00	13
Time= 1.000E+01	17
Time= 3.000E+01	21
Time= 1.000E+02	25
Time= 3.000E+02	29
Time= 1.000E+03	33

Cancer Risk Slope Factors Summary Table
 Risk Library: FGR 13 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Ac-227+D	1.47E-06	3.48E-10	SLPF(1,1)
Sf-1	Pa-231	1.39E-07	1.39E-07	SLPF(2,1)
Sf-1	Pb-210+D	4.21E-09	1.41E-09	SLPF(3,1)
Sf-1	Ra-226+D	8.49E-06	2.29E-08	SLPF(4,1)
Sf-1	Ra-228+D	4.53E-06	0.00E+00	SLPF(5,1)
Sf-1	Th-228+D	7.76E-06	5.59E-09	SLPF(6,1)
Sf-1	Th-230	8.19E-10	8.19E-10	SLPF(7,1)
Sf-1	Th-232	3.42E-10	3.42E-10	SLPF(8,1)
Sf-1	U-234	2.52E-10	2.52E-10	SLPF(9,1)
Sf-1	U-235+D	5.43E-07	5.18E-07	SLPF(10,1)
Sf-1	U-238	4.99E-11	4.99E-11	SLPF(11,1)
Sf-1	U-238+D	1.14E-07	4.99E-11	SLPF(12,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Ac-227+D	2.13E-07	1.49E-07	SLPF(1,2)
Sf-2	Pa-231	7.62E-08	7.62E-08	SLPF(2,2)
Sf-2	Pb-210+D	3.08E-08	1.58E-08	SLPF(3,2)
Sf-2	Ra-226+D	2.83E-08	2.82E-08	SLPF(4,2)
Sf-2	Ra-228+D	4.37E-08	4.37E-08	SLPF(5,2)
Sf-2	Th-228+D	1.44E-07	1.32E-07	SLPF(6,2)
Sf-2	Th-230	3.40E-08	3.40E-08	SLPF(7,2)
Sf-2	Th-232	4.33E-08	4.33E-08	SLPF(8,2)
Sf-2	U-234	2.78E-08	2.78E-08	SLPF(9,2)
Sf-2	U-235+D	2.50E-08	2.50E-08	SLPF(10,2)
Sf-2	U-238	2.36E-08	2.36E-08	SLPF(11,2)
Sf-2	U-238+D	2.36E-08	2.36E-08	SLPF(12,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	6.53E-10	2.45E-10	SLPF(1,3)
Sf-3	Pa-231	2.26E-10	2.26E-10	SLPF(2,3)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(3,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(4,3)
Sf-3	Ra-228+D	1.43E-09	1.43E-09	SLPF(5,3)
Sf-3	Th-228+D	4.22E-10	1.48E-10	SLPF(6,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(7,3)
Sf-3	Th-232	1.33E-10	1.33E-10	SLPF(8,3)
Sf-3	U-234	9.55E-11	9.55E-11	SLPF(9,3)
Sf-3	U-235+D	9.76E-11	9.44E-11	SLPF(10,3)
Sf-3	U-238	8.66E-11	8.66E-11	SLPF(11,3)
Sf-3	U-238+D	1.21E-10	8.66E-11	SLPF(12,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	4.86E-10	2.01E-10	SLPF(1,4)
Sf-3	Pa-231	1.73E-10	1.73E-10	SLPF(2,4)
Sf-3	Pb-210+D	2.66E-09	8.81E-10	SLPF(3,4)
Sf-3	Ra-226+D	3.86E-10	3.85E-10	SLPF(4,4)
Sf-3	Ra-228+D	1.04E-09	1.04E-09	SLPF(5,4)
Sf-3	Th-228+D	2.99E-10	1.07E-10	SLPF(6,4)
Sf-3	Th-230	9.10E-11	9.10E-11	SLPF(7,4)
Sf-3	Th-232	1.01E-10	1.01E-10	SLPF(8,4)

Cancer Risk Slope Factors Summary Table (continued)
 Risk Library: FGR 13 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-3	U-234	7.07E-11	7.07E-11	SLPF(9,4)
Sf-3	U-235+D	7.18E-11	6.96E-11	SLPF(10,4)
Sf-3	U-238	6.40E-11	6.40E-11	SLPF(11,4)
Sf-3	U-238+D	8.71E-11	6.40E-11	SLPF(12,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	6.53E-10	2.45E-10	SLPF(1,5)
Sf-3	Pa-231	2.26E-10	2.26E-10	SLPF(2,5)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(3,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(4,5)
Sf-3	Ra-228+D	1.43E-09	1.43E-09	SLPF(5,5)
Sf-3	Th-228+D	4.22E-10	1.48E-10	SLPF(6,5)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(7,5)
Sf-3	Th-232	1.33E-10	1.33E-10	SLPF(8,5)
Sf-3	U-234	9.55E-11	9.55E-11	SLPF(9,5)
Sf-3	U-235+D	9.76E-11	9.44E-11	SLPF(10,5)
Sf-3	U-238	8.66E-11	8.66E-11	SLPF(11,5)
Sf-3	U-238+D	1.21E-10	8.66E-11	SLPF(12,5)
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	7.60E+02	7.60E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	5.70E+02	5.70E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.50E+02	1.50E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	2.50E+02	2.50E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

Nuclide (i)	Slope(i)* t=	ETFG(i,t) At Time in Years (dimensionless)							
		0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	3.480E-10	1.757E-01	1.757E-01	1.757E-01	1.757E-01	1.757E-01	1.757E-01	1.757E-01	1.757E-01
Ac-228	4.530E-06	1.730E-01	1.730E-01	1.730E-01	1.730E-01	1.730E-01	1.730E-01	1.730E-01	1.730E-01
At-218	3.570E-09	1.782E-01	1.782E-01	1.782E-01	1.782E-01	1.782E-01	1.782E-01	1.782E-01	1.782E-01
Bi-210	2.760E-09	1.736E-01	1.736E-01	1.736E-01	1.736E-01	1.736E-01	1.736E-01	1.736E-01	1.736E-01
Bi-211	1.880E-07	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01
Bi-212	8.870E-07	1.723E-01	1.723E-01	1.723E-01	1.723E-01	1.723E-01	1.723E-01	1.723E-01	1.723E-01
Bi-214	7.480E-06	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01
Fr-223	1.400E-07	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01
Pa-231	1.390E-07	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01
Pa-234	8.710E-06	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01
Pa-234m	6.870E-08	1.726E-01	1.726E-01	1.726E-01	1.726E-01	1.726E-01	1.726E-01	1.726E-01	1.726E-01
Pb-210	1.410E-09	1.802E-01	1.802E-01	1.802E-01	1.802E-01	1.802E-01	1.802E-01	1.802E-01	1.802E-01
Pb-211	2.290E-07	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01	1.727E-01
Pb-212	5.090E-07	1.748E-01	1.748E-01	1.748E-01	1.748E-01	1.748E-01	1.748E-01	1.748E-01	1.748E-01
Pb-214	9.820E-07	1.736E-01	1.736E-01	1.736E-01	1.736E-01	1.736E-01	1.736E-01	1.736E-01	1.736E-01
Po-210	3.950E-11	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01
Po-211	3.580E-08	1.720E-01	1.720E-01	1.720E-01	1.720E-01	1.720E-01	1.720E-01	1.720E-01	1.720E-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	3.860E-10	1.720E-01	1.720E-01	1.720E-01	1.720E-01	1.720E-01	1.720E-01	1.720E-01	1.720E-01
Po-215	7.480E-10	1.729E-01	1.729E-01	1.729E-01	1.729E-01	1.729E-01	1.729E-01	1.729E-01	1.729E-01
Po-216	7.870E-11	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01
Po-218	4.260E-11	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01	1.725E-01
Ra-223	4.340E-07	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01
Ra-224	3.720E-08	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01	1.745E-01
Ra-226	2.290E-08	1.750E-01	1.750E-01	1.750E-01	1.750E-01	1.750E-01	1.750E-01	1.750E-01	1.750E-01
Ra-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
Rn-219	2.250E-07	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01	1.737E-01
Rn-220	1.700E-09	1.722E-01	1.722E-01	1.722E-01	1.722E-01	1.722E-01	1.722E-01	1.722E-01	1.722E-01
Rn-222	1.740E-09	1.722E-01	1.722E-01	1.722E-01	1.722E-01	1.722E-01	1.722E-01	1.722E-01	1.722E-01
Th-227	3.780E-07	1.747E-01	1.747E-01	1.747E-01	1.747E-01	1.747E-01	1.747E-01	1.747E-01	1.747E-01
Th-228	5.590E-09	1.754E-01	1.754E-01	1.754E-01	1.754E-01	1.754E-01	1.754E-01	1.754E-01	1.754E-01
Th-230	8.190E-10	1.761E-01	1.761E-01	1.761E-01	1.761E-01	1.761E-01	1.761E-01	1.761E-01	1.761E-01
Th-231	2.450E-08	1.763E-01	1.763E-01	1.763E-01	1.763E-01	1.763E-01	1.763E-01	1.763E-01	1.763E-01
Th-232	3.420E-10	1.770E-01	1.770E-01	1.770E-01	1.770E-01	1.770E-01	1.770E-01	1.770E-01	1.770E-01
Th-234	1.630E-08	1.765E-01	1.765E-01	1.765E-01	1.765E-01	1.765E-01	1.765E-01	1.765E-01	1.765E-01
Tl-207	1.520E-08	1.728E-01	1.728E-01	1.728E-01	1.728E-01	1.728E-01	1.728E-01	1.728E-01	1.728E-01
Tl-208	1.760E-05	1.731E-01	1.731E-01	1.731E-01	1.731E-01	1.731E-01	1.731E-01	1.731E-01	1.731E-01
Tl-210	0.000E+00	1.835E-01	1.835E-01	1.835E-01	1.835E-01	1.835E-01	1.835E-01	1.835E-01	1.835E-01
U-234	2.520E-10	1.771E-01	1.771E-01	1.771E-01	1.771E-01	1.771E-01	1.771E-01	1.771E-01	1.771E-01
U-235	5.180E-07	1.749E-01	1.749E-01	1.749E-01	1.749E-01	1.749E-01	1.749E-01	1.749E-01	1.749E-01
U-238	4.990E-11	1.819E-01	1.819E-01	1.819E-01	1.819E-01	1.819E-01	1.819E-01	1.819E-01	1.819E-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	
Ac-227	2.341E-03	0.000E+00	0.000E+00	0.000E+00	1.084E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.084E+00
Pa-231	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
Pb-210	8.843E-03	0.000E+00	0.000E+00	0.000E+00	4.094E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.094E+00
Ra-226	6.762E-03	0.000E+00	0.000E+00	0.000E+00	3.131E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.131E+00
Ra-228	5.201E-04	0.000E+00	0.000E+00	0.000E+00	2.408E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.408E-01
Th-228	1.821E-03	0.000E+00	0.000E+00	0.000E+00	8.428E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.428E-01
Th-230	4.915E-02	0.000E+00	0.000E+00	0.000E+00	2.276E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.276E+01
Th-232	5.201E-04	0.000E+00	0.000E+00	0.000E+00	2.408E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.408E-01
U-234	1.017E-01	0.000E+00	0.000E+00	0.000E+00	4.708E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.708E+01
U-235	5.982E-03	0.000E+00	0.000E+00	0.000E+00	2.769E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.769E+00
U-238	1.017E-01	0.000E+00	0.000E+00	0.000E+00	4.708E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.708E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.886E-07	0.0262	8.428E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.197E-08	0.0008
Pa-231	3.628E-11	0.0000	2.978E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.089E-12	0.0000
Pb-210	5.847E-09	0.0004	6.319E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.275E-07	0.0221
Ra-226	9.793E-06	0.6612	4.910E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.139E-08	0.0028
Ra-228	3.907E-07	0.0264	5.673E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.601E-09	0.0006
Th-228	8.562E-07	0.0578	2.385E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.239E-09	0.0002
Th-230	6.816E-09	0.0005	4.179E-08	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.771E-08	0.0046
Th-232	3.027E-11	0.0000	5.631E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.007E-10	0.0001
U-234	4.324E-09	0.0003	7.005E-08	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.114E-07	0.0075
U-235	5.409E-07	0.0365	3.706E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.700E-09	0.0005
U-238	1.906E-06	0.1287	5.954E-08	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.407E-07	0.0095
Total	1.389E-05	0.9380	1.983E-07	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.200E-07	0.0486

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.090E-07	0.0276
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.335E-11	0.0000
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	3.397E-07	0.0229
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	9.839E-06	0.6643
Ra-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	3.998E-07	0.0270
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	8.618E-07	0.0582
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	1.163E-07	0.0079
Th-232	0.000E+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-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.858E-07	0.0125
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.513E-07	0.0372
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.107E-06	0.1422
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	1.481E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.885E-07	0.0262	8.426E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.197E-08	0.0008
Pb-210	4.356E-09	0.0003	4.708E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.440E-07	0.0165
Ra-226	9.422E-06	0.6362	6.290E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.210E-07	0.0082
Ra-228	3.291E-07	0.0222	7.525E-10	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.491E-09	0.0002
Th-228	2.599E-07	0.0175	7.240E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.830E-10	0.0001
Th-230	3.791E-07	0.0256	4.201E-08	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.154E-08	0.0048
Th-232	6.580E-07	0.0444	2.039E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.167E-09	0.0006
U-234	4.383E-09	0.0003	7.005E-08	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.114E-07	0.0075
U-235	5.410E-07	0.0365	3.710E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.707E-09	0.0005
U-238	1.906E-06	0.1287	5.954E-08	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.407E-07	0.0095
Total	1.389E-05	0.9380	1.983E-07	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.200E-07	0.0486

Total Excess Cancer Risk CNRSI(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

Radionuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.089E-07	0.0276
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	2.531E-07	0.0171
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	9.550E-06	0.6448
Ra-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	3.333E-07	0.0225
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	2.616E-07	0.0177
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	4.927E-07	0.0333
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.682E-07	0.0451
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.859E-07	0.0125
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.514E-07	0.0372
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.107E-06	0.1422
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	1.481E-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	
Ac-227	2.263E-03	0.000E+00	0.000E+00	0.000E+00	1.048E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.048E+00
Pa-231	1.265E-07	0.000E+00	0.000E+00	0.000E+00	5.855E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.855E-05
Pb-210	8.776E-03	0.000E+00	0.000E+00	0.000E+00	4.063E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.063E+00
Ra-226	6.777E-03	0.000E+00	0.000E+00	0.000E+00	3.137E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.137E+00
Ra-228	5.199E-04	0.000E+00	0.000E+00	0.000E+00	2.407E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.407E-01
Th-228	1.425E-03	0.000E+00	0.000E+00	0.000E+00	6.598E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.598E-01
Th-230	4.915E-02	0.000E+00	0.000E+00	0.000E+00	2.276E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.276E+01
Th-232	5.201E-04	0.000E+00	0.000E+00	0.000E+00	2.408E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.408E-01
U-234	1.016E-01	0.000E+00	0.000E+00	0.000E+00	4.705E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.705E+01
U-235	5.977E-03	0.000E+00	0.000E+00	0.000E+00	2.767E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.767E+00
U-238	1.016E-01	0.000E+00	0.000E+00	0.000E+00	4.705E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.705E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.758E-07	0.0255	8.150E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.157E-08	0.0008
Pa-231	3.916E-11	0.0000	3.214E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.413E-12	0.0000
Pb-210	5.817E-09	0.0004	6.287E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.259E-07	0.0221
Ra-226	9.814E-06	0.6650	4.920E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.148E-08	0.0028
Ra-228	3.906E-07	0.0265	5.672E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.600E-09	0.0006
Th-228	7.997E-07	0.0542	2.228E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.025E-09	0.0002
Th-230	6.816E-09	0.0005	4.179E-08	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.771E-08	0.0046
Th-232	3.027E-11	0.0000	5.631E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.007E-10	0.0001
U-234	4.321E-09	0.0003	7.000E-08	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.113E-07	0.0075
U-235	5.405E-07	0.0366	3.703E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.695E-09	0.0005
U-238	1.905E-06	0.1291	5.950E-08	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.406E-07	0.0095
Total	1.384E-05	0.9380	1.977E-07	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.177E-07	0.0486

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.955E-07	0.0268
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.679E-11	0.0000
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	3.380E-07	0.0229
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	9.860E-06	0.6681
Ra-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	3.998E-07	0.0271
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	8.049E-07	0.0545
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	1.163E-07	0.0079
Th-232	0.000E+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-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.856E-07	0.0126
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.509E-07	0.0373
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.105E-06	0.1426
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	1.476E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.757E-07	0.0255	8.148E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.157E-08	0.0008
Pb-210	4.221E-09	0.0003	4.563E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.365E-07	0.0160
Ra-226	9.413E-06	0.6379	6.395E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.266E-07	0.0086
Ra-228	3.127E-07	0.0212	7.257E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.173E-09	0.0002
Th-228	1.809E-07	0.0123	5.039E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.843E-10	0.0000
Th-230	4.088E-07	0.0277	4.203E-08	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.192E-08	0.0049
Th-232	6.967E-07	0.0472	2.128E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.569E-09	0.0006
U-234	4.387E-09	0.0003	7.000E-08	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.113E-07	0.0075
U-235	5.406E-07	0.0366	3.708E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.702E-09	0.0005
U-238	1.905E-06	0.1291	5.950E-08	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.406E-07	0.0095
Total	1.384E-05	0.9380	1.977E-07	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.177E-07	0.0486

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.954E-07	0.0268
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	2.453E-07	0.0166
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	9.546E-06	0.6469
Ra-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	3.166E-07	0.0215
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	1.821E-07	0.0123
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	5.227E-07	0.0354
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.074E-07	0.0479
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.857E-07	0.0126
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.510E-07	0.0373
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.105E-06	0.1426
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	1.476E-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	
Ac-227	2.116E-03	0.000E+00	0.000E+00	0.000E+00	9.797E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.797E-01
Pa-231	3.789E-07	0.000E+00	0.000E+00	0.000E+00	1.754E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.754E-04
Pb-210	8.650E-03	0.000E+00	0.000E+00	0.000E+00	4.005E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.005E+00
Ra-226	6.807E-03	0.000E+00	0.000E+00	0.000E+00	3.151E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.151E+00
Ra-228	5.195E-04	0.000E+00	0.000E+00	0.000E+00	2.405E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.405E-01
Th-228	9.584E-04	0.000E+00	0.000E+00	0.000E+00	4.437E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.437E-01
Th-230	4.916E-02	0.000E+00	0.000E+00	0.000E+00	2.276E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.276E+01
Th-232	5.201E-04	0.000E+00	0.000E+00	0.000E+00	2.408E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.408E-01
U-234	1.015E-01	0.000E+00	0.000E+00	0.000E+00	4.698E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.698E+01
U-235	5.969E-03	0.000E+00	0.000E+00	0.000E+00	2.763E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.763E+00
U-238	1.015E-01	0.000E+00	0.000E+00	0.000E+00	4.698E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.698E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.514E-07	0.0239	7.620E-09	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.082E-08	0.0007
Pa-231	4.492E-11	0.0000	3.686E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.062E-12	0.0000
Pb-210	5.762E-09	0.0004	6.227E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.228E-07	0.0220
Ra-226	9.855E-06	0.6705	4.941E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.165E-08	0.0028
Ra-228	3.905E-07	0.0266	5.670E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.598E-09	0.0006
Th-228	7.329E-07	0.0499	2.042E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.772E-09	0.0002
Th-230	6.816E-09	0.0005	4.179E-08	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.771E-08	0.0046
Th-232	3.027E-11	0.0000	5.631E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.007E-10	0.0001
U-234	4.314E-09	0.0003	6.990E-08	0.0048	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.112E-07	0.0076
U-235	5.397E-07	0.0367	3.698E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.686E-09	0.0005
U-238	1.902E-06	0.1294	5.941E-08	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.404E-07	0.0096
Total	1.379E-05	0.9381	1.968E-07	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.134E-07	0.0485

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.698E-07	0.0252
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.366E-11	0.0000
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	3.347E-07	0.0228
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	9.902E-06	0.6736
Ra-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	3.997E-07	0.0272
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	7.377E-07	0.0502
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	1.163E-07	0.0079
Th-232	0.000E+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-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.854E-07	0.0126
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.501E-07	0.0374
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.102E-06	0.1430
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	1.470E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.513E-07	0.0239	7.618E-09	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.082E-08	0.0007
Pb-210	3.964E-09	0.0003	4.285E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.221E-07	0.0151
Ra-226	9.396E-06	0.6392	6.593E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.373E-07	0.0093
Ra-228	2.688E-07	0.0183	6.346E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.579E-09	0.0002
Th-228	8.764E-08	0.0060	2.442E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.315E-10	0.0000
Th-230	4.680E-07	0.0318	4.207E-08	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.275E-08	0.0049
Th-232	7.670E-07	0.0522	2.293E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.260E-09	0.0006
U-234	4.397E-09	0.0003	6.991E-08	0.0048	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.112E-07	0.0076
U-235	5.399E-07	0.0367	3.704E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.694E-09	0.0005
U-238	1.902E-06	0.1294	5.942E-08	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.404E-07	0.0096
Total	1.379E-05	0.9381	1.968E-07	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.134E-07	0.0485

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.697E-07	0.0252
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	2.303E-07	0.0157
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	9.540E-06	0.6490
Ra-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	2.720E-07	0.0185
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	8.821E-08	0.0060
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	5.828E-07	0.0397
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.785E-07	0.0530
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.855E-07	0.0126
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.503E-07	0.0374
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.102E-06	0.1430
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	1.470E-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	
Ac-227	1.673E-03	0.000E+00	0.000E+00	0.000E+00	7.744E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.744E-01
Pa-231	1.256E-06	0.000E+00	0.000E+00	0.000E+00	5.817E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.817E-04
Pb-210	8.281E-03	0.000E+00	0.000E+00	0.000E+00	3.834E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.834E+00
Ra-226	6.910E-03	0.000E+00	0.000E+00	0.000E+00	3.199E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.199E+00
Ra-228	5.186E-04	0.000E+00	0.000E+00	0.000E+00	2.401E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.401E-01
Th-228	5.536E-04	0.000E+00	0.000E+00	0.000E+00	2.563E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.563E-01
Th-230	4.916E-02	0.000E+00	0.000E+00	0.000E+00	2.276E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.276E+01
Th-232	5.201E-04	0.000E+00	0.000E+00	0.000E+00	2.408E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.408E-01
U-234	1.010E-01	0.000E+00	0.000E+00	0.000E+00	4.674E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.674E+01
U-235	5.939E-03	0.000E+00	0.000E+00	0.000E+00	2.750E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.750E+00
U-238	1.010E-01	0.000E+00	0.000E+00	0.000E+00	4.674E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.674E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Ri-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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.778E-07	0.0189	6.026E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.558E-09	0.0006
Pa-231	6.492E-11	0.0000	5.328E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.316E-12	0.0000
Pb-210	5.602E-09	0.0004	6.055E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.138E-07	0.0214
Ra-226	1.000E-05	0.6810	5.014E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.226E-08	0.0029
Ra-228	3.903E-07	0.0266	5.667E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.593E-09	0.0006
Th-228	6.747E-07	0.0459	1.880E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.552E-09	0.0002
Th-230	6.816E-09	0.0005	4.179E-08	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.772E-08	0.0046
Th-232	3.027E-11	0.0000	5.631E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.007E-10	0.0001
U-234	4.293E-09	0.0003	6.955E-08	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.106E-07	0.0075
U-235	5.370E-07	0.0366	3.679E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.652E-09	0.0005
U-238	1.893E-06	0.1289	5.912E-08	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.397E-07	0.0095
Total	1.379E-05	0.9390	1.942E-07	0.0132	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.013E-07	0.0478

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.924E-07	0.0199
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.757E-11	0.0000
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	3.255E-07	0.0222
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	1.005E-05	0.6842
Ra-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	3.995E-07	0.0272
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	6.792E-07	0.0462
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	1.163E-07	0.0079
Th-232	0.000E+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-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.844E-07	0.0126
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.474E-07	0.0373
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.092E-06	0.1424
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	1.468E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.776E-07	0.0189	6.021E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.551E-09	0.0006
Pb-210	3.181E-09	0.0002	3.438E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.782E-07	0.0121
Ra-226	9.335E-06	0.6357	7.187E-09	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.694E-07	0.0115
Ra-228	1.283E-07	0.0087	3.085E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.155E-09	0.0001
Th-228	6.938E-09	0.0005	1.933E-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-11	0.0000
Th-230	6.744E-07	0.0459	4.222E-08	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.614E-08	0.0052
Th-232	9.298E-07	0.0633	2.682E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.077E-08	0.0007
U-234	4.449E-09	0.0003	6.956E-08	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.106E-07	0.0075
U-235	5.373E-07	0.0366	3.689E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.666E-09	0.0005
U-238	1.893E-06	0.1289	5.912E-08	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.397E-07	0.0095
Total	1.379E-05	0.9390	1.942E-07	0.0132	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.013E-07	0.0478

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.922E-07	0.0199
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	1.848E-07	0.0126
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	9.511E-06	0.6477
Ra-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	1.298E-07	0.0088
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	6.983E-09	0.0005
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	7.928E-07	0.0540
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.433E-07	0.0642
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.846E-07	0.0126
U-235	0.000E+00	0.0000	0.000E+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-07	0.0373
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.092E-06	0.1424
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	1.468E-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+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	
Ac-227	8.554E-04	0.000E+00	0.000E+00	0.000E+00	3.960E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.960E-01
Pa-231	3.715E-06	0.000E+00	0.000E+00	0.000E+00	1.720E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.720E-03
Pb-210	7.679E-03	0.000E+00	0.000E+00	0.000E+00	3.555E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.555E+00
Ra-226	7.203E-03	0.000E+00	0.000E+00	0.000E+00	3.335E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.335E+00
Ra-228	5.180E-04	0.000E+00	0.000E+00	0.000E+00	2.398E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.398E-01
Th-228	5.181E-04	0.000E+00	0.000E+00	0.000E+00	2.398E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.398E-01
Th-230	4.917E-02	0.000E+00	0.000E+00	0.000E+00	2.276E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.276E+01
Th-232	5.201E-04	0.000E+00	0.000E+00	0.000E+00	2.408E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.408E-01
U-234	9.953E-02	0.000E+00	0.000E+00	0.000E+00	4.608E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.608E+01
U-235	5.855E-03	0.000E+00	0.000E+00	0.000E+00	2.711E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.711E+00
U-238	9.953E-02	0.000E+00	0.000E+00	0.000E+00	4.608E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.608E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.423E-07	0.0096	3.087E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.384E-09	0.0003
Pa-231	1.210E-10	0.0000	9.927E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.363E-11	0.0000
Pb-210	5.368E-09	0.0004	5.802E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.007E-07	0.0202
Ra-226	1.041E-05	0.6988	5.218E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.399E-08	0.0030
Ra-228	3.902E-07	0.0262	5.665E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.590E-09	0.0006
Th-228	6.694E-07	0.0449	1.865E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.532E-09	0.0002
Th-230	6.818E-09	0.0005	4.180E-08	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.773E-08	0.0045
Th-232	3.026E-11	0.0000	5.630E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.007E-10	0.0001
U-234	4.232E-09	0.0003	6.856E-08	0.0046	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.090E-07	0.0073
U-235	5.294E-07	0.0355	3.627E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.558E-09	0.0004
U-238	1.866E-06	0.1253	5.828E-08	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.377E-07	0.0092
Total	1.402E-05	0.9415	1.894E-07	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.821E-07	0.0458

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.498E-07	0.0101
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.445E-10	0.0000
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	3.119E-07	0.0209
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	1.046E-05	0.7021
Ra-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	3.993E-07	0.0268
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	6.738E-07	0.0452
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	1.163E-07	0.0078
Th-232	0.000E+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-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.818E-07	0.0122
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.396E-07	0.0362
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.062E-06	0.1384
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	1.489E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.418E-07	0.0095	3.074E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.366E-09	0.0003
Pb-210	1.696E-09	0.0001	1.833E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.502E-08	0.0064
Ra-226	9.161E-06	0.6151	8.253E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.285E-07	0.0153
Ra-228	1.166E-08	0.0008	2.814E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.036E-10	0.0000
Th-228	4.945E-12	0.0000	1.378E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.871E-14	0.0000
Th-230	1.257E-06	0.0844	4.270E-08	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.887E-08	0.0060
Th-232	1.048E-06	0.0704	2.966E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.182E-08	0.0008
U-234	4.744E-09	0.0003	6.858E-08	0.0046	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.091E-07	0.0073
U-235	5.301E-07	0.0356	3.649E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.589E-09	0.0004
U-238	1.866E-06	0.1253	5.829E-08	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.377E-07	0.0092
Total	1.402E-05	0.9415	1.894E-07	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.821E-07	0.0458

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+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-07	0.0100
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	9.855E-08	0.0066
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	9.398E-06	0.6310
Ra-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	1.179E-08	0.0008
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	4.978E-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	1.388E-06	0.0932
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.063E-06	0.0714
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.824E-07	0.0122
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.403E-07	0.0363
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.062E-06	0.1384
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	1.489E-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+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	
Ac-227	8.931E-05	0.000E+00	0.000E+00	0.000E+00	4.135E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.135E-02
Pa-231	1.177E-05	0.000E+00	0.000E+00	0.000E+00	5.450E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.450E-03
Pb-210	7.766E-03	0.000E+00	0.000E+00	0.000E+00	3.595E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.595E+00
Ra-226	8.185E-03	0.000E+00	0.000E+00	0.000E+00	3.790E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.790E+00
Ra-228	5.179E-04	0.000E+00	0.000E+00	0.000E+00	2.398E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.398E-01
Th-228	5.179E-04	0.000E+00	0.000E+00	0.000E+00	2.398E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.398E-01
Th-230	4.920E-02	0.000E+00	0.000E+00	0.000E+00	2.278E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.278E+01
Th-232	5.201E-04	0.000E+00	0.000E+00	0.000E+00	2.408E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.408E-01
U-234	9.467E-02	0.000E+00	0.000E+00	0.000E+00	4.383E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.383E+01
U-235	5.569E-03	0.000E+00	0.000E+00	0.000E+00	2.578E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.578E+00
U-238	9.467E-02	0.000E+00	0.000E+00	0.000E+00	4.383E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.383E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-214	Bi-214
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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.578E-08	0.0010	3.423E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.861E-10	0.0000
Pa-231	3.045E-10	0.0000	2.499E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.432E-11	0.0000
Pb-210	5.621E-09	0.0004	6.076E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.149E-07	0.0197
Ra-226	1.178E-05	0.7354	5.904E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.977E-08	0.0031
Ra-228	3.901E-07	0.0244	5.665E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.590E-09	0.0005
Th-228	6.694E-07	0.0418	1.865E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.532E-09	0.0002
Th-230	6.821E-09	0.0004	4.182E-08	0.0026	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.776E-08	0.0042
Th-232	3.026E-11	0.0000	5.630E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.007E-10	0.0000
U-234	4.025E-09	0.0003	6.521E-08	0.0041	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.037E-07	0.0065
U-235	5.036E-07	0.0314	3.450E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.238E-09	0.0004
U-238	1.775E-06	0.1108	5.543E-08	0.0035	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.310E-07	0.0082
Total	1.515E-05	0.9459	1.813E-07	0.0113	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.858E-07	0.0428

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.661E-08	0.0010
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.638E-10	0.0000
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	3.266E-07	0.0204
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	1.183E-05	0.7389
Ra-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	3.993E-07	0.0249
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	6.738E-07	0.0421
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	1.164E-07	0.0073
Th-232	0.000E+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-09	0.0001
U-234	0.000E+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-07	0.0108
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.133E-07	0.0321
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.961E-06	0.1225
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	1.601E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.349E-08	0.0008	2.925E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.154E-10	0.0000
Pb-210	1.878E-10	0.0000	2.030E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.052E-08	0.0007
Ra-226	8.576E-06	0.5355	8.904E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.750E-07	0.0172
Ra-228	2.435E-12	0.0000	5.876E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.163E-14	0.0000
Th-228	4.781E-23	0.0000	1.332E-25	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.809E-25	0.0000
Th-230	3.209E-06	0.2004	4.461E-08	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.467E-07	0.0092
Th-232	1.060E-06	0.0662	2.994E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.192E-08	0.0007
U-234	7.374E-09	0.0005	6.528E-08	0.0041	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.039E-07	0.0065
U-235	5.062E-07	0.0316	3.525E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.343E-09	0.0004
U-238	1.775E-06	0.1108	5.545E-08	0.0035	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.310E-07	0.0082
Total	1.515E-05	0.9459	1.813E-07	0.0113	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.858E-07	0.0428

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.419E-08	0.0009
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	1.091E-08	0.0007
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	8.860E-06	0.5533
Ra-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	2.463E-12	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	4.813E-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	3.401E-06	0.2124
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.074E-06	0.0671
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.765E-07	0.0110
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.160E-07	0.0322
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.961E-06	0.1225
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	1.601E-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+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	
Ac-227	2.667E-05	0.000E+00	0.000E+00	0.000E+00	1.235E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.235E-02
Pa-231	3.054E-05	0.000E+00	0.000E+00	0.000E+00	1.414E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.414E-02
Pb-210	1.018E-02	0.000E+00	0.000E+00	0.000E+00	4.711E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.711E+00
Ra-226	1.066E-02	0.000E+00	0.000E+00	0.000E+00	4.937E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.937E+00
Ra-228	5.179E-04	0.000E+00	0.000E+00	0.000E+00	2.398E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.398E-01
Th-228	5.179E-04	0.000E+00	0.000E+00	0.000E+00	2.398E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.398E-01
Th-230	4.926E-02	0.000E+00	0.000E+00	0.000E+00	2.281E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.281E+01
Th-232	5.201E-04	0.000E+00	0.000E+00	0.000E+00	2.408E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.408E-01
U-234	8.206E-02	0.000E+00	0.000E+00	0.000E+00	3.799E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.799E+01
U-235	4.827E-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
U-238	8.206E-02	0.000E+00	0.000E+00	0.000E+00	3.799E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.799E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	6.777E-09	0.0004	1.470E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.087E-10	0.0000
Pa-231	7.318E-10	0.0000	6.006E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.247E-11	0.0000
Pb-210	7.341E-09	0.0004	7.934E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.112E-07	0.0214
Ra-226	1.523E-05	0.7923	7.635E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.436E-08	0.0033
Ra-228	3.901E-07	0.0203	5.664E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.588E-09	0.0004
Th-228	6.693E-07	0.0348	1.865E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.532E-09	0.0001
Th-230	6.830E-09	0.0004	4.187E-08	0.0022	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.785E-08	0.0035
Th-232	3.026E-11	0.0000	5.630E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.006E-10	0.0000
U-234	3.489E-09	0.0002	5.653E-08	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.990E-08	0.0047
U-235	4.365E-07	0.0227	2.990E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.407E-09	0.0003
U-238	1.538E-06	0.0800	4.805E-08	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.135E-07	0.0059
Total	1.829E-05	0.9515	1.682E-07	0.0088	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.645E-07	0.0398

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.133E-09	0.0004
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.743E-10	0.0000
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	4.265E-07	0.0222
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	1.530E-05	0.7960
Ra-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	3.992E-07	0.0208
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	6.737E-07	0.0350
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	1.166E-07	0.0061
Th-232	0.000E+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-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.499E-07	0.0078
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.449E-07	0.0231
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.700E-06	0.0884
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	1.922E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.625E-11	0.0000	3.524E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.005E-13	0.0000
Pb-210	3.489E-13	0.0000	3.771E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.954E-11	0.0000
Ra-226	7.100E-06	0.3694	7.502E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.344E-07	0.0122
Ra-228	7.440E-23	0.0000	1.795E-25	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.607E-25	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	8.120E-06	0.4225	4.970E-08	0.0026	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.080E-07	0.0160
Th-232	1.059E-06	0.0551	2.994E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.192E-08	0.0006
U-234	2.652E-08	0.0014	5.672E-08	0.0030	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.081E-08	0.0047
U-235	4.440E-07	0.0231	3.197E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.698E-09	0.0003
U-238	1.538E-06	0.0800	4.810E-08	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.136E-07	0.0059
Total	1.829E-05	0.9515	1.682E-07	0.0088	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.645E-07	0.0398

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.710E-11	0.0000
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	2.027E-11	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	7.342E-06	0.3820
Ra-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	7.524E-23	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	8.478E-06	0.4411
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.074E-06	0.0559
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.740E-07	0.0091
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.529E-07	0.0236
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.700E-06	0.0885
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	1.922E-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+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	
Ac-227	5.753E-05	0.000E+00	0.000E+00	0.000E+00	2.663E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.663E-02
Pa-231	6.128E-05	0.000E+00	0.000E+00	0.000E+00	2.837E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.837E-02
Pb-210	1.607E-02	0.000E+00	0.000E+00	0.000E+00	7.440E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.440E+00
Ra-226	1.645E-02	0.000E+00	0.000E+00	0.000E+00	7.615E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.615E+00
Ra-228	5.176E-04	0.000E+00	0.000E+00	0.000E+00	2.397E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.397E-01
Th-228	5.176E-04	0.000E+00	0.000E+00	0.000E+00	2.397E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.397E-01
Th-230	4.933E-02	0.000E+00	0.000E+00	0.000E+00	2.284E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.284E+01
Th-232	5.198E-04	0.000E+00	0.000E+00	0.000E+00	2.407E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.407E-01
U-234	4.976E-02	0.000E+00	0.000E+00	0.000E+00	2.304E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.304E+01
U-235	2.927E-03	0.000E+00	0.000E+00	0.000E+00	1.355E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.355E+00
U-238	4.976E-02	0.000E+00	0.000E+00	0.000E+00	2.304E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.304E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.417E-08	0.0005	3.073E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.364E-10	0.0000
Pa-231	1.427E-09	0.0001	1.171E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.608E-10	0.0000
Pb-210	1.148E-08	0.0004	1.241E-08	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.434E-07	0.0241
Ra-226	2.329E-05	0.8734	1.168E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.842E-08	0.0037
Ra-228	3.899E-07	0.0146	5.662E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.585E-09	0.0003
Th-228	6.690E-07	0.0251	1.864E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.531E-09	0.0001
Th-230	6.840E-09	0.0003	4.193E-08	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.795E-08	0.0025
Th-232	3.025E-11	0.0000	5.627E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.002E-10	0.0000
U-234	2.116E-09	0.0001	3.428E-08	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.451E-08	0.0020
U-235	2.647E-07	0.0099	1.813E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.279E-09	0.0001
U-238	9.328E-07	0.0350	2.914E-08	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.885E-08	0.0026
Total	2.558E-05	0.9594	1.347E-07	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.489E-07	0.0356

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.491E-08	0.0006
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.705E-09	0.0001
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	6.673E-07	0.0250
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	2.340E-05	0.8775
Ra-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	3.991E-07	0.0150
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	6.734E-07	0.0253
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	1.167E-07	0.0044
Th-232	0.000E+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-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.091E-08	0.0034
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.698E-07	0.0101
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.031E-06	0.0387
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	2.666E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	9.865E-22	0.0000	2.140E-23	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.039E-23	0.0000
Pb-210	9.647E-23	0.0000	1.043E-22	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.404E-21	0.0000
Ra-226	3.665E-06	0.1375	3.873E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.210E-07	0.0045
Ra-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-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	U.UUUU+UU	U.UUUU	U.UUUU+UU	U.UUUU	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.947E-05	0.7304	6.142E-08	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.827E-07	0.0256
Th-232	1.059E-06	0.0397	2.993E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.192E-08	0.0004
U-234	1.687E-07	0.0063	3.490E-08	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.040E-08	0.0023
U-235	2.803E-07	0.0105	2.238E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.876E-09	0.0001
U-238	9.330E-07	0.0350	2.923E-08	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.901E-08	0.0026
Total	2.558E-05	0.9594	1.347E-07	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.489E-07	0.0356

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.038E-21	0.0000
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	5.605E-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	3.790E-06	0.1421
Ra-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-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	2.022E-05	0.7583
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.074E-06	0.0403
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.640E-07	0.0099
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.864E-07	0.0107
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.031E-06	0.0387
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	2.666E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Utility Worker

DOSE: All Nuclides Summed, All Pathways Summed

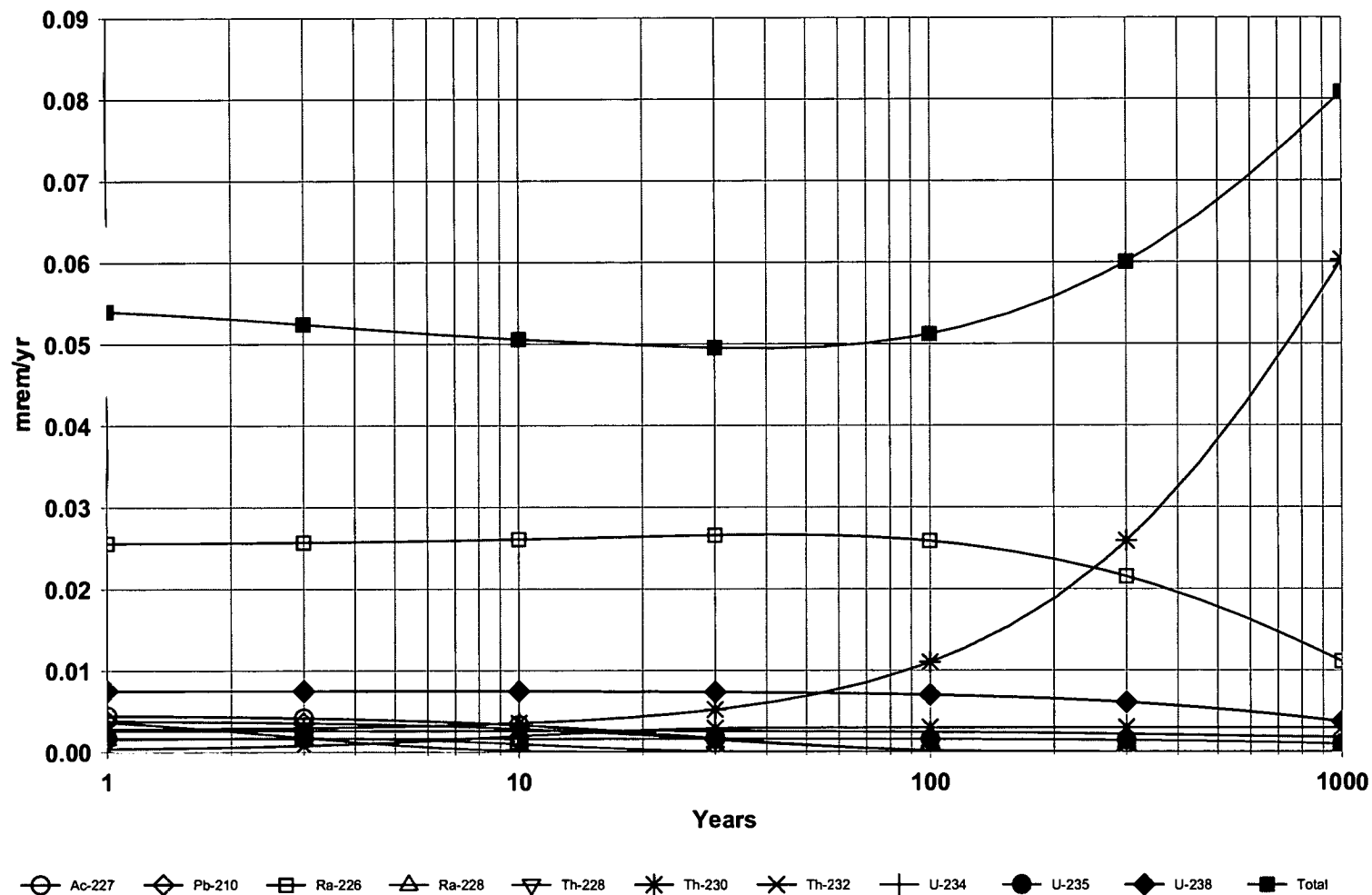


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Dose Conversion Factor (and Related) Parameter Summary
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(3)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(4)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(5)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238	1.180E-01	1.180E-01	DCF2(11)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(12)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(3)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(4)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(10)
D-1	U-238	2.550E-04	2.550E-04	DCF3(11)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(12)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34				

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(12,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(12,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(12,3)
D-5				
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(12,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(12,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.129E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+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): Ac-227	9.000E-02	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pb-210	3.400E-01	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	2.600E-01	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	2.000E-02	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.000E-02	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	1.890E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	2.000E-02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	3.910E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.300E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	3.910E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
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)	1.280E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.200E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	3.600E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	3.048E+00	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.040E+01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.170E+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)	9.200E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Runoff coefficient	8.000E-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
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 Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.772E-03	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.584E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.113E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.113E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC (6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU (6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS (6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.990E-07	ALEACH (6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC (7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU (7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS (7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.990E-07	ALEACH (7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC (8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU (8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS (8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.990E-07	ALEACH (8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU (9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS (9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU (10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS (10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (10)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU (11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS (11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (11)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (2)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU (2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS (2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (2)
R017	Inhalation rate (m**3/yr)	1.055E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Exposure duration	1.000E+00	3.000E+01	---	ED
R017	Shielding factor, inhalation	5.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-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)	9.100E-03	2.500E-01	---	FOTD
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)	1.752E+02	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

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
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	---	RUKI(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
C14	DCF correction factor for gaseous forms of C14	not used	0.000E+00	---	CO2F
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)
STDR	Surface water	1.000E+00	1.000E+00	---	STDR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
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	---	HMX
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	active

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	11292.00 square meters	Ac-227	9.000E-02
Thickness:	2.00 meters	Pb-210	3.400E-01
Cover Depth:	0.00 meters	Ra-226	2.600E-01
		Ra-228	2.000E-02
		Th-228	7.000E-02
		Th-230	1.890E+00
		Th-232	2.000E-02
		U-234	3.910E+00
		U-235	2.300E-01
		U-238	3.910E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+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):	5.530E-02	5.403E-02	5.243E-02	5.056E-02	4.952E-02	5.120E-02	6.004E-02	8.081E-02
M(t):	2.212E-03	2.161E-03	2.097E-03	2.022E-03	1.981E-03	2.048E-03	2.402E-03	3.232E-03

Maximum TDOSE(t): 8.081E-02 mrem/yr at t = 1.000E+03 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.
Ac-227	1.537E-03	0.0278	9.773E-04	0.0177	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.088E-03	0.0378
Pb-210	1.786E-05	0.0003	1.275E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.883E-03	0.0702
Ra-226	2.491E-02	0.4504	3.820E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.937E-04	0.0107
Ra-228	1.237E-03	0.0224	1.911E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.730E-05	0.0009
Th-228	5.140E-03	0.0929	3.330E-05	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.570E-05	0.0014
Th-230	5.917E-05	0.0011	1.012E-03	0.0183	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.652E-03	0.0299
Th-232	7.081E-05	0.0013	5.395E-05	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.988E-05	0.0016
U-234	1.379E-05	0.0002	8.473E-04	0.0153	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.764E-03	0.0319
U-235	1.511E-03	0.0273	4.645E-05	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.804E-05	0.0018
U-238	5.096E-03	0.0921	7.577E-04	0.0137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.674E-03	0.0303
Total	3.959E-02	0.7159	3.746E-03	0.0677	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.197E-02	0.2164

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.602E-03	0.0832
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	3.914E-03	0.0708
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	2.550E-02	0.4612
Ra-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	1.286E-03	0.0233
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	5.249E-03	0.0949
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	2.723E-03	0.0492
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.146E-04	0.0039
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.625E-03	0.0475
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.656E-03	0.0299
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.528E-03	0.1361
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	5.530E-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+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.
Ac-227	1.486E-03	0.0275	9.450E-04	0.0175	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.019E-03	0.0374
Pb-210	1.731E-05	0.0003	1.236E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.763E-03	0.0696
Ra-226	2.488E-02	0.4606	4.115E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.839E-04	0.0127
Ra-228	1.515E-03	0.0280	4.407E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.807E-05	0.0009
Th-228	3.578E-03	0.0662	2.318E-05	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.269E-05	0.0010
Th-230	1.376E-04	0.0025	1.012E-03	0.0187	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.654E-03	0.0306
Th-232	2.386E-04	0.0044	5.434E-05	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.565E-05	0.0018
U-234	1.378E-05	0.0003	8.467E-04	0.0157	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.762E-03	0.0326
U-235	1.510E-03	0.0279	4.643E-05	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.806E-05	0.0018
U-238	5.092E-03	0.0943	7.571E-04	0.0140	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.673E-03	0.0310
Total	3.847E-02	0.7121	3.706E-03	0.0686	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.185E-02	0.2193

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.450E-03	0.0824
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	3.792E-03	0.0702
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	2.557E-02	0.4733
Ra-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	1.567E-03	0.0290
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	3.654E-03	0.0676
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	2.804E-03	0.0519
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.886E-04	0.0072
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.623E-03	0.0485
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.654E-03	0.0306
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.522E-03	0.1392
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	5.403E-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+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.
Ac-227	1.389E-03	0.0265	8.836E-04	0.0169	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.888E-03	0.0360
Pb-210	1.625E-05	0.0003	1.160E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.533E-03	0.0674
Ra-226	2.484E-02	0.4737	4.676E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.558E-04	0.0163
Ra-228	1.650E-03	0.0315	6.448E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.453E-05	0.0008
Th-228	1.733E-03	0.0331	1.123E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.553E-05	0.0005
Th-230	2.941E-04	0.0056	1.012E-03	0.0193	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.659E-03	0.0316
Th-232	6.283E-04	0.0120	5.571E-05	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.069E-04	0.0020
U-234	1.377E-05	0.0003	8.455E-04	0.0161	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.760E-03	0.0336
U-235	1.508E-03	0.0288	4.639E-05	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.810E-05	0.0019
U-238	5.085E-03	0.0970	7.561E-04	0.0144	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.671E-03	0.0319
Total	3.715E-02	0.7087	3.633E-03	0.0693	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.164E-02	0.2220

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.161E-03	0.0794
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	3.561E-03	0.0679
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	2.570E-02	0.4901
Ra-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	1.701E-03	0.0324
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	1.770E-03	0.0338
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	2.965E-03	0.0566
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.909E-04	0.0151
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.619E-03	0.0500
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.652E-03	0.0315
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.512E-03	0.1433
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	5.243E-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+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.
Ac-227	1.098E-03	0.0217	6.983E-04	0.0138	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.492E-03	0.0295
Pb-210	1.304E-05	0.0003	9.311E-06	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.835E-03	0.0561
Ra-226	2.468E-02	0.4881	6.372E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.376E-03	0.0272
Ra-228	9.670E-04	0.0191	4.447E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.291E-05	0.0005
Th-228	1.372E-04	0.0027	8.892E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.021E-06	0.0000
Th-230	8.398E-04	0.0166	1.012E-03	0.0200	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.684E-03	0.0333
Th-232	1.763E-03	0.0349	6.065E-05	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.351E-04	0.0027
U-234	1.377E-05	0.0003	8.414E-04	0.0166	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.751E-03	0.0346
U-235	1.501E-03	0.0297	4.630E-05	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.834E-05	0.0019
U-238	5.059E-03	0.1001	7.523E-04	0.0149	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.663E-03	0.0329
Total	3.607E-02	0.7134	3.432E-03	0.0679	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.106E-02	0.2187

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.288E-03	0.0650
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	2.858E-03	0.0565
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	2.606E-02	0.5154
Ra-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	9.943E-04	0.0197
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	1.401E-04	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	3.535E-03	0.0699
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.959E-03	0.0387
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.606E-03	0.0516
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.645E-03	0.0325
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.474E-03	0.1478
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	5.056E-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+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.
Ac-227	5.607E-04	0.0113	3.566E-04	0.0072	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.618E-04	0.0154
Pb-210	6.953E-06	0.0001	4.965E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.512E-03	0.0305
Ra-226	2.422E-02	0.4891	9.504E-06	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.341E-03	0.0473
Ra-228	9.107E-05	0.0018	4.286E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.111E-06	0.0000
Th-228	9.781E-08	0.0000	6.338E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.441E-09	0.0000
Th-230	2.379E-03	0.0480	1.012E-03	0.0204	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.804E-03	0.0364
Th-232	2.674E-03	0.0540	6.490E-05	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.564E-04	0.0032
U-234	1.417E-05	0.0003	8.298E-04	0.0168	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.727E-03	0.0349
U-235	1.480E-03	0.0299	4.634E-05	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.960E-05	0.0020
U-238	4.987E-03	0.1007	7.417E-04	0.0150	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.639E-03	0.0331
Total	3.641E-02	0.7353	3.066E-03	0.0619	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.004E-02	0.2028

Total Dose Contributions TDDSE(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.679E-03	0.0339
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	1.524E-03	0.0308
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	2.657E-02	0.5365
Ra-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	9.361E-05	0.0019
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	9.989E-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	5.195E-03	0.1049
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.895E-03	0.0585
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.571E-03	0.0519
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.626E-03	0.0328
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.368E-03	0.1488
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	4.952E-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+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.
Ac-227	5.334E-05	0.0010	3.392E-05	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.248E-05	0.0014
Pb-210	7.698E-07	0.0000	5.496E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.674E-04	0.0033
Ra-226	2.267E-02	0.4428	1.209E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.163E-03	0.0618
Ra-228	1.903E-08	0.0000	8.954E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.409E-10	0.0000
Th-228	9.457E-19	0.0000	6.127E-21	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.393E-20	0.0000
Th-230	7.542E-03	0.1473	1.014E-03	0.0198	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.448E-03	0.0478
Th-232	2.765E-03	0.0540	6.532E-05	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.585E-04	0.0031
U-234	1.985E-05	0.0004	7.905E-04	0.0154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.645E-03	0.0321
U-235	1.413E-03	0.0276	4.764E-05	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.063E-04	0.0021
U-238	4.744E-03	0.0927	7.056E-04	0.0138	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.559E-03	0.0305
Total	3.921E-02	0.7658	2.670E-03	0.0521	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.320E-03	0.1820

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.597E-04	0.0031
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	1.687E-04	0.0033
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	2.585E-02	0.5048
Ra-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	1.956E-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	9.657E-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	1.100E-02	0.2149
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.988E-03	0.0584
U-234	0.000E+00	0.0000	0.000E+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-03	0.0480
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.567E-03	0.0306
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.009E-03	0.1369
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	5.120E-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.
Ac-227	6.426E-08	0.0000	4.087E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.732E-08	0.0000
Pb-210	1.430E-09	0.0000	1.021E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.110E-07	0.0000
Ra-226	1.877E-02	0.3126	1.036E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.727E-03	0.0454
Ra-228	5.812E-19	0.0000	2.735E-21	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.347E-20	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	2.053E-02	0.3419	1.019E-03	0.0170	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.319E-03	0.0719
Th-232	2.764E-03	0.0460	6.532E-05	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.585E-04	0.0026
U-234	6.715E-05	0.0011	6.883E-04	0.0115	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.437E-03	0.0239
U-235	1.239E-03	0.0206	5.125E-05	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.231E-04	0.0021
U-238	4.112E-03	0.0685	6.120E-04	0.0102	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.353E-03	0.0225
Total	4.748E-02	0.7908	2.447E-03	0.0407	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.012E-02	0.1685

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.925E-07	0.0000
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	3.134E-07	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	2.151E-02	0.3582
Ra-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	5.974E-19	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	2.587E-02	0.4308
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.988E-03	0.0498
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.192E-03	0.0365
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.414E-03	0.0235
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.077E-03	0.1012
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	6.004E-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.
Ac-227	3.902E-18	0.0000	2.481E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.302E-18	0.0000
Pb-210	3.955E-19	0.0000	2.824E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.599E-17	0.0000
Ra-226	9.690E-03	0.1199	5.350E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.408E-03	0.0174
Ra-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-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	5.055E-02	0.6256	1.029E-03	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.671E-03	0.1073
Th-232	2.763E-03	0.0342	6.529E-05	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.584E-04	0.0020
U-234	4.346E-04	0.0054	4.270E-04	0.0053	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.405E-04	0.0116
U-235	7.817E-04	0.0097	5.211E-05	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.400E-04	0.0017
U-238	2.494E-03	0.0309	3.719E-04	0.0046	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.219E-04	0.0102
Total	6.672E-02	0.8256	1.951E-03	0.0241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E-02	0.1502

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.168E-17	0.0000
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	8.666E-17	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	1.110E-02	0.1374
Ra-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-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	6.025E-02	0.7456
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.987E-03	0.0370
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.802E-03	0.0223
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.738E-04	0.0121
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.688E-03	0.0456
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	8.081E-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

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
Ac-227+D	Ac-227+D	1.000E+00	5.113E-02	4.944E-02	4.623E-02	3.654E-02	1.866E-02	1.775E-03	2.138E-06	1.298E-16
Pb-210+D	Pb-210+D	1.000E+00	1.151E-02	1.115E-02	1.047E-02	8.405E-03	4.482E-03	4.962E-04	9.219E-07	2.549E-16
Ra-226+D	Ra-226+D	1.000E+00	9.791E-02	9.782E-02	9.763E-02	9.699E-02	9.517E-02	8.908E-02	7.375E-02	3.807E-02
Ra-226+D	Pb-210+D	1.000E+00	1.798E-04	5.316E-04	1.202E-03	3.233E-03	7.011E-03	1.033E-02	8.971E-03	4.632E-03
Ra-226+D	ΣDSR (j)		9.809E-02	9.835E-02	9.883E-02	1.002E-01	1.022E-01	9.942E-02	8.272E-02	4.270E-02
Ra-228+D	Ra-228+D	1.000E+00	5.047E-02	4.472E-02	3.510E-02	1.504E-02	1.336E-03	2.790E-07	8.522E-18	0.000E+00
Ra-228+D	Th-228+D	1.000E+00	1.382E-02	3.363E-02	4.995E-02	3.467E-02	3.345E-03	6.988E-07	2.135E-17	0.000E+00
Ra-228+D	ΣDSR (j)		6.430E-02	7.835E-02	8.506E-02	4.972E-02	4.681E-03	9.778E-07	2.987E-17	0.000E+00
Th-228+D	Th-228+D	1.000E+00	7.499E-02	5.220E-02	2.529E-02	2.002E-03	1.427E-06	1.380E-17	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	1.420E-03	1.420E-03	1.420E-03	1.419E-03	1.419E-03	1.418E-03	1.416E-03	1.406E-03
Th-230	Ra-226+D	1.000E+00	2.121E-05	6.361E-05	1.483E-04	4.434E-04	1.276E-03	4.067E-03	1.109E-02	2.731E-02
Th-230	Pb-210+D	1.000E+00	2.603E-08	1.805E-07	9.347E-07	7.776E-06	5.395E-05	3.376E-04	1.185E-03	3.160E-03
Th-230	ΣDSR (j)		1.441E-03	1.483E-03	1.569E-03	1.871E-03	2.749E-03	5.823E-03	1.369E-02	3.188E-02
Th-232	Th-232	1.000E+00	7.050E-03	7.050E-03	7.050E-03	7.050E-03	7.050E-03	7.050E-03	7.049E-03	7.046E-03
Th-232	Ra-226+D	1.000E+00	3.104E-03	0.034E-03	1.041E-02	3.838E-02	5.203E-02	5.336E-02	5.335E-02	5.333E-02
Th-232	Th-228+D	1.000E+00	5.779E-04	3.545E-03	1.409E-02	5.249E-02	8.568E-02	8.901E-02	8.900E-02	8.896E-02
Th-232	ΣDSR (j)		1.073E-02	1.943E-02	3.955E-02	9.793E-02	1.448E-01	1.494E-01	1.494E-01	1.493E-01
U-234	U-234	1.000E+00	6.713E-04	6.708E-04	6.698E-04	6.665E-04	6.570E-04	6.248E-04	5.413E-04	3.275E-04
U-234	Th-230	1.000E+00	6.388E-09	1.916E-08	4.467E-08	1.337E-07	3.855E-07	1.239E-06	3.449E-06	9.074E-06
U-234	Ra-226+D	1.000E+00	6.364E-11	4.453E-10	2.351E-09	2.095E-08	1.747E-07	1.824E-06	1.461E-05	1.117E-04
U-234	Pb-210+D	1.000E+00	5.867E-14	8.738E-13	1.004E-11	2.517E-10	5.291E-09	1.214E-07	1.418E-06	1.257E-05
U-234	ΣDSR (j)		6.713E-04	6.708E-04	6.699E-04	6.666E-04	6.575E-04	6.280E-04	5.607E-04	4.609E-04
U-235+D	U-235+D	1.000E+00	7.198E-03	7.193E-03	7.182E-03	7.147E-03	7.045E-03	6.701E-03	5.809E-03	3.522E-03
U-235+D	Pa-231	1.000E+00	2.183E-07	6.544E-07	1.525E-06	4.551E-06	1.303E-05	4.081E-05	1.055E-04	2.115E-04
U-235+D	Ac-227+D	1.000E+00	5.786E-09	4.010E-08	2.073E-07	1.714E-06	1.171E-05	7.051E-05	2.313E-04	5.001E-04
U-235+D	ΣDSR (j)		7.198E-03	7.193E-03	7.184E-03	7.153E-03	7.070E-03	6.813E-03	6.146E-03	4.234E-03
U-238	U-238	5.400E-05	3.246E-08	3.243E-08	3.239E-08	3.223E-08	3.177E-08	3.022E-08	2.619E-08	1.588E-08
U-238+D	U-238+D	9.999E-01	1.925E-03	1.924E-03	1.921E-03	1.911E-03	1.884E-03	1.792E-03	1.554E-03	9.421E-04
U-238+D	U-234	9.999E-01	9.513E-10	2.852E-09	6.646E-09	1.984E-08	5.680E-08	1.780E-07	4.613E-07	9.303E-07
U-238+D	Th-230	9.999E-01	6.036E-15	4.223E-14	2.230E-13	1.988E-12	1.661E-11	1.743E-10	1.417E-09	1.137E-08
U-238+D	Ra-226+D	9.999E-01	4.510E-17	6.762E-16	7.879E-15	2.081E-13	5.030E-12	1.726E-10	4.098E-09	1.008E-07
U-238+D	Pb-210+D	9.999E-01	3.330E-20	1.026E-18	2.553E-17	1.906E-15	1.192E-13	9.637E-12	3.641E-10	1.101E-08
U-238+D	ΣDSR (j)		1.925E-03	1.924E-03	1.921E-03	1.912E-03	1.884E-03	1.793E-03	1.554E-03	9.431E-04

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Nuclide	(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
Ac-227		4.889E+02	5.056E+02	5.408E+02	6.842E+02	1.340E+03	1.409E+04	1.169E+07	*7.232E+13
Pb-210		2.172E+03	2.241E+03	2.387E+03	2.974E+03	5.578E+03	5.039E+04	2.712E+07	*7.634E+13
Ra-226		2.549E+02	2.542E+02	2.529E+02	2.494E+02	2.447E+02	2.515E+02	3.022E+02	5.854E+02
Ra-228		3.888E+02	3.191E+02	2.939E+02	5.029E+02	5.341E+03	2.557E+07	*2.726E+14	*2.726E+14
Th-228		3.334E+02	4.790E+02	9.886E+02	1.249E+04	1.752E+07	*8.195E+14	*8.195E+14	*8.195E+14
Th-230		1.735E+04	1.685E+04	1.594E+04	1.336E+04	9.095E+03	4.294E+03	1.827E+03	7.842E+02
Th-232		2.330E+03	1.287E+03	6.322E+02	2.553E+02	1.727E+02	1.673E+02	1.673E+02	1.674E+02
U-234		3.724E+04	3.727E+04	3.732E+04	3.750E+04	3.802E+04	3.981E+04	4.458E+04	5.424E+04
U-235		3.473E+03	3.475E+03	3.480E+03	3.495E+03	3.536E+03	3.670E+03	4.068E+03	5.905E+03
U-238		1.299E+04	1.299E+04	1.301E+04	1.308E+04	1.327E+04	1.395E+04	1.609E+04	2.651E+04

*At specific activity limit

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 = 1.000E+03 years

Nuclide	Initial	tmin	DSR(i,tmin)	G(i,tmin)	DSR(i,tmax)	G(i,tmax)
(i)	(pCi/g)	(years)		(pCi/g)		(pCi/g)
Ac-227	9.000E-02	0.000E+00	5.113E-02	4.889E+02	1.298E-16	*7.232E+13
Pb-210	3.400E-01	0.000E+00	1.151E-02	2.172E+03	2.549E-16	*7.634E+13
Ra-226	2.600E-01	41.57 ± 0.08	1.024E-01	2.441E+02	4.270E-02	5.854E+02
Ra-228	2.000E-02	2.674 ± 0.005	8.525E-02	2.933E+02	0.000E+00	*2.726E+14
Th-228	7.000E-02	0.000E+00	7.499E-02	3.334E+02	0.000E+00	*8.195E+14
Th-230	1.890E+00	1.000E+03	3.188E-02	7.842E+02	3.188E-02	7.842E+02
Th-232	2.000E-02	102.8 ± 0.2	1.494E-01	1.673E+02	1.493E-01	1.674E+02
U-234	3.910E+00	0.000E+00	6.713E-04	3.724E+04	4.609E-04	5.424E+04
U-235	2.300E-01	0.000E+00	7.198E-03	3.473E+03	4.234E-03	5.905E+03
U-238	3.910E+00	0.000E+00	1.925E-03	1.299E+04	9.431E-04	2.651E+04

*At specific activity limit

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr								
			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
Ac-227	Ac-227	1.000E+00		4.602E-03	4.450E-03	4.161E-03	3.288E-03	1.679E-03	1.597E-04	1.925E-07	1.168E-17
Ac-227	U-235	1.000E+00		1.331E-09	9.224E-09	4.768E-08	3.943E-07	2.694E-06	1.622E-05	5.321E-05	1.150E-04
Ac-227	ΣDOSE(j)			4.602E-03	4.450E-03	4.161E-03	3.289E-03	1.682E-03	1.760E-04	5.340E-05	1.150E-04
Pb-210	Pb-210	1.000E+00		3.914E-03	3.792E-03	3.561E-03	2.858E-03	1.524E-03	1.687E-04	3.134E-07	8.666E-17
Pb-210	Ra-226	1.000E+00		4.674E-05	1.382E-04	3.125E-04	8.405E-04	1.823E-03	2.686E-03	2.333E-03	1.204E-03
Pb-210	Th-230	1.000E+00		4.920E-08	3.412E-07	1.767E-06	1.470E-05	1.020E-04	6.381E-04	2.239E-03	5.973E-03
Pb-210	U-234	1.000E+00		2.294E-13	3.417E-12	3.924E-11	9.841E-10	2.069E-08	4.747E-07	5.543E-06	4.914E-05
Pb-210	U-238	9.999E-01		1.302E-19	4.013E-18	9.980E-17	7.453E-15	4.662E-13	3.768E-11	1.424E-09	4.305E-08
Pb-210	ΣDOSE(j)			3.960E-03	3.931E-03	3.876E-03	3.713E-03	3.449E-03	3.494E-03	4.578E-03	7.226E-03
Ra-226	Ra-226	1.000E+00		2.546E-02	2.543E-02	2.538E-02	2.522E-02	2.475E-02	2.316E-02	1.917E-02	9.899E-03
Ra-226	Th-230	1.000E+00		4.009E-05	1.202E-04	2.802E-04	8.379E-04	2.411E-03	7.686E-03	2.095E-02	5.162E-02
Ra-226	U-234	1.000E+00		2.488E-10	1.741E-09	9.193E-09	8.192E-08	6.831E-07	7.134E-06	5.714E-05	4.369E-04
Ra-226	U-238	9.999E-01		1.763E-16	2.644E-15	3.081E-14	8.137E-13	1.967E-11	6.747E-10	1.602E-08	3.941E-07
Ra-226	ΣDOSE(j)			2.550E-02	2.555E-02	2.566E-02	2.606E-02	2.716E-02	3.086E-02	4.018E-02	6.196E-02
Ra-228	Ra-228	1.000E+00		1.009E-03	8.944E-04	7.020E-04	3.008E-04	2.672E-05	5.579E-09	1.704E-19	0.000E+00
Ra-228	Th-232	1.000E+00		6.207E-05	1.767E-04	3.682E-04	7.677E-04	1.041E-03	1.067E-03	1.067E-03	1.067E-03
Ra-228	ΣDOSE(j)			1.072E-03	1.071E-03	1.070E-03	1.069E-03	1.067E-03	1.067E-03	1.067E-03	1.067E-03
Th-228	Ra-228	1.000E+00		2.765E-04	6.727E-04	9.991E-04	6.935E-04	6.689E-05	1.398E-08	4.269E-19	0.000E+00
Th-228	Th-228	1.000E+00		5.249E-03	3.654E-03	1.770E-03	1.401E-04	9.989E-08	9.657E-19	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00		1.156E-05	7.090E-05	2.817E-04	1.050E-03	1.714E-03	1.780E-03	1.780E-03	1.779E-03
Th-228	ΣDOSE(j)			5.537E-03	4.397E-03	3.051E-03	1.883E-03	1.781E-03	1.780E-03	1.780E-03	1.779E-03
Th-230	Th-230	1.000E+00		2.683E-03	2.683E-03	2.683E-03	2.683E-03	2.682E-03	2.681E-03	2.675E-03	2.657E-03
Th-230	U-234	1.000E+00		2.498E-08	7.491E-08	1.747E-07	5.227E-07	1.507E-06	4.843E-06	1.349E-05	3.548E-05
Th-230	U-238	9.999E-01		2.360E-14	1.651E-13	8.720E-13	7.775E-12	6.493E-11	6.817E-10	5.542E-09	4.446E-08
Th-230	ΣDOSE(j)			2.683E-03	2.683E-03	2.683E-03	2.683E-03	2.684E-03	2.685E-03	2.689E-03	2.693E-03
Th-232	Th-232	1.000E+00		1.410E-04	1.410E-04	1.410E-04	1.410E-04	1.410E-04	1.410E-04	1.410E-04	1.409E-04
U-234	U-234	1.000E+00		2.625E-03	2.623E-03	2.619E-03	2.606E-03	2.569E-03	2.443E-03	2.116E-03	1.281E-03
U-234	U-238	9.999E-01		3.720E-09	1.115E-08	2.598E-08	7.757E-08	2.221E-07	6.961E-07	1.804E-06	3.637E-06
U-234	ΣDOSE(j)			2.625E-03	2.623E-03	2.619E-03	2.606E-03	2.569E-03	2.444E-03	2.118E-03	1.284E-03
U-235	U-235	1.000E+00		1.655E-03	1.654E-03	1.652E-03	1.644E-03	1.620E-03	1.541E-03	1.336E-03	8.101E-04
Pa-231	U-235	1.000E+00		5.021E-08	1.505E-07	3.507E-07	1.047E-06	2.997E-06	9.386E-06	2.428E-05	4.865E-05
U-238	U-238	5.400E-05		1.269E-07	1.268E-07	1.266E-07	1.260E-07	1.242E-07	1.182E-07	1.024E-07	6.210E-08
U-238	U-238	9.999E-01		7.528E-03	7.522E-03	7.511E-03	7.474E-03	7.368E-03	7.008E-03	6.075E-03	3.684E-03
U-238	ΣDOSE(j)			7.528E-03	7.522E-03	7.512E-03	7.474E-03	7.368E-03	7.008E-03	6.075E-03	3.684E-03

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g							
			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
Ac-227	Ac-227	1.000E+00	9.000E-02	8.703E-02	8.137E-02	6.431E-02	3.284E-02	3.124E-03	3.764E-06	2.285E-16
Ac-227	U-235	1.000E+00	0.000E+00	7.656E-08	6.733E-07	6.912E-06	5.038E-05	3.099E-04	1.022E-03	2.212E-03
Ac-227	ΣS(j):		9.000E-02	8.703E-02	8.137E-02	6.432E-02	3.289E-02	3.434E-03	1.026E-03	2.212E-03
Pb-210	Pb-210	1.000E+00	3.400E-01	3.295E-01	3.094E-01	2.483E-01	1.324E-01	1.466E-02	2.723E-05	7.529E-15
Pb-210	Ra-226	1.000E+00	0.000E+00	7.952E-03	2.310E-02	6.900E-02	1.544E-01	2.297E-01	1.996E-01	1.030E-01
Pb-210	Th-230	1.000E+00	0.000E+00	1.259E-05	1.109E-04	1.145E-03	8.476E-03	5.421E-02	1.912E-01	5.107E-01
Pb-210	U-234	1.000E+00	0.000E+00	7.834E-11	2.081E-09	7.284E-08	1.689E-06	4.011E-05	4.725E-04	4.199E-03
Pb-210	U-238	9.999E-01	0.000E+00	5.561E-17	4.444E-15	5.239E-13	3.742E-11	3.166E-09	1.211E-07	3.677E-06
Pb-210	ΣS(j):		3.400E-01	3.374E-01	3.326E-01	3.184E-01	2.953E-01	2.986E-01	3.913E-01	6.179E-01
Ra-226	Ra-226	1.000E+00	2.600E-01	2.598E-01	2.593E-01	2.576E-01	2.527E-01	2.366E-01	1.958E-01	1.011E-01
Ra-226	Th-230	1.000E+00	0.000E+00	8.184E-04	2.453E-03	8.149E-03	2.422E-02	7.809E-02	2.136E-01	5.268E-01
Ra-226	U-234	1.000E+00	0.000E+00	7.620E-09	6.850E-08	7.582E-07	6.748E-06	7.212E-05	5.816E-04	4.457E-03
Ra-226	U-238	9.999E-01	0.000E+00	7.200E-15	1.942E-13	7.161E-12	1.911E-10	6.788E-09	1.628E-07	4.018E-06
Ra-226	ΣS(j):		2.600E-01	2.606E-01	2.617E-01	2.657E-01	2.770E-01	3.147E-01	4.100E-01	6.324E-01
Ra-228	Ra-228	1.000E+00	2.000E-02	1.772E-02	1.391E-02	5.960E-03	5.294E-04	1.105E-07	3.377E-18	0.000E+00
Ra-228	Th-232	1.000E+00	0.000E+00	2.271E-03	6.065E-03	1.398E-02	1.939E-02	1.991E-02	1.991E-02	1.990E-02
Ra-228	ΣS(j):		2.000E-02	1.999E-02	1.997E-02	1.994E-02	1.992E-02	1.991E-02	1.991E-02	1.990E-02
Th-228	Ra-228	1.000E+00	0.000E+00	5.704E-03	1.076E-02	8.149E-03	7.945E-04	1.660E-07	5.071E-18	0.000E+00
Th-228	Th-228	1.000E+00	7.000E-02	4.872E-02	2.361E-02	1.869E-03	1.332E-06	1.288E-17	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	0.000E+00	3.728E-04	2.485E-03	1.127E-02	1.912E-02	1.991E-02	1.991E-02	1.990E-02
Th-228	ΣS(j):		7.000E-02	5.480E-02	3.685E-02	2.129E-02	1.992E-02	1.991E-02	1.991E-02	1.990E-02
Th-230	Th-230	1.000E+00	1.890E+00	1.890E+00	1.890E+00	1.890E+00	1.889E+00	1.888E+00	1.885E+00	1.872E+00
Th-230	U-234	1.000E+00	0.000E+00	3.518E-05	1.055E-04	3.507E-04	1.044E-03	3.395E-03	9.486E-03	2.498E-02
Th-230	U-238	9.999E-01	0.000E+00	4.987E-11	4.484E-10	4.965E-09	4.426E-08	4.755E-07	3.892E-06	3.130E-05
Th-230	ΣS(j):		1.890E+00	1.890E+00	1.890E+00	1.890E+00	1.891E+00	1.892E+00	1.894E+00	1.897E+00
Th-232	Th-232	1.000E+00	2.000E-02	2.000E-02	2.000E-02	2.000E-02	2.000E-02	2.000E-02	2.000E-02	1.999E-02
U-234	U-234	1.000E+00	3.910E+00	3.907E+00	3.902E+00	3.882E+00	3.827E+00	3.639E+00	3.153E+00	1.908E+00
U-234	U-238	9.999E-01	0.000E+00	1.108E-05	3.318E-05	1.100E-04	3.255E-04	1.032E-03	2.682E-03	5.416E-03
U-234	ΣS(j):		3.910E+00	3.907E+00	3.902E+00	3.882E+00	3.827E+00	3.640E+00	3.155E+00	1.913E+00
U-235	U-235	1.000E+00	2.300E-01	2.298E-01	2.295E-01	2.284E-01	2.251E-01	2.141E-01	1.856E-01	1.125E-01
Pa-231	U-235	1.000E+00	0.000E+00	4.863E-06	1.457E-05	4.831E-05	1.429E-04	4.526E-04	1.174E-03	2.356E-03
U-238	U-238	5.400E-05	2.111E-04	2.110E-04	2.107E-04	2.096E-04	2.067E-04	1.966E-04	1.704E-04	1.033E-04
U-238	U-238	9.999E-01	3.910E+00	3.907E+00	3.901E+00	3.882E+00	3.827E+00	3.640E+00	3.155E+00	1.913E+00
U-238	ΣS(j):		3.910E+00	3.907E+00	3.902E+00	3.882E+00	3.827E+00	3.640E+00	3.155E+00	1.913E+00

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 2.60 seconds

EXCESS CANCER RISK: All Nuclides Summed, All Pathways Summed

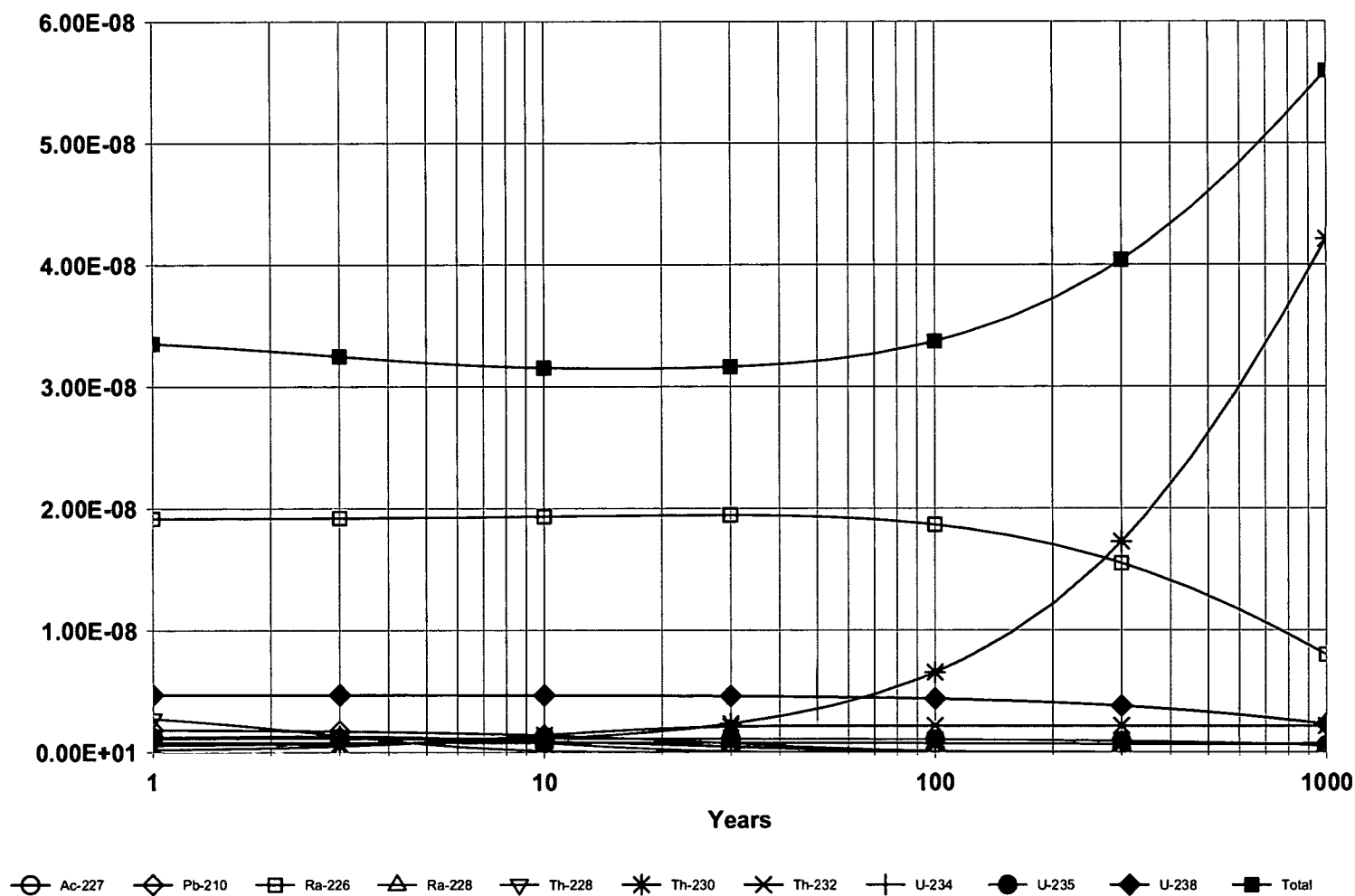


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Time= 0.000E+00	5
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Time= 3.000E+00	13
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Time= 3.000E+01	21
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Time= 3.000E+02	29
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Cancer Risk Slope Factors Summary Table
 Risk Library: FGR 13 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Ac-227+D	1.47E-06	3.48E-10	SLPF(1,1)
Sf-1	Pa-231	1.39E-07	1.39E-07	SLPF(2,1)
Sf-1	Pb-210+D	4.21E-09	1.41E-09	SLPF(3,1)
Sf-1	Ra-226+D	8.49E-06	2.29E-08	SLPF(4,1)
Sf-1	Ra-228+D	4.53E-06	0.00E+00	SLPF(5,1)
Sf-1	Th-228+D	7.76E-06	5.59E-09	SLPF(6,1)
Sf-1	Th-230	8.19E-10	8.19E-10	SLPF(7,1)
Sf-1	Th-232	3.42E-10	3.42E-10	SLPF(8,1)
Sf-1	U-234	2.52E-10	2.52E-10	SLPF(9,1)
Sf-1	U-235+D	5.43E-07	5.18E-07	SLPF(10,1)
Sf-1	U-238	4.99E-11	4.99E-11	SLPF(11,1)
Sf-1	U-238+D	1.14E-07	4.99E-11	SLPF(12,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Ac-227+D	2.13E-07	1.49E-07	SLPF(1,2)
Sf-2	Pa-231	7.62E-08	7.62E-08	SLPF(2,2)
Sf-2	Pb-210+D	3.08E-08	1.58E-08	SLPF(3,2)
Sf-2	Ra-226+D	2.83E-08	2.82E-08	SLPF(4,2)
Sf-2	Ra-228+D	4.37E-08	4.37E-08	SLPF(5,2)
Sf-2	Th-228+D	1.44E-07	1.32E-07	SLPF(6,2)
Sf-2	Th-230	3.40E-08	3.40E-08	SLPF(7,2)
Sf-2	Th-232	4.33E-08	4.33E-08	SLPF(8,2)
Sf-2	U-234	2.78E-08	2.78E-08	SLPF(9,2)
Sf-2	U-235+D	2.50E-08	2.50E-08	SLPF(10,2)
Sf-2	U-238	2.36E-08	2.36E-08	SLPF(11,2)
Sf-2	U-238+D	2.36E-08	2.36E-08	SLPF(12,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	6.53E-10	2.45E-10	SLPF(1,3)
Sf-3	Pa-231	2.26E-10	2.26E-10	SLPF(2,3)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(3,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(4,3)
Sf-3	Ra-228+D	1.43E-09	1.43E-09	SLPF(5,3)
Sf-3	Th-228+D	4.22E-10	1.48E-10	SLPF(6,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(7,3)
Sf-3	Th-232	1.33E-10	1.33E-10	SLPF(8,3)
Sf-3	U-234	9.55E-11	9.55E-11	SLPF(9,3)
Sf-3	U-235+D	9.76E-11	9.44E-11	SLPF(10,3)
Sf-3	U-238	8.66E-11	8.66E-11	SLPF(11,3)
Sf-3	U-238+D	1.21E-10	8.66E-11	SLPF(12,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	4.86E-10	2.01E-10	SLPF(1,4)
Sf-3	Pa-231	1.73E-10	1.73E-10	SLPF(2,4)
Sf-3	Pb-210+D	2.66E-09	8.81E-10	SLPF(3,4)
Sf-3	Ra-226+D	3.86E-10	3.85E-10	SLPF(4,4)
Sf-3	Ra-228+D	1.04E-09	1.04E-09	SLPF(5,4)
Sf-3	Th-228+D	2.99E-10	1.07E-10	SLPF(6,4)
Sf-3	Th-230	9.10E-11	9.10E-11	SLPF(7,4)
Sf-3	Th-232	1.01E-10	1.01E-10	SLPF(8,4)

Cancer Risk Slope Factors Summary Table (continued)
 Risk Library: FGR 13 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-3	U-234	7.07E-11	7.07E-11	SLPF(9,4)
Sf-3	U-235+D	7.18E-11	6.96E-11	SLPF(10,4)
Sf-3	U-238	6.40E-11	6.40E-11	SLPF(11,4)
Sf-3	U-238+D	8.71E-11	6.40E-11	SLPF(12,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	6.53E-10	2.45E-10	SLPF(1,5)
Sf-3	Pa-231	2.26E-10	2.26E-10	SLPF(2,5)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(3,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(4,5)
Sf-3	Ra-228+D	1.43E-09	1.43E-09	SLPF(5,5)
Sf-3	Th-228+D	4.22E-10	1.48E-10	SLPF(6,5)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(7,5)
Sf-3	Th-232	1.33E-10	1.33E-10	SLPF(8,5)
Sf-3	U-234	9.55E-11	9.55E-11	SLPF(9,5)
Sf-3	U-235+D	9.76E-11	9.44E-11	SLPF(10,5)
Sf-3	U-238	8.66E-11	8.66E-11	SLPF(11,5)
Sf-3	U-238+D	1.21E-10	8.66E-11	SLPF(12,5)
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	7.60E+02	7.60E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	5.70E+02	5.70E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.50E+02	1.50E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	2.50E+02	2.50E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

Nuclide (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
Ac-227	3.480E-10	8.716E-03	8.716E-03	8.716E-03	8.716E-03	8.716E-03	8.716E-03	8.716E-03	8.716E-03
Ac-228	4.530E-06	8.579E-03	8.579E-03	8.579E-03	8.579E-03	8.579E-03	8.579E-03	8.579E-03	8.579E-03
At-218	3.570E-09	8.837E-03	8.837E-03	8.837E-03	8.837E-03	8.837E-03	8.837E-03	8.837E-03	8.837E-03
Bi-210	2.760E-09	8.610E-03	8.610E-03	8.610E-03	8.610E-03	8.610E-03	8.610E-03	8.610E-03	8.610E-03
Bi-211	1.880E-07	8.613E-03	8.613E-03	8.613E-03	8.613E-03	8.613E-03	8.613E-03	8.613E-03	8.613E-03
Bi-212	8.870E-07	8.543E-03	8.543E-03	8.543E-03	8.543E-03	8.543E-03	8.543E-03	8.543E-03	8.543E-03
Bi-214	7.480E-06	8.565E-03	8.565E-03	8.565E-03	8.565E-03	8.565E-03	8.565E-03	8.565E-03	8.565E-03
Fr-223	1.400E-07	8.657E-03	8.657E-03	8.657E-03	8.657E-03	8.657E-03	8.657E-03	8.657E-03	8.657E-03
Pa-231	1.390E-07	8.615E-03	8.615E-03	8.615E-03	8.615E-03	8.615E-03	8.615E-03	8.615E-03	8.615E-03
Pa-234	8.710E-06	8.565E-03	8.565E-03	8.565E-03	8.565E-03	8.565E-03	8.565E-03	8.565E-03	8.565E-03
Pa-234m	6.870E-08	8.558E-03	8.558E-03	8.558E-03	8.558E-03	8.558E-03	8.558E-03	8.558E-03	8.558E-03
Pb-210	1.410E-09	8.935E-03	8.935E-03	8.935E-03	8.935E-03	8.935E-03	8.935E-03	8.935E-03	8.935E-03
Pb-211	2.290E-07	8.564E-03	8.564E-03	8.564E-03	8.564E-03	8.564E-03	8.564E-03	8.564E-03	8.564E-03
Pb-212	5.090E-07	8.669E-03	8.669E-03	8.669E-03	8.669E-03	8.669E-03	8.669E-03	8.669E-03	8.669E-03
Pb-214	9.820E-07	8.607E-03	8.607E-03	8.607E-03	8.607E-03	8.607E-03	8.607E-03	8.607E-03	8.607E-03
Po-210	3.950E-11	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03
Po-211	3.580E-08	8.529E-03	8.529E-03	8.529E-03	8.529E-03	8.529E-03	8.529E-03	8.529E-03	8.529E-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	3.860E-10	8.529E-03	8.529E-03	8.529E-03	8.529E-03	8.529E-03	8.529E-03	8.529E-03	8.529E-03
Po-215	7.480E-10	8.575E-03	8.575E-03	8.575E-03	8.575E-03	8.575E-03	8.575E-03	8.575E-03	8.575E-03
Po-216	7.870E-11	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03
Po-218	4.260E-11	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03	8.556E-03
Ra-223	4.340E-07	8.652E-03	8.652E-03	8.652E-03	8.652E-03	8.652E-03	8.652E-03	8.652E-03	8.652E-03
Ra-224	3.720E-08	8.656E-03	8.656E-03	8.656E-03	8.656E-03	8.656E-03	8.656E-03	8.656E-03	8.656E-03
Ra-226	2.290E-08	8.676E-03	8.676E-03	8.676E-03	8.676E-03	8.676E-03	8.676E-03	8.676E-03	8.676E-03
Ra-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
Rn-219	2.250E-07	8.612E-03	8.612E-03	8.612E-03	8.612E-03	8.612E-03	8.612E-03	8.612E-03	8.612E-03
Rn-220	1.700E-09	8.539E-03	8.539E-03	8.539E-03	8.539E-03	8.539E-03	8.539E-03	8.539E-03	8.539E-03
Rn-222	1.740E-09	8.539E-03	8.539E-03	8.539E-03	8.539E-03	8.539E-03	8.539E-03	8.539E-03	8.539E-03
Th-227	3.780E-07	8.663E-03	8.663E-03	8.663E-03	8.663E-03	8.663E-03	8.663E-03	8.663E-03	8.663E-03
Th-228	5.590E-09	8.701E-03	8.701E-03	8.701E-03	8.701E-03	8.701E-03	8.701E-03	8.701E-03	8.701E-03
Th-230	8.190E-10	8.734E-03	8.734E-03	8.734E-03	8.734E-03	8.734E-03	8.734E-03	8.734E-03	8.734E-03
Th-231	2.450E-08	8.744E-03	8.744E-03	8.744E-03	8.744E-03	8.744E-03	8.744E-03	8.744E-03	8.744E-03
Th-232	3.420E-10	8.778E-03	8.778E-03	8.778E-03	8.778E-03	8.778E-03	8.778E-03	8.778E-03	8.778E-03
Th-234	1.630E-08	8.755E-03	8.755E-03	8.755E-03	8.755E-03	8.755E-03	8.755E-03	8.755E-03	8.755E-03
Tl-207	1.520E-08	8.567E-03	8.567E-03	8.567E-03	8.567E-03	8.567E-03	8.567E-03	8.567E-03	8.567E-03
Tl-208	1.760E-05	8.587E-03	8.587E-03	8.587E-03	8.587E-03	8.587E-03	8.587E-03	8.587E-03	8.587E-03
Tl-210	0.000E+00	9.100E-03	9.100E-03	9.100E-03	9.100E-03	9.100E-03	9.100E-03	9.100E-03	9.100E-03
U-234	2.520E-10	8.783E-03	8.783E-03	8.783E-03	8.783E-03	8.783E-03	8.783E-03	8.783E-03	8.783E-03
U-235	5.180E-07	8.673E-03	8.673E-03	8.673E-03	8.673E-03	8.673E-03	8.673E-03	8.673E-03	8.673E-03
U-238	4.990E-11	9.022E-03	9.022E-03	9.022E-03	9.022E-03	9.022E-03	9.022E-03	9.022E-03	9.022E-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	
Ac-227	1.478E-04	0.000E+00	0.000E+00	0.000E+00	1.435E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.435E-01
Pa-231	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
Pb-210	5.584E-04	0.000E+00	0.000E+00	0.000E+00	5.421E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.421E-01
Ra-226	4.270E-04	0.000E+00	0.000E+00	0.000E+00	4.145E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.145E-01
Ra-228	3.285E-05	0.000E+00	0.000E+00	0.000E+00	3.189E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.189E-02
Th-228	1.150E-04	0.000E+00	0.000E+00	0.000E+00	1.116E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.116E-01
Th-230	3.104E-03	0.000E+00	0.000E+00	0.000E+00	3.013E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.013E+00
Th-232	3.285E-05	0.000E+00	0.000E+00	0.000E+00	3.189E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.189E-02
U-234	6.421E-03	0.000E+00	0.000E+00	0.000E+00	6.234E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.234E+00
U-235	3.777E-04	0.000E+00	0.000E+00	0.000E+00	3.667E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.667E-01
U-238	6.421E-03	0.000E+00	0.000E+00	0.000E+00	6.234E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.234E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.120E-09	0.0326	3.094E-11	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.214E-11	0.0027
Pa-231	2.912E-15	0.0000	3.043E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.763E-16	0.0000
Pb-210	1.243E-11	0.0004	1.711E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.859E-09	0.0540
Ra-226	1.893E-08	0.5502	1.208E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.136E-10	0.0062
Ra-228	7.771E-10	0.0226	1.437E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.568E-11	0.0013
Th-228	4.130E-09	0.1200	1.465E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.171E-11	0.0012
Th-230	1.352E-11	0.0004	1.055E-10	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.586E-10	0.0104
Th-232	6.004E-14	0.0000	1.422E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.241E-12	0.0001
U-234	8.651E-12	0.0003	1.784E-10	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.951E-10	0.0173
U-235	1.082E-09	0.0314	9.440E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.579E-11	0.0010
U-238	3.814E-09	0.1108	1.517E-10	0.0044	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.516E-10	0.0218
Total	2.989E-08	0.8686	5.227E-10	0.0152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.998E-09	0.1162

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+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-09	0.0361
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.093E-15	0.0000
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	1.889E-09	0.0549
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	1.916E-08	0.5567
Ra-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	8.242E-10	0.0240
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	4.187E-09	0.1217
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	4.776E-10	0.0139
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.723E-12	0.0002
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.822E-10	0.0227
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.127E-09	0.0328
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.718E-09	0.1371
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	3.441E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.120E-09	0.0326	3.094E-11	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.214E-11	0.0027
Pb-210	1.228E-11	0.0004	1.691E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.837E-09	0.0534
Ra-226	1.890E-08	0.5493	1.227E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.352E-10	0.0068
Ra-228	9.383E-10	0.0273	2.085E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.512E-11	0.0013
Th-228	3.915E-09	0.1138	1.389E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.955E-11	0.0011
Th-230	4.329E-11	0.0013	1.056E-10	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.589E-10	0.0104
Th-232	5.370E-11	0.0016	1.536E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.974E-12	0.0002
U-234	8.651E-12	0.0003	1.784E-10	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.951E-10	0.0173
U-235	1.082E-09	0.0314	9.441E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.579E-11	0.0010
U-238	3.814E-09	0.1108	1.517E-10	0.0044	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.516E-10	0.0218
Total	2.989E-08	0.8686	5.227E-10	0.0152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.998E-09	0.1162

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+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-09	0.0361
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	1.866E-09	0.0542
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	1.915E-08	0.5565
Ra-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	9.855E-10	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	3.969E-09	0.1153
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	5.078E-10	0.0148
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.221E-11	0.0018
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.822E-10	0.0227
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.127E-09	0.0328
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.718E-09	0.1371
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	3.441E-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	
Ac-227	1.429E-04	0.000E+00	0.000E+00	0.000E+00	1.387E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.387E-01
Pa-231	7.986E-09	0.000E+00	0.000E+00	0.000E+00	7.753E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.753E-06
Pb-210	5.542E-04	0.000E+00	0.000E+00	0.000E+00	5.380E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.380E-01
Ra-226	4.279E-04	0.000E+00	0.000E+00	0.000E+00	4.154E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.154E-01
Ra-228	3.283E-05	0.000E+00	0.000E+00	0.000E+00	3.187E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.187E-02
Th-228	9.000E-05	0.000E+00	0.000E+00	0.000E+00	8.737E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.737E-02
Th-230	3.104E-03	0.000E+00	0.000E+00	0.000E+00	3.013E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.013E+00
Th-232	3.285E-05	0.000E+00	0.000E+00	0.000E+00	3.189E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.189E-02
U-234	6.417E-03	0.000E+00	0.000E+00	0.000E+00	6.229E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.229E+00
U-235	3.775E-04	0.000E+00	0.000E+00	0.000E+00	3.664E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.664E-01
U-238	6.417E-03	0.000E+00	0.000E+00	0.000E+00	6.229E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.229E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.083E-09	0.0323	2.992E-11	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.909E-11	0.0027
Pa-231	8.732E-15	0.0000	9.125E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.627E-15	0.0000
Pb-210	1.234E-11	0.0004	1.698E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.845E-09	0.0550
Ra-226	1.897E-08	0.5658	1.211E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.141E-10	0.0064
Ra-228	7.767E-10	0.0232	1.436E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.566E-11	0.0014
Th-228	3.280E-09	0.0978	1.164E-11	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.313E-11	0.0010
Th-230	1.352E-11	0.0004	1.055E-10	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.586E-10	0.0107
Th-232	6.004E-14	0.0000	1.422E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.241E-12	0.0001
U-234	8.645E-12	0.0003	1.783E-10	0.0053	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.947E-10	0.0177
U-235	1.081E-09	0.0323	9.434E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.577E-11	0.0011
U-238	3.812E-09	0.1137	1.516E-10	0.0045	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.511E-10	0.0224
Total	2.904E-08	0.8661	5.184E-10	0.0155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.972E-09	0.1185

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.202E-09	0.0359
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.227E-14	0.0000
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	1.875E-09	0.0559
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	1.920E-08	0.5726
Ra-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	8.238E-10	0.0246
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	3.325E-09	0.0992
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	4.776E-10	0.0142
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.723E-12	0.0002
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.817E-10	0.0233
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.127E-09	0.0336
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.714E-09	0.1406
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	3.353E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.083E-09	0.0323	2.992E-11	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.909E-11	0.0027
Pb-210	1.190E-11	0.0004	1.638E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.780E-09	0.0531
Ra-226	1.888E-08	0.5632	1.265E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.780E-10	0.0083
Pa-228	1.150E-09	0.0343	2.979E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.319E-11	0.0013
Th-228	2.725E-09	0.0813	9.668E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.753E-11	0.0008
Th-230	1.028E-10	0.0031	1.056E-10	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.597E-10	0.0107
Th-232	1.811E-10	0.0054	1.847E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.231E-11	0.0004
U-234	8.646E-12	0.0003	1.783E-10	0.0053	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.947E-10	0.0177
U-235	1.081E-09	0.0323	9.434E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.577E-11	0.0011
U-238	3.812E-09	0.1137	1.516E-10	0.0045	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.511E-10	0.0224
Total	2.904E-08	0.8661	5.184E-10	0.0155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.972E-09	0.1185

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.202E-09	0.0359
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	1.809E-09	0.0539
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	1.917E-08	0.5719
Ra-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	1.197E-09	0.0357
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	2.763E-09	0.0824
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	5.681E-10	0.0169
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.952E-10	0.0058
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.817E-10	0.0233
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.127E-09	0.0336
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.714E-09	0.1406
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	3.353E-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	
Ac-227	1.336E-04	0.000E+00	0.000E+00	0.000E+00	1.297E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.297E-01
Pa-231	2.392E-08	0.000E+00	0.000E+00	0.000E+00	2.323E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.323E-05
Pb-210	5.462E-04	0.000E+00	0.000E+00	0.000E+00	5.303E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.303E-01
Ra-226	4.298E-04	0.000E+00	0.000E+00	0.000E+00	4.173E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.173E-01
Ra-228	3.280E-05	0.000E+00	0.000E+00	0.000E+00	3.185E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.185E-02
Th-228	6.052E-05	0.000E+00	0.000E+00	0.000E+00	5.875E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.875E-02
Th-230	3.104E-03	0.000E+00	0.000E+00	0.000E+00	3.013E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.013E+00
Th-232	3.285E-05	0.000E+00	0.000E+00	0.000E+00	3.189E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.189E-02
U-234	6.408E-03	0.000E+00	0.000E+00	0.000E+00	6.220E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.220E+00
U-235	3.769E-04	0.000E+00	0.000E+00	0.000E+00	3.659E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.659E-01
U-238	6.408E-03	0.000E+00	0.000E+00	0.000E+00	6.220E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.220E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.013E-09	0.0312	2.797E-11	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.330E-11	0.0026
Pa-231	2.035E-14	0.0000	2.126E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.121E-15	0.0000
Pb-210	1.216E-11	0.0004	1.674E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.819E-09	0.0560
Ra-226	1.906E-08	0.5867	1.216E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.150E-10	0.0066
Ra-228	7.761E-10	0.0239	1.435E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.562E-11	0.0014
Th-228	2.276E-09	0.0701	8.073E-12	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.299E-11	0.0007
Th-230	1.352E-11	0.0004	1.055E-10	0.0032	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.586E-10	0.0110
Th-232	6.004E-14	0.0000	1.422E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.241E-12	0.0001
U-234	8.632E-12	0.0003	1.781E-10	0.0055	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.938E-10	0.0183
U-235	1.080E-09	0.0332	9.420E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.571E-11	0.0011
U-238	3.806E-09	0.1172	1.514E-10	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.500E-10	0.0231
Total	2.804E-08	0.8633	5.122E-10	0.0158	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.929E-09	0.1210

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+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-09	0.0346
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.859E-14	0.0000
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	1.848E-09	0.0569
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	1.928E-08	0.5937
Ra-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	8.232E-10	0.0253
Th-220	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.307E-09	0.0710
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	4.776E-10	0.0147
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.723E-12	0.0002
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.805E-10	0.0240
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.125E-09	0.0346
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.707E-09	0.1449
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	3.248E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.013E-09	0.0312	2.797E-11	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.330E-11	0.0026
Pb-210	1.118E-11	0.0003	1.538E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.672E-09	0.0515
Ra-226	1.885E-08	0.5803	1.338E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.594E-10	0.0111
Pa-228	1.254E-09	0.0386	3.585E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.745E-11	0.0012
Th-228	1.320E-09	0.0407	4.684E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.334E-11	0.0004
Th-230	2.216E-10	0.0068	1.057E-10	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.617E-10	0.0111
Th-232	4.772E-10	0.0147	2.661E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.206E-11	0.0007
U-234	8.640E-12	0.0003	1.781E-10	0.0055	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.939E-10	0.0183
U-235	1.080E-09	0.0332	9.422E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.572E-11	0.0011
U-238	3.806E-09	0.1172	1.514E-10	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.500E-10	0.0231
Total	2.804E-08	0.8633	5.122E-10	0.0158	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.929E-09	0.1210

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+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-09	0.0346
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	1.698E-09	0.0523
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	1.922E-08	0.5918
Ra-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	1.295E-09	0.0399
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	1.338E-09	0.0412
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	6.890E-10	0.0212
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.020E-10	0.0155
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.806E-10	0.0240
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.125E-09	0.0346
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.707E-09	0.1449
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	3.248E-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+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	
Ac-227	1.056E-04	0.000E+00	0.000E+00	0.000E+00	1.025E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.025E-01
Pa-231	7.934E-08	0.000E+00	0.000E+00	0.000E+00	7.703E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.703E-05
Pb-210	5.229E-04	0.000E+00	0.000E+00	0.000E+00	5.077E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.077E-01
Ra-226	4.364E-04	0.000E+00	0.000E+00	0.000E+00	4.236E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.236E-01
Ra-228	3.275E-05	0.000E+00	0.000E+00	0.000E+00	3.179E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.179E-02
Th-228	3.496E-05	0.000E+00	0.000E+00	0.000E+00	3.394E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.394E-02
Th-230	3.104E-03	0.000E+00	0.000E+00	0.000E+00	3.014E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.014E+00
Th-232	3.285E-05	0.000E+00	0.000E+00	0.000E+00	3.189E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.189E-02
U-234	6.376E-03	0.000E+00	0.000E+00	0.000E+00	6.189E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.189E+00
U-235	3.750E-04	0.000E+00	0.000E+00	0.000E+00	3.641E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.641E-01
U-238	6.376E-03	0.000E+00	0.000E+00	0.000E+00	6.189E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.189E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(1rn,i,t) and QINT9W(1rn,i,t) for Inhalation of
 Radon and its Decay Products as pCi/yr at t= 1.000E+01 years

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	8.007E-10	0.0254	2.211E-11	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.585E-11	0.0021
Pa-231	6.073E-14	0.0000	6.346E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.827E-14	0.0000
Pb-210	1.165E-11	0.0004	1.604E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.743E-09	0.0553
Ra-226	1.935E-08	0.6133	1.235E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.183E-10	0.0069
Ra-228	7.749E-10	0.0246	1.433E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.555E-11	0.0014
Th-228	1.405E-09	0.0445	4.984E-12	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.419E-11	0.0004
Th-230	1.352E-11	0.0004	1.055E-10	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.586E-10	0.0114
Th-232	6.004E-14	0.0000	1.422E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.241E-12	0.0001
U-234	8.589E-12	0.0003	1.772E-10	0.0056	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.909E-10	0.0187
U-235	1.074E-09	0.0341	9.373E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.554E-11	0.0011
U-238	3.787E-09	0.1201	1.506E-10	0.0048	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.462E-10	0.0237
Total	2.722E-08	0.8629	5.010E-10	0.0159	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.823E-09	0.1212

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.887E-10	0.0282
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.534E-14	0.0000
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	1.771E-09	0.0561
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	1.958E-08	0.6206
Ra-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	8.219E-10	0.0261
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	1.424E-09	0.0451
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	4.777E-10	0.0151
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.723E-12	0.0002
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.766E-10	0.0246
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.119E-09	0.0355
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.684E-09	0.1485
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	3.155E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	8.006E-10	0.0254	2.211E-11	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.584E-11	0.0021
Pb-210	8.970E-12	0.0003	1.234E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.342E-09	0.0425
Ra-226	1.873E-08	0.5936	1.558E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.059E-10	0.0192
Ra-228	7.355E-10	0.0233	2.238E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.805E-11	0.0006
Th-228	1.045E-10	0.0033	3.708E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.056E-12	0.0000
Th-230	6.357E-10	0.0202	1.060E-10	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.725E-10	0.0118
Th-232	1.340E-09	0.0425	5.229E-12	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.488E-11	0.0014
U-234	8.653E-12	0.0003	1.772E-10	0.0056	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.909E-10	0.0187
U-235	1.075E-09	0.0341	9.382E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.556E-11	0.0011
U-238	3.787E-09	0.1201	1.506E-10	0.0048	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.463E-10	0.0237
Total	2.722E-08	0.8629	5.010E-10	0.0159	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.823E-09	0.1212

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.886E-10	0.0282
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	1.363E-09	0.0432
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	1.935E-08	0.6133
Ra-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	7.557E-10	0.0240
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	1.060E-10	0.0034
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	1.114E-09	0.0353
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.390E-09	0.0441
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.768E-10	0.0246
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.120E-09	0.0355
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.684E-09	0.1485
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	3.155E-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	
Ac-227	5.401E-05	0.000E+00	0.000E+00	0.000E+00	5.244E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.244E-02
Pa-231	2.346E-07	0.000E+00	0.000E+00	0.000E+00	2.277E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.277E-04
Pb-210	4.849E-04	0.000E+00	0.000E+00	0.000E+00	4.708E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.708E-01
Ra-226	4.548E-04	0.000E+00	0.000E+00	0.000E+00	4.416E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.416E-01
Ra-228	3.271E-05	0.000E+00	0.000E+00	0.000E+00	3.175E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.175E-02
Th-228	3.271E-05	0.000E+00	0.000E+00	0.000E+00	3.176E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.176E-02
Th-230	3.105E-03	0.000E+00	0.000E+00	0.000E+00	3.014E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.014E+00
Th-232	3.284E-05	0.000E+00	0.000E+00	0.000E+00	3.189E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.189E-02
U-234	6.285E-03	0.000E+00	0.000E+00	0.000E+00	6.102E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.102E+00
U-235	3.697E-04	0.000E+00	0.000E+00	0.000E+00	3.589E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.589E-01
U-238	6.285E-03	0.000E+00	0.000E+00	0.000E+00	6.102E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.102E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.095E-10	0.0129	1.131E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.367E-11	0.0011
Pa-231	1.739E-13	0.0000	1.817E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.231E-14	0.0000
Pb-210	1.082E-11	0.0003	1.490E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.619E-09	0.0512
Ra-226	2.016E-08	0.6373	1.287E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.275E-10	0.0072
Ra-228	7.741E-10	0.0245	1.431E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.550E-11	0.0014
Th-228	1.328E-09	0.0420	4.711E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.341E-11	0.0004
Th-230	1.352E-11	0.0004	1.056E-10	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.587E-10	0.0113
Th-232	6.004E-14	0.0000	1.422E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.241E-12	0.0001
U-234	8.467E-12	0.0003	1.747E-10	0.0055	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.825E-10	0.0184
U-235	1.059E-09	0.0335	9.240E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.503E-11	0.0011
U-238	3.733E-09	0.1180	1.485E-10	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.356E-10	0.0232
Total	2.750E-08	0.8692	4.846E-10	0.0153	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.655E-09	0.1155

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.544E-10	0.0144
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.443E-13	0.0000
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	1.645E-09	0.0520
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	2.040E-08	0.6449
Ra-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	8.210E-10	0.0259
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	1.346E-09	0.0425
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	4.778E-10	0.0151
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.723E-12	0.0002
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.656E-10	0.0242
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.104E-09	0.0349
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.617E-09	0.1459
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	3.164E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.088E-10	0.0129	1.129E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.362E-11	0.0011
Pb-210	4.783E-12	0.0002	6.582E-12	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.154E-10	0.0226
Ra-226	1.838E-08	0.5809	1.960E-11	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.063E-09	0.0336
Na-229	6.977E-11	0.0022	2.128E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.643E-12	0.0001
Th-228	7.451E-14	0.0000	2.643E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.525E-16	0.0000
Th-230	1.804E-09	0.0570	1.071E-10	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.265E-10	0.0135
Th-232	2.033E-09	0.0643	7.352E-12	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.151E-11	0.0019
U-234	8.982E-12	0.0003	1.747E-10	0.0055	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.827E-10	0.0184
U-235	1.060E-09	0.0335	9.276E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.514E-11	0.0011
U-238	3.733E-09	0.1180	1.485E-10	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.357E-10	0.0233
Total	2.750E-08	0.8692	4.846E-10	0.0153	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.655E-09	0.1155

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.537E-10	0.0143
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	7.268E-10	0.0230
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	1.946E-08	0.6151
Ra-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	7.113E-11	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	7.553E-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	2.338E-09	0.0739
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.102E-09	0.0664
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.663E-10	0.0242
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.104E-09	0.0349
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.618E-09	0.1459
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	3.164E-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	
Ac-227	5.639E-06	0.000E+00	0.000E+00	0.000E+00	5.475E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.475E-03
Pa-231	7.433E-07	0.000E+00	0.000E+00	0.000E+00	7.216E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.216E-04
Pb-210	4.904E-04	0.000E+00	0.000E+00	0.000E+00	4.761E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.761E-01
Ra-226	5.169E-04	0.000E+00	0.000E+00	0.000E+00	5.018E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.018E-01
Ra-228	3.270E-05	0.000E+00	0.000E+00	0.000E+00	3.175E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.175E-02
Th-228	3.270E-05	0.000E+00	0.000E+00	0.000E+00	3.175E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.175E-02
Th-230	3.106E-03	0.000E+00	0.000E+00	0.000E+00	3.016E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.016E+00
Th-232	3.284E-05	0.000E+00	0.000E+00	0.000E+00	3.188E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.188E-02
U-234	5.978E-03	0.000E+00	0.000E+00	0.000E+00	5.804E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.804E+00
U-235	3.517E-04	0.000E+00	0.000E+00	0.000E+00	3.414E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.414E-01
U-238	5.978E-03	0.000E+00	0.000E+00	0.000E+00	5.804E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.804E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-214	Bi-214
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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.284E-11	0.0013	1.183E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.523E-12	0.0001
Pa-231	5.445E-13	0.0000	5.690E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.638E-13	0.0000
Pb-210	1.097E-11	0.0003	1.509E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.640E-09	0.0486
Ra-226	2.291E-08	0.6795	1.462E-11	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.585E-10	0.0077
Ra-228	7.739E-10	0.0230	1.431E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.549E-11	0.0013
Th-228	1.328E-09	0.0394	4.710E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.341E-11	0.0004
Th-230	1.353E-11	0.0004	1.056E-10	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.589E-10	0.0106
Th-232	6.004E-14	0.0000	1.422E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.241E-12	0.0001
U-234	8.054E-12	0.0002	1.661E-10	0.0049	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.541E-10	0.0164
U-235	1.008E-09	0.0299	8.789E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.332E-11	0.0010
U-238	3.551E-09	0.1053	1.412E-10	0.0042	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.997E-10	0.0208
Total	2.965E-08	0.8792	4.603E-10	0.0137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.612E-09	0.1071

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.754E-11	0.0014
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.653E-13	0.0000
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	1.666E-09	0.0494
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	2.318E-08	0.6876
Ra-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	8.209E-10	0.0243
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	1.346E-09	0.0399
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	4.780E-10	0.0142
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.723E-12	0.0002
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.283E-10	0.0216
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.050E-09	0.0311
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.392E-09	0.1303
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	3.372E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.889E-11	0.0012	1.074E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.198E-12	0.0001
Pb-210	5.295E-13	0.0000	7.287E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.920E-11	0.0023
Ra-226	1.721E-08	0.5103	2.258E-11	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.455E-09	0.0432
Ra-228	1.447E-14	0.0000	4.446E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.431E-16	0.0000
Th-228	7.204E-25	0.0000	2.555E-27	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.276E-27	0.0000
Th-230	5.722E-09	0.1697	1.118E-10	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.222E-10	0.0214
Th-232	2.102E-09	0.0623	7.563E-12	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.315E-11	0.0019
U-234	1.337E-11	0.0004	1.663E-10	0.0049	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.548E-10	0.0165
U-235	1.012E-09	0.0300	8.955E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.381E-11	0.0010
U-238	3.551E-09	0.1053	1.413E-10	0.0042	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.999E-10	0.0208
Total	2.965E-08	0.8792	4.603E-10	0.0137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.612E-09	0.1071

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+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-11	0.0013
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	8.046E-11	0.0024
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	1.868E-08	0.5541
Ra-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	1.486E-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	7.302E-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	6.556E-09	0.1944
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.173E-09	0.0644
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.345E-10	0.0218
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.055E-09	0.0313
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.392E-09	0.1303
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	3.372E-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+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	
Ac-227	1.684E-06	0.000E+00	0.000E+00	0.000E+00	1.635E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.635E-03
Pa-231	1.929E-06	0.000E+00	0.000E+00	0.000E+00	1.872E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.872E-03
Pb-210	6.426E-04	0.000E+00	0.000E+00	0.000E+00	6.239E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.239E-01
Ra-226	6.733E-04	0.000E+00	0.000E+00	0.000E+00	6.537E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.537E-01
Ra-228	3.270E-05	0.000E+00	0.000E+00	0.000E+00	3.175E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.175E-02
Th-228	3.270E-05	0.000E+00	0.000E+00	0.000E+00	3.175E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.175E-02
Th-230	3.111E-03	0.000E+00	0.000E+00	0.000E+00	3.020E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.020E+00
Th-232	3.284E-05	0.000E+00	0.000E+00	0.000E+00	3.188E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.188E-02
U-234	5.182E-03	0.000E+00	0.000E+00	0.000E+00	5.031E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.031E+00
U-235	3.048E-04	0.000E+00	0.000E+00	0.000E+00	2.959E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.959E-01
U-238	5.182E-03	0.000E+00	0.000E+00	0.000E+00	5.031E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.031E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.300E-11	0.0003	3.590E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.069E-12	0.0000
Pa-231	1.408E-12	0.0000	1.472E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.237E-13	0.0000
Pb-210	1.437E-11	0.0004	1.977E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.149E-09	0.0532
Ra-226	2.984E-08	0.7387	1.905E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.367E-10	0.0083
Ra-228	7.738E-10	0.0192	1.431E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.549E-11	0.0011
Th-228	1.328E-09	0.0329	4.710E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.341E-11	0.0003
Th-230	1.355E-11	0.0003	1.058E-10	0.0026	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.593E-10	0.0089
Th-232	6.003E-14	0.0000	1.422E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.240E-12	0.0001
U-234	6.981E-12	0.0002	1.440E-10	0.0036	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.803E-10	0.0119
U-235	8.733E-10	0.0216	7.618E-12	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.888E-11	0.0007
U-238	3.078E-09	0.0762	1.224E-10	0.0030	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.065E-10	0.0150
Total	3.594E-08	0.8898	4.267E-10	0.0106	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.025E-09	0.0997

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.443E-11	0.0004
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.979E-12	0.0000
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	2.183E-09	0.0541
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	3.019E-08	0.7475
Ra-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	8.208E-10	0.0203
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	1.346E-09	0.0333
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	4.787E-10	0.0119
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.722E-12	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.313E-10	0.0156
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.098E-10	0.0225
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.807E-09	0.0943
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	4.039E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.686E-14	0.0000	1.294E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.853E-15	0.0000
Pb-210	9.838E-16	0.0000	1.354E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.472E-13	0.0000
Ra-226	1.424E-08	0.3527	1.916E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.256E-09	0.0311
Ra-228	4.421E-25	0.0000	1.358E-27	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.048E-26	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	1.558E-08	0.3857	1.248E-10	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.584E-09	0.0392
Th-232	2.102E-09	0.0520	7.562E-12	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.314E-11	0.0016
U-234	4.949E-11	0.0012	1.445E-10	0.0036	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.847E-10	0.0120
U-235	8.877E-10	0.0220	8.123E-12	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.037E-11	0.0008
U-238	3.078E-09	0.0762	1.225E-10	0.0030	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.070E-10	0.0150
Total	3.594E-08	0.8898	4.267E-10	0.0106	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.025E-09	0.0997

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.201E-14	0.0000
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	1.495E-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	1.552E-08	0.3842
Ra-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	4.539E-25	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	1.729E-08	0.4280
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.172E-09	0.0538
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.787E-10	0.0168
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.262E-10	0.0229
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.808E-09	0.0943
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	4.039E-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	
Ac-227	3.633E-06	0.000E+00	0.000E+00	0.000E+00	3.527E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.527E-03
Pa-231	3.870E-06	0.000E+00	0.000E+00	0.000E+00	3.757E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.757E-03
Pb-210	1.015E-03	0.000E+00	0.000E+00	0.000E+00	9.852E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.852E-01
Ra-226	1.039E-03	0.000E+00	0.000E+00	0.000E+00	1.008E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.008E+00
Ra-228	3.269E-05	0.000E+00	0.000E+00	0.000E+00	3.173E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.173E-02
Th-228	3.269E-05	0.000E+00	0.000E+00	0.000E+00	3.173E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.173E-02
Th-230	3.115E-03	0.000E+00	0.000E+00	0.000E+00	3.024E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.024E+00
Th-232	3.283E-05	0.000E+00	0.000E+00	0.000E+00	3.187E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.187E-02
U-234	3.142E-03	0.000E+00	0.000E+00	0.000E+00	3.050E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.050E+00
U-235	1.848E-04	0.000E+00	0.000E+00	0.000E+00	1.794E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.794E-01
U-238	3.142E-03	0.000E+00	0.000E+00	0.000E+00	3.050E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.050E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.801E-11	0.0005	7.733E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.303E-12	0.0000
Pa-231	2.822E-12	0.0001	2.949E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.491E-13	0.0000
Pb-210	2.268E-11	0.0004	3.122E-11	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.393E-09	0.0607
Ra-226	4.600E-08	0.8226	2.937E-11	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.191E-10	0.0093
Ra-228	7.735E-10	0.0138	1.430E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.547E-11	0.0008
Th-228	1.327E-09	0.0237	4.708E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.340E-11	0.0002
Th-230	1.357E-11	0.0002	1.059E-10	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.599E-10	0.0064
Th-232	6.000E-14	0.0000	1.421E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.238E-12	0.0001
U-234	4.233E-12	0.0001	8.732E-11	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.912E-10	0.0052
U-235	5.296E-10	0.0095	4.619E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.751E-11	0.0003
U-238	1.866E-09	0.0334	7.423E-11	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.678E-10	0.0066
Total	5.057E-08	0.9042	3.413E-10	0.0061	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.014E-09	0.0897

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+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-11	0.0006
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.966E-12	0.0001
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	3.446E-09	0.0616
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	4.655E-08	0.8324
Ra-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	8.204E-10	0.0147
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	1.345E-09	0.0241
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	4.794E-10	0.0086
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.720E-12	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.828E-10	0.0068
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.517E-10	0.0099
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.308E-09	0.0413
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	5.593E-08	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.845E-24	0.0000	7.856E-26	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.339E-25	0.0000
Pb-210	2.720E-25	0.0000	3.744E-25	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.069E-23	0.0000
Ra-226	7.354E-09	0.1315	9.894E-12	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.483E-10	0.0116
Ra-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-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	3.836E-08	0.6859	1.548E-10	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.592E-09	0.0642
Th-232	2.101E-09	0.0376	7.559E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.311E-11	0.0011
U-234	3.289E-10	0.0059	8.889E-11	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.219E-10	0.0058
U-235	5.604E-10	0.0100	5.688E-12	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.067E-11	0.0004
U-238	1.867E-09	0.0334	7.447E-11	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.686E-10	0.0066
Total	5.057E-08	0.9042	3.413E-10	0.0061	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.014E-09	0.0897

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+03 years

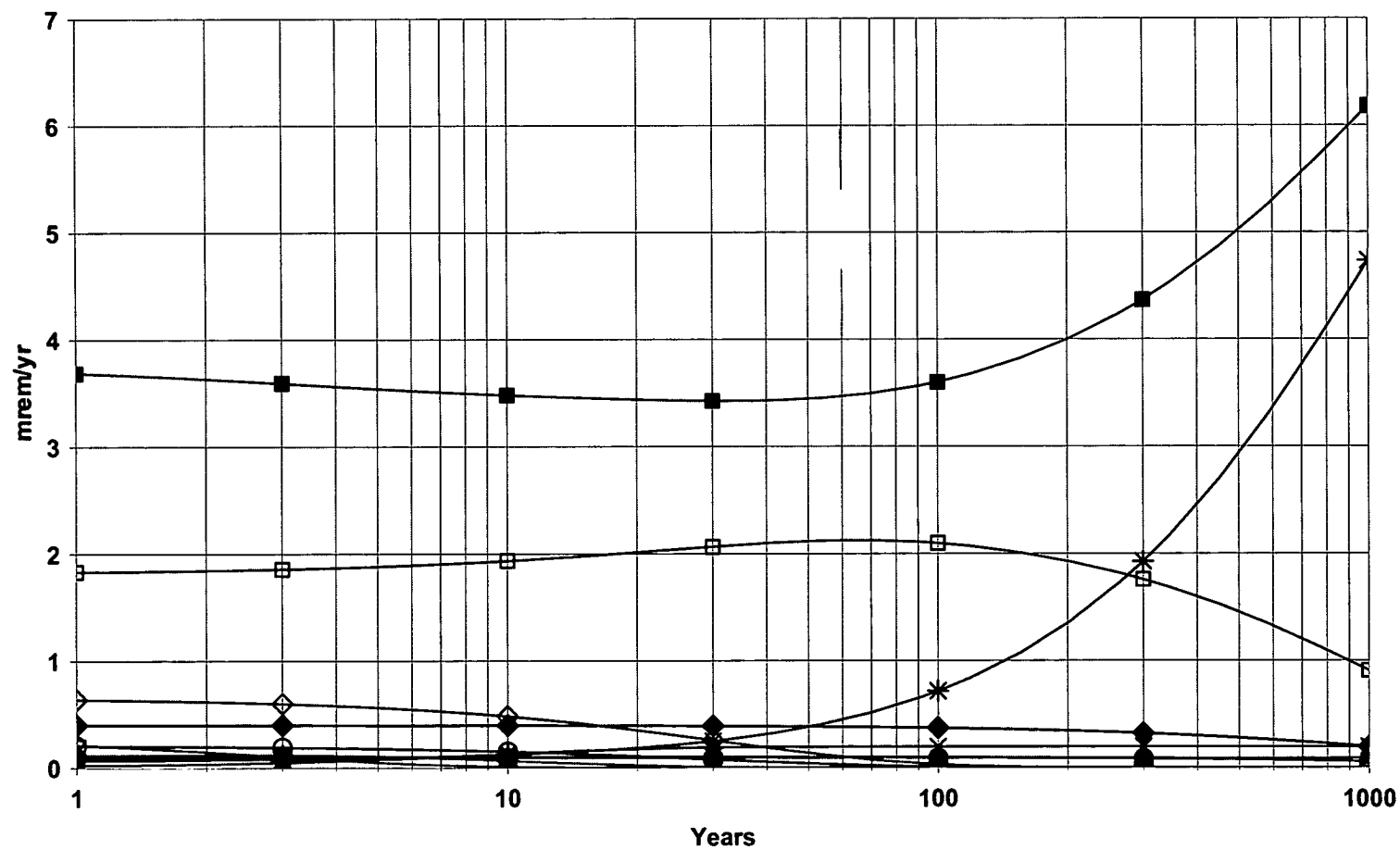
Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.157E-24	0.0000
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	4.133E-23	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	8.012E-09	0.1433
Ra-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-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	4.211E-08	0.7529
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.171E-09	0.0388
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.397E-10	0.0132
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.867E-10	0.0105
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.310E-09	0.0413
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	5.593E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Onsite Resident

DOSE: All Nuclides Summed, All Pathways Summed



○ Ac-227
 ◇ Pb-210
 ◻ Ra-226
 △ Ra-228
 ▽ Th-228
 * Th-230
 ✱ Th-232
 + U-234
 ● U-235
 ◆ U-238
 ■ Total

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Dose Conversion Factor (and Related) Parameter Summary
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Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(3)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(4)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(5)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238	1.180E-01	1.180E-01	DCF2(11)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(12)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(3)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(4)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(10)
D-1	U-238	2.550E-04	2.550E-04	DCF3(11)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(12)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(12,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(12,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(12,3)
D-5				
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				

Dose Conversion Factor (and Related) Parameter Summary (continued)
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Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(12,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(12,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.129E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+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): Ac-227	9.000E-02	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pb-210	3.400E-01	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	2.600E-01	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	2.000E-02	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.000E-02	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	1.890E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	2.000E-02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	3.910E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.300E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	3.910E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
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)	1.280E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.200E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	3.600E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	3.048E+00	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.040E+01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.170E+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)	9.200E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Runoff coefficient	8.000E-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
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	---	II(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 Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.772E-03	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.584E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.113E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.113E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC (6)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU (6,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS (6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.990E-07	ALEACH (6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC (7)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU (7,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS (7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.990E-07	ALEACH (7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC (8)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU (8,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS (8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.990E-07	ALEACH (8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (9)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU (9,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS (9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (10)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU (10,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS (10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (10)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (11)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU (11,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS (11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (11)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC (2)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU (2,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS (2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.147E-04	ALEACH (2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (2)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	5.900E-06	1.000E-04	---	MLINH

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	5.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.550E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	7.990E-02	2.500E-01	---	FOTD
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

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
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
C14	DCF correction factor for gaseous forms of C14	not used	0.000E+00	---	CO2F
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)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
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	active

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	11292.00 square meters	Ac-227	9.000E-02
Thickness:	2.00 meters	Pb-210	3.400E-01
Cover Depth:	0.00 meters	Ra-226	2.600E-01
		Ra-228	2.000E-02
		Th-228	7.000E-02
		Th-230	1.890E+00
		Th-232	2.000E-02
		U-234	3.910E+00
		U-235	2.300E-01
		U-238	3.910E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+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):	3.762E+00	3.687E+00	3.593E+00	3.482E+00	3.428E+00	3.602E+00	4.370E+00	6.180E+00
M(t):	1.505E-01	1.475E-01	1.437E-01	1.393E-01	1.371E-01	1.441E-01	1.748E-01	2.472E-01

Maximum TDOSE(t): 6.180E+00 mrem/yr at t = 1.000E+03 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.
Ac-227	9.091E-02	0.0242	1.028E-03	0.0003	0.000E+00	0.0000	7.755E-02	0.0206	0.000E+00	0.0000	0.000E+00	0.0000	4.215E-02	0.0112
Pb-210	1.057E-03	0.0003	1.341E-05	0.0000	0.000E+00	0.0000	5.768E-01	0.1533	0.000E+00	0.0000	0.000E+00	0.0000	7.840E-02	0.0208
Ra-226	1.474E+00	0.3917	4.017E-06	0.0000	0.000E+00	0.0000	3.333E-01	0.0886	0.000E+00	0.0000	0.000E+00	0.0000	1.199E-02	0.0032
Ra-228	7.317E-02	0.0195	2.010E-06	0.0000	0.000E+00	0.0000	2.594E-02	0.0069	0.000E+00	0.0000	0.000E+00	0.0000	9.549E-04	0.0003
Th-228	3.041E-01	0.0808	3.502E-05	0.0000	0.000E+00	0.0000	1.125E-03	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	1.528E-03	0.0004
Th-230	3.501E-03	0.0009	1.064E-03	0.0003	0.000E+00	0.0000	2.503E-02	0.0067	0.000E+00	0.0000	0.000E+00	0.0000	3.336E-02	0.0089
Th-232	4.189E-03	0.0011	5.673E-05	0.0000	0.000E+00	0.0000	2.793E-03	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	1.815E-03	0.0005
U-234	8.157E-04	0.0002	8.910E-04	0.0002	0.000E+00	0.0000	6.550E-02	0.0174	0.000E+00	0.0000	0.000E+00	0.0000	3.561E-02	0.0095
U-235	8.940E-02	0.0238	4.884E-05	0.0000	0.000E+00	0.0000	3.646E-03	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	1.979E-03	0.0005
U-238	3.015E-01	0.0801	7.967E-04	0.0002	0.000E+00	0.0000	6.219E-02	0.0165	0.000E+00	0.0000	0.000E+00	0.0000	3.381E-02	0.0090
Total	2.342E+00	0.6227	3.939E-03	0.0010	0.000E+00	0.0000	1.174E+00	0.3121	0.000E+00	0.0000	0.000E+00	0.0000	2.416E-01	0.0642

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.116E-01	0.0563
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	6.562E-01	0.1745
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	1.819E+00	0.4835
Ra-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	1.001E-01	0.0266
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	3.068E-01	0.0816
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	6.295E-02	0.0167
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.854E-03	0.0024
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.028E-01	0.0273
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.508E-02	0.0253
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.983E-01	0.1059
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	3.762E+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.
Ac-227	8.791E-02	0.0238	9.937E-04	0.0003	0.000E+00	0.0000	7.499E-02	0.0203	0.000E+00	0.0000	0.000E+00	0.0000	4.076E-02	0.0111
Pb-210	1.024E-03	0.0003	1.299E-05	0.0000	0.000E+00	0.0000	5.589E-01	0.1516	0.000E+00	0.0000	0.000E+00	0.0000	7.597E-02	0.0206
Ra-226	1.472E+00	0.3993	4.327E-06	0.0000	0.000E+00	0.0000	3.467E-01	0.0940	0.000E+00	0.0000	0.000E+00	0.0000	1.381E-02	0.0037
Ra-228	8.961E-02	0.0243	4.634E-06	0.0000	0.000E+00	0.0000	2.310E-02	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	9.706E-04	0.0003
Th-228	2.117E-01	0.0574	2.438E-05	0.0000	0.000E+00	0.0000	7.831E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.064E-03	0.0003
Th-230	8.139E-03	0.0022	1.064E-03	0.0003	0.000E+00	0.0000	2.610E-02	0.0071	0.000E+00	0.0000	0.000E+00	0.0000	3.340E-02	0.0091
Th-232	1.412E-02	0.0038	5.714E-05	0.0000	0.000E+00	0.0000	5.731E-03	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	1.931E-03	0.0005
U-234	8.153E-04	0.0002	8.904E-04	0.0002	0.000E+00	0.0000	6.546E-02	0.0178	0.000E+00	0.0000	0.000E+00	0.0000	3.558E-02	0.0097
U-235	8.934E-02	0.0242	4.882E-05	0.0000	0.000E+00	0.0000	3.656E-03	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	1.980E-03	0.0005
U-238	3.013E-01	0.0817	7.962E-04	0.0002	0.000E+00	0.0000	6.215E-02	0.0169	0.000E+00	0.0000	0.000E+00	0.0000	3.378E-02	0.0092
Total	2.276E+00	0.6174	3.897E-03	0.0011	0.000E+00	0.0000	1.168E+00	0.3167	0.000E+00	0.0000	0.000E+00	0.0000	2.392E-01	0.0649

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.047E-01	0.0555
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	6.359E-01	0.1725
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	1.833E+00	0.4971
Ra-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	1.137E-01	0.0308
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	2.136E-01	0.0579
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	6.870E-02	0.0186
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.184E-02	0.0059
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.027E-01	0.0279
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.502E-02	0.0258
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.980E-01	0.1080
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	3.687E+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.
Ac-227	8.219E-02	0.0229	9.291E-04	0.0003	0.000E+00	0.0000	7.012E-02	0.0195	0.000E+00	0.0000	0.000E+00	0.0000	3.811E-02	0.0106
Pb-210	9.615E-04	0.0003	1.220E-05	0.0000	0.000E+00	0.0000	5.249E-01	0.1461	0.000E+00	0.0000	0.000E+00	0.0000	7.134E-02	0.0199
Ra-226	1.469E+00	0.4090	4.917E-06	0.0000	0.000E+00	0.0000	3.717E-01	0.1035	0.000E+00	0.0000	0.000E+00	0.0000	1.728E-02	0.0048
Ra-228	9.763E-02	0.0272	6.781E-06	0.0000	0.000E+00	0.0000	1.823E-02	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	8.990E-04	0.0003
Th-228	1.026E-01	0.0285	1.181E-05	0.0000	0.000E+00	0.0000	3.794E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	5.154E-04	0.0001
Th-230	1.740E-02	0.0048	1.064E-03	0.0003	0.000E+00	0.0000	2.836E-02	0.0079	0.000E+00	0.0000	0.000E+00	0.0000	3.349E-02	0.0093
Th-232	3.717E-02	0.0103	5.858E-05	0.0000	0.000E+00	0.0000	1.069E-02	0.0030	0.000E+00	0.0000	0.000E+00	0.0000	2.158E-03	0.0006
U-234	8.146E-04	0.0002	8.891E-04	0.0002	0.000E+00	0.0000	6.536E-02	0.0182	0.000E+00	0.0000	0.000E+00	0.0000	3.553E-02	0.0099
U-235	8.921E-02	0.0248	4.878E-05	0.0000	0.000E+00	0.0000	3.675E-03	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	1.981E-03	0.0006
U-238	3.008E-01	0.0837	7.950E-04	0.0002	0.000E+00	0.0000	6.206E-02	0.0173	0.000E+00	0.0000	0.000E+00	0.0000	3.373E-02	0.0094
Total	2.198E+00	0.6119	3.820E-03	0.0011	0.000E+00	0.0000	1.155E+00	0.3216	0.000E+00	0.0000	0.000E+00	0.0000	2.350E-01	0.0654

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.914E-01	0.0533
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	5.972E-01	0.1662
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	1.858E+00	0.5173
Ra-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	1.168E-01	0.0325
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	1.035E-01	0.0288
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	8.032E-02	0.0224
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.008E-02	0.0139
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.026E-01	0.0286
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.492E-02	0.0264
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.974E-01	0.1106
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	3.593E+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.
Ac-227	6.496E-02	0.0187	7.343E-04	0.0002	0.000E+00	0.0000	5.542E-02	0.0159	0.000E+00	0.0000	0.000E+00	0.0000	3.012E-02	0.0087
Pb-210	7.715E-04	0.0002	9.791E-06	0.0000	0.000E+00	0.0000	4.212E-01	0.1210	0.000E+00	0.0000	0.000E+00	0.0000	5.725E-02	0.0164
Ra-226	1.460E+00	0.4193	6.700E-06	0.0000	0.000E+00	0.0000	4.474E-01	0.1285	0.000E+00	0.0000	0.000E+00	0.0000	2.778E-02	0.0080
Ra-228	5.721E-02	0.0164	4.676E-06	0.0000	0.000E+00	0.0000	7.870E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	4.625E-04	0.0001
Th-228	8.119E-03	0.0023	9.350E-07	0.0000	0.000E+00	0.0000	3.004E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.080E-05	0.0000
Th-230	4.969E-02	0.0143	1.064E-03	0.0003	0.000E+00	0.0000	3.742E-02	0.0107	0.000E+00	0.0000	0.000E+00	0.0000	3.399E-02	0.0098
Th-232	1.043E-01	0.0300	6.377E-05	0.0000	0.000E+00	0.0000	2.111E-02	0.0061	0.000E+00	0.0000	0.000E+00	0.0000	2.728E-03	0.0008
U-234	8.149E-04	0.0002	8.848E-04	0.0003	0.000E+00	0.0000	6.504E-02	0.0187	0.000E+00	0.0000	0.000E+00	0.0000	3.536E-02	0.0102
U-235	8.878E-02	0.0255	4.869E-05	0.0000	0.000E+00	0.0000	3.748E-03	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	1.985E-03	0.0006
U-238	2.993E-01	0.0860	7.911E-04	0.0002	0.000E+00	0.0000	6.175E-02	0.0177	0.000E+00	0.0000	0.000E+00	0.0000	3.357E-02	0.0096
Total	2.134E+00	0.6129	3.609E-03	0.0010	0.000E+00	0.0000	1.121E+00	0.3220	0.000E+00	0.0000	0.000E+00	0.0000	2.233E-01	0.0641

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.
Ac-227	0.000E+00	0.0000	0.000E+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-01	0.0434
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	4.792E-01	0.1376
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	1.935E+00	0.5558
Ra-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	6.555E-02	0.0188
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	8.191E-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	1.222E-01	0.0351
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.282E-01	0.0368
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.021E-01	0.0293
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.456E-02	0.0272
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.954E-01	0.1136
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	3.482E+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+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.
Ac-227	3.317E-02	0.0097	3.750E-04	0.0001	0.000E+00	0.0000	2.830E-02	0.0083	0.000E+00	0.0000	0.000E+00	0.0000	1.538E-02	0.0045
Pb-210	4.114E-04	0.0001	5.221E-06	0.0000	0.000E+00	0.0000	2.246E-01	0.0655	0.000E+00	0.0000	0.000E+00	0.0000	3.052E-02	0.0089
Ra-226	1.433E+00	0.4180	9.994E-06	0.0000	0.000E+00	0.0000	5.861E-01	0.1710	0.000E+00	0.0000	0.000E+00	0.0000	4.725E-02	0.0138
Ra-228	5.388E-03	0.0016	4.507E-07	0.0000	0.000E+00	0.0000	7.001E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	4.262E-05	0.0000
Th-228	5.787E-06	0.0000	6.664E-10	0.0000	0.000E+00	0.0000	2.141E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.908E-08	0.0000
Th-230	1.408E-01	0.0411	1.064E-03	0.0003	0.000E+00	0.0000	7.046E-02	0.0206	0.000E+00	0.0000	0.000E+00	0.0000	3.642E-02	0.0106
Th-232	1.582E-01	0.0462	6.825E-05	0.0000	0.000E+00	0.0000	2.826E-02	0.0082	0.000E+00	0.0000	0.000E+00	0.0000	3.158E-03	0.0009
U-234	8.386E-04	0.0002	8.726E-04	0.0003	0.000E+00	0.0000	6.413E-02	0.0187	0.000E+00	0.0000	0.000E+00	0.0000	3.487E-02	0.0102
U-235	8.757E-02	0.0255	4.872E-05	0.0000	0.000E+00	0.0000	3.973E-03	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	2.011E-03	0.0006
U-238	2.951E-01	0.0861	7.799E-04	0.0002	0.000E+00	0.0000	6.088E-02	0.0178	0.000E+00	0.0000	0.000E+00	0.0000	3.309E-02	0.0097
Total	2.154E+00	0.6285	3.225E-03	0.0009	0.000E+00	0.0000	1.067E+00	0.3114	0.000E+00	0.0000	0.000E+00	0.0000	2.027E-01	0.0592

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.723E-02	0.0225
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	2.555E-01	0.0745
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	2.066E+00	0.6028
Ra-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	6.131E-03	0.0018
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	5.838E-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	2.487E-01	0.0726
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.897E-01	0.0553
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.007E-01	0.0294
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.360E-02	0.0273
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.898E-01	0.1137
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	3.428E+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+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.
Ac-227	3.156E-03	0.0009	3.567E-05	0.0000	0.000E+00	0.0000	2.692E-03	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	1.463E-03	0.0004
Pb-210	4.554E-05	0.0000	5.779E-07	0.0000	0.000E+00	0.0000	2.486E-02	0.0069	0.000E+00	0.0000	0.000E+00	0.0000	3.379E-03	0.0009
Ra-226	1.341E+00	0.3725	1.271E-05	0.0000	0.000E+00	0.0000	6.931E-01	0.1924	0.000E+00	0.0000	0.000E+00	0.0000	6.387E-02	0.0177
Ra-228	1.126E-06	0.0000	9.416E-11	0.0000	0.000E+00	0.0000	1.462E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.902E-09	0.0000
Th-228	5.595E-17	0.0000	6.443E-21	0.0000	0.000E+00	0.0000	2.070E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.812E-19	0.0000
Th-230	4.462E-01	0.1239	1.066E-03	0.0003	0.000E+00	0.0000	2.171E-01	0.0603	0.000E+00	0.0000	0.000E+00	0.0000	4.942E-02	0.0137
Th-232	1.636E-01	0.0454	6.869E-05	0.0000	0.000E+00	0.0000	2.895E-02	0.0080	0.000E+00	0.0000	0.000E+00	0.0000	3.200E-03	0.0009
U-234	1.174E-03	0.0003	8.312E-04	0.0002	0.000E+00	0.0000	6.117E-02	0.0170	0.000E+00	0.0000	0.000E+00	0.0000	3.321E-02	0.0092
U-235	8.360E-02	0.0232	5.010E-05	0.0000	0.000E+00	0.0000	4.805E-03	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	2.146E-03	0.0006
U-238	2.807E-01	0.0779	7.420E-04	0.0002	0.000E+00	0.0000	5.792E-02	0.0161	0.000E+00	0.0000	0.000E+00	0.0000	3.148E-02	0.0087
Total	2.320E+00	0.6441	2.807E-03	0.0008	0.000E+00	0.0000	1.091E+00	0.3028	0.000E+00	0.0000	0.000E+00	0.0000	1.882E-01	0.0522

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.347E-03	0.0020
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	2.829E-02	0.0079
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	2.098E+00	0.5826
Ra-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	1.281E-06	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	5.645E-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	7.139E-01	0.1982
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.958E-01	0.0544
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.639E-02	0.0268
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.060E-02	0.0252
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.708E-01	0.1030
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	3.602E+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+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.
Ac-227	3.802E-06	0.0000	4.298E-08	0.0000	0.000E+00	0.0000	3.243E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.763E-06	0.0000
Pb-210	8.462E-08	0.0000	1.074E-09	0.0000	0.000E+00	0.0000	4.619E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.279E-06	0.0000
Ra-226	1.111E+00	0.2542	1.090E-05	0.0000	0.000E+00	0.0000	5.898E-01	0.1350	0.000E+00	0.0000	0.000E+00	0.0000	5.505E-02	0.0126
Ra-228	3.438E-17	0.0000	2.876E-21	0.0000	0.000E+00	0.0000	4.466E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.719E-19	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	1.215E+00	0.2779	1.072E-03	0.0002	0.000E+00	0.0000	6.233E-01	0.1426	0.000E+00	0.0000	0.000E+00	0.0000	8.719E-02	0.0200
Th-232	1.635E-01	0.0374	6.868E-05	0.0000	0.000E+00	0.0000	2.895E-02	0.0066	0.000E+00	0.0000	0.000E+00	0.0000	3.200E-03	0.0007
U-234	3.973E-03	0.0009	7.238E-04	0.0002	0.000E+00	0.0000	5.449E-02	0.0125	0.000E+00	0.0000	0.000E+00	0.0000	2.901E-02	0.0066
U-235	7.331E-02	0.0168	5.389E-05	0.0000	0.000E+00	0.0000	6.789E-03	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	2.485E-03	0.0006
U-238	2.433E-01	0.0557	6.436E-04	0.0001	0.000E+00	0.0000	5.024E-02	0.0115	0.000E+00	0.0000	0.000E+00	0.0000	2.731E-02	0.0062
Total	2.809E+00	0.6429	2.573E-03	0.0006	0.000E+00	0.0000	1.354E+00	0.3098	0.000E+00	0.0000	0.000E+00	0.0000	2.043E-01	0.0467

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.852E-06	0.0000
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	5.256E-05	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	1.755E+00	0.4017
Ra-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	3.913E-17	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	1.926E+00	0.4408
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.958E-01	0.0448
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.820E-02	0.0202
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.264E-02	0.0189
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.215E-01	0.0736
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	4.370E+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+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.
Ac-227	2.308E-16	0.0000	2.609E-18	0.0000	0.000E+00	0.0000	1.969E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.070E-16	0.0000
Pb-210	2.340E-17	0.0000	2.969E-19	0.0000	0.000E+00	0.0000	1.277E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.736E-15	0.0000
Ra-226	5.733E-01	0.0928	5.626E-06	0.0000	0.000E+00	0.0000	3.045E-01	0.0493	0.000E+00	0.0000	0.000E+00	0.0000	2.842E-02	0.0046
Ra-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-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	2.991E+00	0.4840	1.082E-03	0.0002	0.000E+00	0.0000	1.567E+00	0.2535	0.000E+00	0.0000	0.000E+00	0.0000	1.751E-01	0.0283
Th-232	1.635E-01	0.0265	6.865E-05	0.0000	0.000E+00	0.0000	2.894E-02	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	3.198E-03	0.0005
U-234	2.572E-02	0.0042	4.491E-04	0.0001	0.000E+00	0.0000	4.513E-02	0.0073	0.000E+00	0.0000	0.000E+00	0.0000	1.899E-02	0.0031
U-235	4.625E-02	0.0075	5.480E-05	0.0000	0.000E+00	0.0000	9.642E-03	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	2.826E-03	0.0005
U-238	1.475E-01	0.0239	3.911E-04	0.0001	0.000E+00	0.0000	3.054E-02	0.0049	0.000E+00	0.0000	0.000E+00	0.0000	1.659E-02	0.0027
Total	3.947E+00	0.6387	2.051E-03	0.0003	0.000E+00	0.0000	1.986E+00	0.3213	0.000E+00	0.0000	0.000E+00	0.0000	2.451E-01	0.0397

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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.374E-16	0.0000
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	1.453E-14	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	9.062E-01	0.1466
Ra-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-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	4.734E+00	0.7660
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.957E-01	0.0317
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.029E-02	0.0146
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.877E-02	0.0095
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.951E-01	0.0316
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	6.180E+00	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

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
Ac-227+D	Ac-227+D	1.000E+00	2.352E+00	2.274E+00	2.126E+00	1.680E+00	8.581E-01	8.163E-02	9.835E-05	5.971E-15
Pb-210+D	Pb-210+D	1.000E+00	1.930E+00	1.870E+00	1.756E+00	1.409E+00	7.515E-01	8.320E-02	1.546E-04	4.274E-14
Ra-226+D	Ra-226+D	1.000E+00	6.961E+00	6.954E+00	6.941E+00	6.895E+00	6.766E+00	6.333E+00	5.243E+00	2.707E+00
Ra-226+D	Pb-210+D	1.000E+00	3.492E-02	9.473E-02	2.071E-01	5.476E-01	1.181E+00	1.738E+00	1.509E+00	7.789E-01
Ra-226+D	ΣDSR(j)		6.995E+00	7.049E+00	7.148E+00	7.443E+00	7.947E+00	8.071E+00	6.752E+00	3.486E+00
Ra-228+D	Ra-228+D	1.000E+00	4.188E+00	3.710E+00	2.913E+00	1.248E+00	1.109E-01	2.315E-05	7.071E-16	0.000E+00
Ra-228+D	Th-228+D	1.000E+00	8.154E-01	1.974E+00	2.926E+00	2.029E+00	1.957E-01	4.089E-05	1.249E-15	0.000E+00
Ra-228+D	ΣDSR(j)		5.003E+00	5.684E+00	5.838E+00	3.277E+00	3.066E-01	6.404E-05	1.956E-15	0.000E+00
Th-228+D	Th-228+D	1.000E+00	4.383E+00	3.051E+00	1.478E+00	1.170E-01	8.340E-05	8.064E-16	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	3.181E-02	3.181E-02	3.181E-02	3.181E-02	3.180E-02	3.178E-02	3.172E-02	3.151E-02
Th-230	Ra-226+D	1.000E+00	1.492E-03	4.504E-03	1.052E-02	3.150E-02	9.067E-02	2.891E-01	7.881E-01	1.942E+00
Th-230	Pb-210+D	1.000E+00	5.462E-06	3.380E-05	1.651E-04	1.329E-03	9.119E-03	5.684E-02	1.993E-01	5.315E-01
Th-230	ΣDSR(j)		3.331E-02	3.635E-02	4.250E-02	6.464E-02	1.316E-01	3.777E-01	1.019E+00	2.505E+00
Th-232	Th-232	1.000E+00	1.557E-01	1.557E-01	1.557E-01	1.557E-01	1.557E-01	1.557E-01	1.556E-01	1.556E-01
Th-232	Ra-228+D	1.000E+00	2.528E-01	7.274E-01	1.522E+00	3.179E+00	4.312E+00	4.422E+00	4.421E+00	4.420E+00
Th-232	Th-228+D	1.000E+00	3.427E-02	2.087E-01	8.266E-01	3.075E+00	5.017E+00	5.212E+00	5.211E+00	5.209E+00
Th-232	ΣDSR(j)		4.427E-01	1.092E+00	2.504E+00	6.410E+00	9.484E+00	9.789E+00	9.788E+00	9.784E+00
U-234	U-234	1.000E+00	2.629E-02	2.628E-02	2.624E-02	2.611E-02	2.573E-02	2.447E-02	2.120E-02	1.283E-02
U-234	Th-230	1.000E+00	1.484E-07	4.354E-07	1.007E-06	3.001E-06	8.644E-06	2.776E-05	7.730E-05	2.033E-04
U-234	Ra-226+D	1.000E+00	4.447E-09	3.141E-08	1.666E-07	1.488E-06	1.242E-05	1.297E-04	1.039E-03	7.943E-03
U-234	Pb-210+D	1.000E+00	1.302E-11	1.706E-10	1.814E-09	4.339E-08	8.971E-07	2.046E-05	2.386E-04	2.114E-03
U-234	ΣDSR(j)		2.630E-02	2.628E-02	2.624E-02	2.611E-02	2.576E-02	2.465E-02	2.256E-02	2.309E-02
U-235+D	U-235+D	1.000E+00	4.133E-01	4.130E-01	4.125E-01	4.104E-01	4.046E-01	3.848E-01	3.336E-01	2.023E-01
U-235+D	Pa-231	1.000E+00	3.002E-05	9.216E-05	2.166E-04	6.492E-04	1.861E-03	5.832E-03	1.509E-02	3.023E-02
U-235+D	Ac-227+D	1.000E+00	2.943E-07	1.935E-06	9.746E-06	7.948E-05	5.406E-04	3.249E-03	1.065E-02	2.303E-02
U-235+D	ΣDSR(j)		4.134E-01	4.131E-01	4.127E-01	4.111E-01	4.070E-01	3.939E-01	3.593E-01	2.555E-01
U-238	U-238	5.400E-05	1.272E-06	1.271E-06	1.269E-06	1.263E-06	1.245E-06	1.184E-06	1.027E-06	6.225E-07
U-238+D	U-238+D	9.999E-01	1.019E-01	1.018E-01	1.016E-01	1.011E-01	9.970E-02	9.483E-02	8.220E-02	4.984E-02
U-238+D	U-234	9.999E-01	3.727E-08	1.117E-07	2.603E-07	7.771E-07	2.225E-06	6.974E-06	1.807E-05	3.644E-05
U-238+D	Th-230	9.999E-01	1.435E-13	9.720E-13	5.058E-12	4.474E-11	3.726E-10	3.909E-09	3.177E-08	2.548E-07
U-238+D	Ra-226+D	9.999E-01	3.133E-15	4.754E-14	5.573E-13	1.477E-11	3.574E-10	1.227E-08	2.913E-07	7.165E-06
U-238+D	Pb-210+D	9.999E-01	7.749E-18	2.077E-16	4.714E-15	3.314E-13	2.028E-11	1.626E-09	6.128E-08	1.852E-06
U-238+D	ΣDSR(j)		1.019E-01	1.018E-01	1.016E-01	1.011E-01	9.970E-02	9.484E-02	8.222E-02	4.989E-02

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Nuclide	(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
Ac-227		1.063E+01	1.099E+01	1.176E+01	1.488E+01	2.914E+01	3.063E+02	2.542E+05	*7.232E+13
Pb-210		1.295E+01	1.337E+01	1.423E+01	1.774E+01	3.327E+01	3.005E+02	1.617E+05	*7.634E+13
Ra-226		3.574E+00	3.547E+00	3.497E+00	3.359E+00	3.146E+00	3.098E+00	3.703E+00	7.173E+00
Ra-228		4.997E+00	4.398E+00	4.282E+00	7.628E+00	8.155E+01	3.904E+05	*2.726E+14	*2.726E+14
Th-228		5.704E+00	8.195E+00	1.691E+01	2.137E+02	2.997E+05	*8.195E+14	*8.195E+14	*8.195E+14
Th-230		7.505E+02	6.878E+02	5.883E+02	3.868E+02	1.900E+02	6.619E+01	2.453E+01	9.981E+00
Th-232		5.647E+01	2.290E+01	9.983E+00	3.900E+00	2.636E+00	2.554E+00	2.554E+00	2.555E+00
U-234		9.508E+02	9.514E+02	9.528E+02	9.574E+02	9.706E+02	1.014E+03	1.108E+03	1.083E+03
U-235		6.048E+01	6.051E+01	6.058E+01	6.081E+01	6.143E+01	6.347E+01	6.958E+01	9.784E+01
U-238		2.454E+02	2.456E+02	2.460E+02	2.472E+02	2.507E+02	2.636E+02	3.041E+02	5.011E+02

*At specific activity limit

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 = 1.000E+03 years

Nuclide	Initial	tmin	DSR(i,tmin)	G(i,tmin)	DSR(i,tmax)	G(i,tmax)
(i)	(pCi/g)	(years)		(pCi/g)		(pCi/g)
Ac-227	9.000E-02	0.000E+00	2.352E+00	1.063E+01	5.971E-15	*7.232E+13
Pb-210	3.400E-01	0.000E+00	1.930E+00	1.295E+01	4.274E-14	*7.634E+13
Ra-226	2.600E-01	65.3 ± 0.1	8.175E+00	3.058E+00	3.486E+00	7.173E+00
Ra-228	2.000E-02	2.199 ± 0.004	5.912E+00	4.229E+00	0.000E+00	*2.726E+14
Th-228	7.000E-02	0.000E+00	4.383E+00	5.704E+00	0.000E+00	*8.195E+14
Th-230	1.890E+00	1.000E+03	2.505E+00	9.981E+00	2.505E+00	9.981E+00
Th-232	2.000E-02	103.5 ± 0.2	9.789E+00	2.554E+00	9.784E+00	2.555E+00
U-234	3.910E+00	0.000E+00	2.630E-02	9.508E+02	2.309E-02	1.083E+03
U-235	2.300E-01	0.000E+00	4.134E-01	6.048E+01	2.555E-01	9.784E+01
U-238	3.910E+00	0.000E+00	1.019E-01	2.454E+02	4.989E-02	5.011E+02

*At specific activity limit

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr							
			t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02
Ac-227	Ac-227	1.000E+00	2.116E-01	2.047E-01	1.914E-01	1.512E-01	7.723E-02	7.347E-03	8.852E-06	5.374E-16
Ac-227	U-235	1.000E+00	6.770E-08	4.449E-07	2.242E-06	1.828E-05	1.243E-04	7.472E-04	2.451E-03	5.297E-03
Ac-227	ΣDOSE(j)		2.116E-01	2.047E-01	1.914E-01	1.513E-01	7.735E-02	8.094E-03	2.459E-03	5.297E-03
Pb-210	Pb-210	1.000E+00	6.562E-01	6.359E-01	5.972E-01	4.792E-01	2.555E-01	2.829E-02	5.256E-05	1.453E-14
Pb-210	Ra-226	1.000E+00	9.079E-03	2.463E-02	5.386E-02	1.424E-01	3.071E-01	4.518E-01	3.922E-01	2.025E-01
Pb-210	Th-230	1.000E+00	1.032E-05	6.388E-05	3.120E-04	2.512E-03	1.723E-02	1.074E-01	3.767E-01	1.004E+00
Pb-210	U-234	1.000E+00	5.092E-11	6.669E-10	7.092E-09	1.697E-07	3.508E-06	8.000E-05	9.328E-04	8.265E-03
Pb-210	U-238	9.999E-01	3.030E-17	8.121E-16	1.843E-14	1.296E-12	7.930E-11	6.357E-09	2.396E-07	7.242E-06
Pb-210	ΣDOSE(j)		6.653E-01	6.606E-01	6.513E-01	6.241E-01	5.798E-01	5.876E-01	7.699E-01	1.215E+00
Ra-226	Ra-226	1.000E+00	1.810E+00	1.808E+00	1.805E+00	1.793E+00	1.759E+00	1.647E+00	1.363E+00	7.037E-01
Ra-226	Th-230	1.000E+00	2.820E-03	8.512E-03	1.989E-02	5.954E-02	1.714E-01	5.464E-01	1.489E+00	3.670E+00
Ra-226	U-234	1.000E+00	1.739E-08	1.228E-07	6.513E-07	5.817E-06	4.854E-05	5.071E-04	4.062E-03	3.106E-02
Ra-226	U-238	9.999E-01	1.225E-14	1.859E-13	2.179E-12	5.774E-11	1.397E-09	4.796E-08	1.139E-06	2.802E-05
Ra-226	ΣDOSE(j)		1.813E+00	1.817E+00	1.825E+00	1.852E+00	1.931E+00	2.194E+00	2.857E+00	4.405E+00
Ra-228	Ra-228	1.000E+00	8.376E-02	7.421E-02	5.825E-02	2.496E-02	2.217E-03	4.629E-07	1.414E-17	0.000E+00
Ra-228	Th-232	1.000E+00	5.055E-03	1.455E-02	3.044E-02	6.359E-02	8.624E-02	8.844E-02	8.843E-02	8.839E-02
Ra-228	ΣDOSE(j)		8.881E-02	8.876E-02	8.869E-02	8.855E-02	8.845E-02	8.844E-02	8.843E-02	8.839E-02
Th-228	Ra-228	1.000E+00	1.631E-02	3.947E-02	5.852E-02	4.059E-02	3.914E-03	8.179E-07	2.498E-17	0.000E+00
Th-228	Th-228	1.000E+00	3.068E-01	2.136E-01	1.035E-01	8.191E-03	5.838E-06	5.645E-17	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	6.854E-04	4.174E-03	1.653E-02	6.149E-02	1.003E-01	1.042E-01	1.042E-01	1.042E-01
Th-228	ΣDOSE(j)		3.238E-01	2.572E-01	1.785E-01	1.103E-01	1.043E-01	1.042E-01	1.042E-01	1.042E-01
Th-230	Th-230	1.000E+00	6.012E-02	6.012E-02	6.012E-02	6.012E-02	6.011E-02	6.007E-02	5.995E-02	5.955E-02
Th-230	U-234	1.000E+00	5.801E-07	1.702E-06	3.938E-06	1.174E-05	3.380E-05	1.085E-04	3.022E-04	7.950E-04
Th-230	U-238	9.999E-01	5.610E-13	3.801E-12	1.978E-11	1.749E-10	1.457E-09	1.528E-08	1.242E-07	9.964E-07
Th-230	ΣDOSE(j)		6.012E-02	6.013E-02	6.013E-02	6.013E-02	6.014E-02	6.017E-02	6.025E-02	6.035E-02
Th-232	Th-232	1.000E+00	3.113E-03	3.113E-03	3.113E-03	3.113E-03	3.113E-03	3.113E-03	3.113E-03	3.111E-03
U-234	U-234	1.000E+00	1.028E-01	1.027E-01	1.026E-01	1.021E-01	1.006E-01	9.569E-02	8.290E-02	5.017E-02
U-234	U-238	9.999E-01	1.457E-07	4.369E-07	1.018E-06	3.038E-06	8.700E-06	2.727E-05	7.065E-05	1.425E-04
U-234	ΣDOSE(j)		1.028E-01	1.027E-01	1.026E-01	1.021E-01	1.006E-01	9.572E-02	8.297E-02	5.031E-02
U-235	U-235	1.000E+00	9.507E-02	9.500E-02	9.487E-02	9.439E-02	9.305E-02	8.851E-02	7.672E-02	4.652E-02
Pa-231	U-235	1.000E+00	6.904E-06	2.120E-05	4.981E-05	1.493E-04	4.281E-04	1.341E-03	3.470E-03	6.954E-03
U-238	U-238	5.400E-05	4.974E-06	4.971E-06	4.964E-06	4.939E-06	4.869E-06	4.631E-06	4.014E-06	2.434E-06
U-238	U-238	9.999E-01	3.983E-01	3.980E-01	3.974E-01	3.954E-01	3.898E-01	3.708E-01	3.214E-01	1.949E-01
U-238	ΣDOSE(j)		3.983E-01	3.980E-01	3.974E-01	3.954E-01	3.898E-01	3.708E-01	3.214E-01	1.949E-01

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g								
			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
Ac-227	Ac-227	1.000E+00		9.000E-02	8.703E-02	8.137E-02	6.431E-02	3.284E-02	3.124E-03	3.764E-06	2.285E-16
Ac-227	U-235	1.000E+00		0.000E+00	7.656E-08	6.733E-07	6.912E-06	5.038E-05	3.099E-04	1.022E-03	2.212E-03
Ac-227	ΣS(j):			9.000E-02	8.703E-02	8.137E-02	6.432E-02	3.289E-02	3.434E-03	1.026E-03	2.212E-03
Pb-210	Pb-210	1.000E+00		3.400E-01	3.295E-01	3.094E-01	2.483E-01	1.324E-01	1.466E-02	2.723E-05	7.529E-15
Pb-210	Ra-226	1.000E+00		0.000E+00	7.952E-03	2.310E-02	6.900E-02	1.544E-01	2.297E-01	1.996E-01	1.030E-01
Pb-210	Th-230	1.000E+00		0.000E+00	1.259E-05	1.109E-04	1.145E-03	8.476E-03	5.421E-02	1.912E-01	5.107E-01
Pb-210	U-234	1.000E+00		0.000E+00	7.834E-11	2.081E-09	7.284E-08	1.689E-06	4.011E-05	4.725E-04	4.199E-03
Pb-210	U-238	9.999E-01		0.000E+00	5.561E-17	4.444E-15	5.239E-13	3.742E-11	3.166E-09	1.211E-07	3.677E-06
Pb-210	ΣS(j):			3.400E-01	3.374E-01	3.326E-01	3.184E-01	2.953E-01	2.986E-01	3.913E-01	6.179E-01
Ra-226	Ra-226	1.000E+00		2.600E-01	2.598E-01	2.593E-01	2.576E-01	2.527E-01	2.366E-01	1.958E-01	1.011E-01
Ra-226	Th-230	1.000E+00		0.000E+00	8.184E-04	2.453E-03	8.149E-03	2.422E-02	7.809E-02	2.136E-01	5.268E-01
Ra-226	U-234	1.000E+00		0.000E+00	7.620E-09	6.850E-08	7.582E-07	6.748E-06	7.212E-05	5.816E-04	4.457E-03
Ra-226	U-238	9.999E-01		0.000E+00	7.200E-15	1.942E-13	7.161E-12	1.911E-10	6.788E-09	1.628E-07	4.018E-06
Ra-226	ΣS(j):			2.600E-01	2.606E-01	2.617E-01	2.657E-01	2.570E-01	2.347E-01	4.100E-01	6.324E-01
Ra-228	Ra-228	1.000E+00		2.000E-02	1.772E-02	1.391E-02	5.960E-03	5.294E-04	1.105E-07	3.377E-18	0.000E+00
Ra-228	Th-232	1.000E+00		0.000E+00	2.271E-03	6.065E-03	1.398E-02	1.939E-02	1.991E-02	1.991E-02	1.990E-02
Ra-228	ΣS(j):			2.000E-02	1.999E-02	1.997E-02	1.994E-02	1.992E-02	1.991E-02	1.991E-02	1.990E-02
Th-228	Ra-228	1.000E+00		0.000E+00	5.704E-03	1.076E-02	8.149E-03	7.945E-04	1.660E-07	5.071E-18	0.000E+00
Th-228	Th-228	1.000E+00		7.000E-02	4.872E-02	2.361E-02	1.869E-03	1.332E-06	1.288E-17	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00		0.000E+00	3.728E-04	2.485E-03	1.127E-02	1.912E-02	1.991E-02	1.991E-02	1.990E-02
Th-228	ΣS(j):			7.000E-02	5.480E-02	3.685E-02	2.129E-02	1.992E-02	1.991E-02	1.991E-02	1.990E-02
Th-230	Th-230	1.000E+00		1.890E+00	1.890E+00	1.890E+00	1.890E+00	1.889E+00	1.888E+00	1.885E+00	1.872E+00
Th-230	U-234	1.000E+00		0.000E+00	3.518E-05	1.055E-04	3.507E-04	1.044E-03	3.395E-03	9.486E-03	2.498E-02
Th-230	U-238	9.999E-01		0.000E+00	4.987E-11	4.484E-10	4.965E-09	4.426E-08	4.755E-07	3.892E-06	3.130E-05
Th-230	ΣS(j):			1.890E+00	1.890E+00	1.890E+00	1.890E+00	1.891E+00	1.892E+00	1.894E+00	1.897E+00
Th-232	Th-232	1.000E+00		2.000E-02	2.000E-02	2.000E-02	2.000E-02	2.000E-02	2.000E-02	2.000E-02	1.999E-02
U-234	U-234	1.000E+00		3.910E+00	3.907E+00	3.902E+00	3.882E+00	3.827E+00	3.639E+00	3.153E+00	1.908E+00
U-234	U-238	9.999E-01		0.000E+00	1.108E-05	3.318E-05	1.100E-04	3.255E-04	1.032E-03	2.682E-03	5.416E-03
U-234	ΣS(j):			3.910E+00	3.907E+00	3.902E+00	3.882E+00	3.827E+00	3.640E+00	3.155E+00	1.913E+00
U-235	U-235	1.000E+00		2.300E-01	2.298E-01	2.295E-01	2.284E-01	2.251E-01	2.141E-01	1.856E-01	1.125E-01
Pa-231	U-235	1.000E+00		0.000E+00	4.863E-06	1.457E-05	4.831E-05	1.429E-04	4.526E-04	1.174E-03	2.356E-03
U-238	U-238	5.400E-05		2.111E-04	2.110E-04	2.107E-04	2.096E-04	2.067E-04	1.966E-04	1.704E-04	1.033E-04
U-238	U-238	9.999E-01		3.910E+00	3.907E+00	3.901E+00	3.882E+00	3.827E+00	3.640E+00	3.155E+00	1.913E+00
U-238	ΣS(j):			3.910E+00	3.907E+00	3.902E+00	3.882E+00	3.827E+00	3.640E+00	3.155E+00	1.913E+00

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 4.41 seconds

EXCESS CANCER RISK: All Nuclides Summed, All Pathways Summed

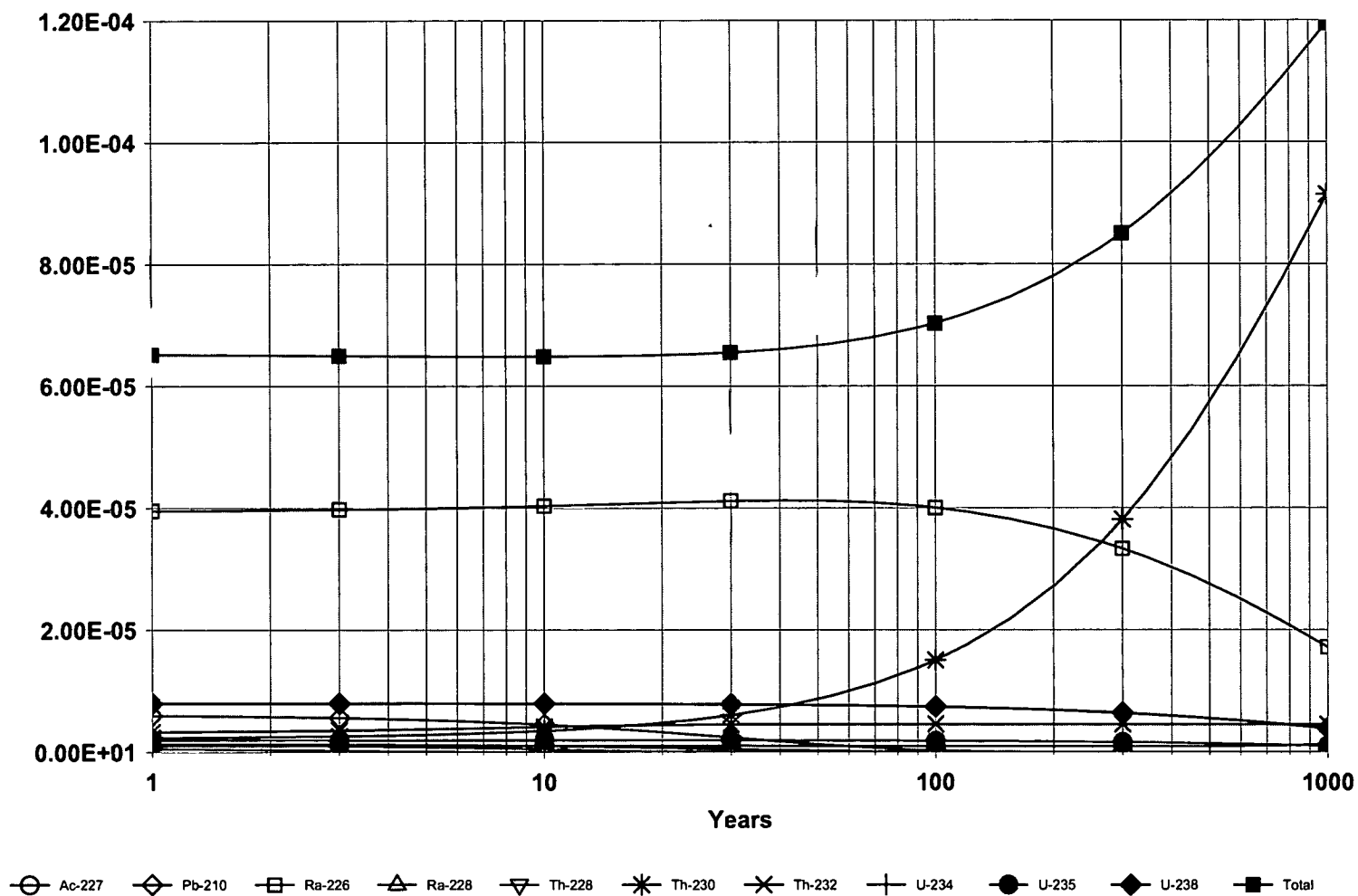


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Amount of Intake Quantities and Excess Cancer Risks	
Time= 0.000E+00	5
Time= 1.000E+00	9
Time= 3.000E+00	13
Time= 1.000E+01	17
Time= 3.000E+01	21
Time= 1.000E+02	25
Time= 3.000E+02	29
Time= 1.000E+03	33

Cancer Risk Slope Factors Summary Table
 Risk Library: FGR 13 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Ac-227+D	1.47E-06	3.48E-10	SLPF(1,1)
Sf-1	Pa-231	1.39E-07	1.39E-07	SLPF(2,1)
Sf-1	Pb-210+D	4.21E-09	1.41E-09	SLPF(3,1)
Sf-1	Ra-226+D	8.49E-06	2.29E-08	SLPF(4,1)
Sf-1	Ra-228+D	4.53E-06	0.00E+00	SLPF(5,1)
Sf-1	Th-228+D	7.76E-06	5.59E-09	SLPF(6,1)
Sf-1	Th-230	8.19E-10	8.19E-10	SLPF(7,1)
Sf-1	Th-232	3.42E-10	3.42E-10	SLPF(8,1)
Sf-1	U-234	2.52E-10	2.52E-10	SLPF(9,1)
Sf-1	U-235+D	5.43E-07	5.18E-07	SLPF(10,1)
Sf-1	U-238	4.99E-11	4.99E-11	SLPF(11,1)
Sf-1	U-238+D	1.14E-07	4.99E-11	SLPF(12,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Ac-227+D	2.13E-07	1.49E-07	SLPF(1,2)
Sf-2	Pa-231	7.62E-08	7.62E-08	SLPF(2,2)
Sf-2	Pb-210+D	3.08E-08	1.58E-08	SLPF(3,2)
Sf-2	Ra-226+D	2.83E-08	2.82E-08	SLPF(4,2)
Sf-2	Ra-228+D	4.37E-08	4.37E-08	SLPF(5,2)
Sf-2	Th-228+D	1.44E-07	1.32E-07	SLPF(6,2)
Sf-2	Th-230	3.40E-08	3.40E-08	SLPF(7,2)
Sf-2	Th-232	4.33E-08	4.33E-08	SLPF(8,2)
Sf-2	U-234	2.78E-08	2.78E-08	SLPF(9,2)
Sf-2	U-235+D	2.50E-08	2.50E-08	SLPF(10,2)
Sf-2	U-238	2.36E-08	2.36E-08	SLPF(11,2)
Sf-2	U-238+D	2.36E-08	2.36E-08	SLPF(12,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	6.53E-10	2.45E-10	SLPF(1,3)
Sf-3	Pa-231	2.26E-10	2.26E-10	SLPF(2,3)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(3,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(4,3)
Sf-3	Ra-228+D	1.43E-09	1.43E-09	SLPF(5,3)
Sf-3	Th-228+D	4.22E-10	1.48E-10	SLPF(6,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(7,3)
Sf-3	Th-232	1.33E-10	1.33E-10	SLPF(8,3)
Sf-3	U-234	9.55E-11	9.55E-11	SLPF(9,3)
Sf-3	U-235+D	9.76E-11	9.44E-11	SLPF(10,3)
Sf-3	U-238	8.66E-11	8.66E-11	SLPF(11,3)
Sf-3	U-238+D	1.21E-10	8.66E-11	SLPF(12,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	4.86E-10	2.01E-10	SLPF(1,4)
Sf-3	Pa-231	1.73E-10	1.73E-10	SLPF(2,4)
Sf-3	Pb-210+D	2.66E-09	8.81E-10	SLPF(3,4)
Sf-3	Ra-226+D	3.86E-10	3.85E-10	SLPF(4,4)
Sf-3	Ra-228+D	1.04E-09	1.04E-09	SLPF(5,4)
Sf-3	Th-228+D	2.99E-10	1.07E-10	SLPF(6,4)
Sf-3	Th-230	9.10E-11	9.10E-11	SLPF(7,4)
Sf-3	Th-232	1.01E-10	1.01E-10	SLPF(8,4)

Cancer Risk Slope Factors Summary Table (continued)
 Risk Library: FGR 13 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-3	U-234	7.07E-11	7.07E-11	SLPF(9,4)
Sf-3	U-235+D	7.18E-11	6.96E-11	SLPF(10,4)
Sf-3	U-238	6.40E-11	6.40E-11	SLPF(11,4)
Sf-3	U-238+D	8.71E-11	6.40E-11	SLPF(12,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	6.53E-10	2.45E-10	SLPF(1,5)
Sf-3	Pa-231	2.26E-10	2.26E-10	SLPF(2,5)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(3,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(4,5)
Sf-3	Ra-228+D	1.43E-09	1.43E-09	SLPF(5,5)
Sf-3	Th-228+D	4.22E-10	1.48E-10	SLPF(6,5)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(7,5)
Sf-3	Th-232	1.33E-10	1.33E-10	SLPF(8,5)
Sf-3	U-234	9.55E-11	9.55E-11	SLPF(9,5)
Sf-3	U-235+D	9.76E-11	9.44E-11	SLPF(10,5)
Sf-3	U-238	8.66E-11	8.66E-11	SLPF(11,5)
Sf-3	U-238+D	1.21E-10	8.66E-11	SLPF(12,5)
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	7.60E+02	7.60E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	5.70E+02	5.70E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.50E+02	1.50E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	2.50E+02	2.50E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

Nuclide (i)	Slope(i)* t=	ETFG(i,t) At Time in Years (dimensionless)							
		0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	3.480E-10	5.157E-01	5.157E-01	5.157E-01	5.157E-01	5.157E-01	5.157E-01	5.157E-01	5.157E-01
Ac-228	4.530E-06	5.076E-01	5.076E-01	5.076E-01	5.076E-01	5.076E-01	5.076E-01	5.076E-01	5.076E-01
At-218	3.570E-09	5.228E-01	5.228E-01	5.228E-01	5.228E-01	5.228E-01	5.228E-01	5.228E-01	5.228E-01
Bi-210	2.760E-09	5.094E-01	5.094E-01	5.094E-01	5.094E-01	5.094E-01	5.094E-01	5.094E-01	5.094E-01
Bi-211	1.880E-07	5.096E-01	5.096E-01	5.096E-01	5.096E-01	5.096E-01	5.096E-01	5.096E-01	5.096E-01
Bi-212	8.870E-07	5.055E-01	5.055E-01	5.055E-01	5.055E-01	5.055E-01	5.055E-01	5.055E-01	5.055E-01
Bi-214	7.480E-06	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01
Fr-223	1.400E-07	5.122E-01	5.122E-01	5.122E-01	5.122E-01	5.122E-01	5.122E-01	5.122E-01	5.122E-01
Pa-231	1.390E-07	5.097E-01	5.097E-01	5.097E-01	5.097E-01	5.097E-01	5.097E-01	5.097E-01	5.097E-01
Pa-234	8.710E-06	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01
Pa-234m	6.870E-08	5.063E-01	5.063E-01	5.063E-01	5.063E-01	5.063E-01	5.063E-01	5.063E-01	5.063E-01
Pb-210	1.410E-09	5.286E-01	5.286E-01	5.286E-01	5.286E-01	5.286E-01	5.286E-01	5.286E-01	5.286E-01
Pb-211	2.290E-07	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01	5.067E-01
Pb-212	5.090E-07	5.129E-01	5.129E-01	5.129E-01	5.129E-01	5.129E-01	5.129E-01	5.129E-01	5.129E-01
Pb-214	9.820E-07	5.093E-01	5.093E-01	5.093E-01	5.093E-01	5.093E-01	5.093E-01	5.093E-01	5.093E-01
Po-210	3.950E-11	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01
Po-211	3.580E-08	5.046E-01	5.046E-01	5.046E-01	5.046E-01	5.046E-01	5.046E-01	5.046E-01	5.046E-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	3.860E-10	5.046E-01	5.046E-01	5.046E-01	5.046E-01	5.046E-01	5.046E-01	5.046E-01	5.046E-01
Po-215	7.480E-10	5.073E-01	5.073E-01	5.073E-01	5.073E-01	5.073E-01	5.073E-01	5.073E-01	5.073E-01
Po-216	7.870E-11	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01
Po-218	4.260E-11	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01	5.062E-01
Ra-223	4.340E-07	5.119E-01	5.119E-01	5.119E-01	5.119E-01	5.119E-01	5.119E-01	5.119E-01	5.119E-01
Ra-224	3.720E-08	5.121E-01	5.121E-01	5.121E-01	5.121E-01	5.121E-01	5.121E-01	5.121E-01	5.121E-01
Ra-226	2.290E-08	5.133E-01	5.133E-01	5.133E-01	5.133E-01	5.133E-01	5.133E-01	5.133E-01	5.133E-01
Ra-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
Rn-219	2.250E-07	5.095E-01	5.095E-01	5.095E-01	5.095E-01	5.095E-01	5.095E-01	5.095E-01	5.095E-01
Rn-220	1.700E-09	5.052E-01	5.052E-01	5.052E-01	5.052E-01	5.052E-01	5.052E-01	5.052E-01	5.052E-01
Rn-222	1.740E-09	5.052E-01	5.052E-01	5.052E-01	5.052E-01	5.052E-01	5.052E-01	5.052E-01	5.052E-01
Th-227	3.780E-07	5.125E-01	5.125E-01	5.125E-01	5.125E-01	5.125E-01	5.125E-01	5.125E-01	5.125E-01
Th-228	5.590E-09	5.148E-01	5.148E-01	5.148E-01	5.148E-01	5.148E-01	5.148E-01	5.148E-01	5.148E-01
Th-230	8.190E-10	5.167E-01	5.167E-01	5.167E-01	5.167E-01	5.167E-01	5.167E-01	5.167E-01	5.167E-01
Th-231	2.450E-08	5.173E-01	5.173E-01	5.173E-01	5.173E-01	5.173E-01	5.173E-01	5.173E-01	5.173E-01
Th-232	3.420E-10	5.193E-01	5.193E-01	5.193E-01	5.193E-01	5.193E-01	5.193E-01	5.193E-01	5.193E-01
Th-234	1.630E-08	5.180E-01	5.180E-01	5.180E-01	5.180E-01	5.180E-01	5.180E-01	5.180E-01	5.180E-01
Tl-207	1.520E-08	5.069E-01	5.069E-01	5.069E-01	5.069E-01	5.069E-01	5.069E-01	5.069E-01	5.069E-01
Tl-208	1.760E-05	5.081E-01	5.081E-01	5.081E-01	5.081E-01	5.081E-01	5.081E-01	5.081E-01	5.081E-01
Tl-210	0.000E+00	5.384E-01	5.384E-01	5.384E-01	5.384E-01	5.384E-01	5.384E-01	5.384E-01	5.384E-01
U-234	2.520E-10	5.196E-01	5.196E-01	5.196E-01	5.196E-01	5.196E-01	5.196E-01	5.196E-01	5.196E-01
U-235	5.180E-07	5.131E-01	5.131E-01	5.131E-01	5.131E-01	5.131E-01	5.131E-01	5.131E-01	5.131E-01
U-238	4.990E-11	5.338E-01	5.338E-01	5.338E-01	5.338E-01	5.338E-01	5.338E-01	5.338E-01	5.338E-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	
Ac-227	1.554E-04	5.329E+00	0.000E+00	0.000E+00	2.897E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.226E+00
Pa-231	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
Pb-210	5.872E-04	8.052E+01	0.000E+00	0.000E+00	1.094E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.146E+01
Ra-226	4.490E-04	2.463E+02	0.000E+00	0.000E+00	8.369E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.546E+02
Ra-228	3.454E-05	1.894E+01	0.000E+00	0.000E+00	6.438E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.959E+01
Th-228	1.209E-04	1.659E+00	0.000E+00	0.000E+00	2.253E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.912E+00
Th-230	3.264E-03	4.478E+01	0.000E+00	0.000E+00	6.084E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.056E+02
Th-232	3.454E-05	4.739E-01	0.000E+00	0.000E+00	6.438E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.118E+00
U-234	6.752E-03	2.315E+02	0.000E+00	0.000E+00	1.259E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.574E+02
U-235	3.972E-04	1.362E+01	0.000E+00	0.000E+00	7.403E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.102E+01
U-238	6.752E-03	2.315E+02	0.000E+00	0.000E+00	1.259E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.574E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.274E-06	0.0195	6.254E-10	0.0000	6.579E-08	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	3.576E-08	0.0005
Pa-231	1.529E-10	0.0000	2.840E-13	0.0000	1.153E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.570E-11	0.0000
Pb-210	2.038E-08	0.0003	4.985E-10	0.0000	7.674E-06	0.1174	0.000E+00	0.0000	0.000E+00	0.0000	1.040E-06	0.0159
Ra-226	3.466E-05	0.5303	3.933E-10	0.0000	3.927E-06	0.0601	0.000E+00	0.0000	0.000E+00	0.0000	1.335E-07	0.0020
Ra-228	1.375E-06	0.0210	4.519E-11	0.0000	8.086E-07	0.0124	0.000E+00	0.0000	0.000E+00	0.0000	2.759E-08	0.0004
Th-228	2.905E-06	0.0444	1.832E-10	0.0000	1.026E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.001E-08	0.0002
Th-230	2.400E-08	0.0004	3.330E-09	0.0001	1.599E-07	0.0024	0.000E+00	0.0000	0.000E+00	0.0000	2.172E-07	0.0033
Th-232	1.066E-10	0.0000	4.487E-11	0.0000	1.891E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.569E-09	0.0000
U-234	1.520E-08	0.0002	5.571E-09	0.0001	6.563E-07	0.0100	0.000E+00	0.0000	0.000E+00	0.0000	3.567E-07	0.0055
U-235	1.901E-06	0.0291	2.947E-10	0.0000	3.947E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	2.146E-08	0.0003
U-238	6.700E-06	0.1025	4.736E-09	0.0001	8.289E-07	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	4.505E-07	0.0069
Total	4.888E-05	0.7478	1.572E-08	0.0002	1.417E-05	0.2168	0.000E+00	0.0000	0.000E+00	0.0000	2.296E-06	0.0351

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.377E-06	0.0211
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.842E-10	0.0000
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	8.735E-06	0.1336
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	3.873E-05	0.5925
Ra-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	2.212E-06	0.0338
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	2.925E-06	0.0448
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	4.044E-07	0.0062
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.611E-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.034E-06	0.0158
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.962E-06	0.0300
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.985E-06	0.1222
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	6.536E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(lrn,i,t) and CNRS9W(lrn,i,t) for Inhalation of
 Radon and its Decay Products at t= 0.000E+00 years

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.274E-06	0.0195	6.252E-10	0.0000	0.000E+00	0.0000	6.577E-08	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	3.575E-08	0.0005
Pb-210	1.434E-08	0.0002	3.507E-10	0.0000	0.000E+00	0.0000	5.384E-06	0.0824	0.000E+00	0.0000	0.000E+00	0.0000	7.318E-07	0.0112
Ra-226	3.310E-05	0.5064	5.184E-10	0.0000	0.000E+00	0.0000	5.965E-06	0.0913	0.000E+00	0.0000	0.000E+00	0.0000	4.257E-07	0.0065
Ra-228	9.956E-07	0.0152	5.161E-11	0.0000	0.000E+00	0.0000	2.206E-07	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	9.575E-09	0.0001
Th-228	7.622E-07	0.0117	4.806E-11	0.0000	0.000E+00	0.0000	1.934E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.627E-09	0.0000
Th-230	1.595E-06	0.0244	3.351E-09	0.0001	0.000E+00	0.0000	4.127E-07	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	2.333E-07	0.0036
Th-232	2.523E-06	0.0386	1.735E-10	0.0000	0.000E+00	0.0000	5.981E-07	0.0092	0.000E+00	0.0000	0.000E+00	0.0000	2.797E-08	0.0004
U-234	1.549E-08	0.0002	5.572E-09	0.0001	0.000E+00	0.0000	6.564E-07	0.0100	0.000E+00	0.0000	0.000E+00	0.0000	3.568E-07	0.0055
U-235	1.902E-06	0.0291	2.952E-10	0.0000	0.000E+00	0.0000	3.961E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	2.148E-08	0.0003
U-238	6.700E-06	0.1025	4.736E-09	0.0001	0.000E+00	0.0000	8.289E-07	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	4.506E-07	0.0069
Total	4.888E-05	0.7478	1.572E-08	0.0002	0.000E+00	0.0000	1.417E-05	0.2168	0.000E+00	0.0000	0.000E+00	0.0000	2.296E-06	0.0351

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.376E-06	0.0211
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	6.131E-06	0.0938
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	3.949E-05	0.6042
Ra-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	1.226E-06	0.0188
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	7.668E-07	0.0117
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	2.244E-06	0.0343
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.149E-06	0.0482
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.034E-06	0.0158
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.963E-06	0.0300
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.985E-06	0.1222
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	6.536E-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	
Ac-227	1.503E-04	5.154E+00	0.000E+00	0.000E+00	2.801E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.955E+00
Pa-231	8.398E-09	1.122E-03	0.000E+00	0.000E+00	1.565E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.278E-03
Pb-210	5.827E-04	8.011E+01	0.000E+00	0.000E+00	1.086E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.097E+01
Ra-226	4.500E-04	2.468E+02	0.000E+00	0.000E+00	8.387E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.552E+02
Ra-228	3.452E-05	1.886E+01	0.000E+00	0.000E+00	6.435E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.950E+01
Th-228	9.464E-05	1.529E+00	0.000E+00	0.000E+00	1.764E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.293E+00
Th-230	3.264E-03	4.478E+01	0.000E+00	0.000E+00	6.084E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.056E+02
Th-232	3.454E-05	4.739E-01	0.000E+00	0.000E+00	6.438E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.118E+00
U-234	6.747E-03	2.314E+02	0.000E+00	0.000E+00	1.258E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.571E+02
U-235	3.969E-04	1.361E+01	0.000E+00	0.000E+00	7.398E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.101E+01
U-238	6.747E-03	2.314E+02	0.000E+00	0.000E+00	1.258E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.571E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.232E-06	0.0189	6.048E-10	0.0000	6.362E-08	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	3.458E-08	0.0005
Pa-231	1.630E-10	0.0000	3.028E-13	0.0000	1.230E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.674E-11	0.0000
Pb-210	2.029E-08	0.0003	4.962E-10	0.0000	7.639E-06	0.1172	0.000E+00	0.0000	0.000E+00	0.0000	1.035E-06	0.0159
Ra-226	3.474E-05	0.5329	3.941E-10	0.0000	3.936E-06	0.0604	0.000E+00	0.0000	0.000E+00	0.0000	1.338E-07	0.0021
Ra-228	1.375E-06	0.0211	4.518E-11	0.0000	8.084E-07	0.0124	0.000E+00	0.0000	0.000E+00	0.0000	2.758E-08	0.0004
Th-228	2.739E-06	0.0420	1.727E-10	0.0000	9.867E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	9.441E-09	0.0001
Th-230	2.400E-08	0.0004	3.330E-09	0.0001	1.599E-07	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	2.172E-07	0.0033
Th-232	1.066E-10	0.0000	4.487E-11	0.0000	1.891E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.569E-09	0.0000
U-234	1.519E-08	0.0002	5.567E-09	0.0001	6.558E-07	0.0101	0.000E+00	0.0000	0.000E+00	0.0000	3.565E-07	0.0055
U-235	1.900E-06	0.0291	2.945E-10	0.0000	3.944E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	2.144E-08	0.0003
U-238	6.696E-06	0.1027	4.732E-09	0.0001	8.283E-07	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	4.502E-07	0.0069
Total	4.874E-05	0.7477	1.568E-08	0.0002	1.414E-05	0.2170	0.000E+00	0.0000	0.000E+00	0.0000	2.289E-06	0.0351

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+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-06	0.0204
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.030E-10	0.0000
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	8.695E-06	0.1334
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	3.881E-05	0.5953
Ra-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	2.211E-06	0.0339
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	2.759E-06	0.0423
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	4.044E-07	0.0062
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.611E-09	0.0001
U-234	0.000E+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-06	0.0158
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.961E-06	0.0301
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.979E-06	0.1224
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	6.518E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.232E-06	0.0189	6.046E-10	0.0000	0.000E+00	0.0000	6.360E-08	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	3.457E-08	0.0005
Pb-210	1.389E-08	0.0002	3.399E-10	0.0000	0.000E+00	0.0000	5.217E-06	0.0800	0.000E+00	0.0000	0.000E+00	0.0000	7.092E-07	0.0109
Ra-226	3.307E-05	0.5073	5.261E-10	0.0000	0.000E+00	0.0000	6.085E-06	0.0934	0.000E+00	0.0000	0.000E+00	0.0000	4.424E-07	0.0068
Ra-228	9.442E-07	0.0145	4.964E-11	0.0000	0.000E+00	0.0000	1.957E-07	0.0030	0.000E+00	0.0000	0.000E+00	0.0000	8.697E-09	0.0001
Th-228	5.305E-07	0.0081	3.345E-11	0.0000	0.000E+00	0.0000	1.346E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.829E-09	0.0000
Th-230	1.699E-06	0.0261	3.353E-09	0.0001	0.000E+00	0.0000	4.317E-07	0.0066	0.000E+00	0.0000	0.000E+00	0.0000	2.347E-07	0.0036
Th-232	2.640E-06	0.0405	1.797E-10	0.0000	0.000E+00	0.0000	6.232E-07	0.0096	0.000E+00	0.0000	0.000E+00	0.0000	2.907E-08	0.0004
U-234	1.551E-08	0.0002	5.568E-09	0.0001	0.000E+00	0.0000	6.559E-07	0.0101	0.000E+00	0.0000	0.000E+00	0.0000	3.565E-07	0.0055
U-235	1.900E-06	0.0292	2.951E-10	0.0000	0.000E+00	0.0000	3.959E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	2.147E-08	0.0003
U-238	6.696E-06	0.1027	4.733E-09	0.0001	0.000E+00	0.0000	8.283E-07	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	4.502E-07	0.0069
Total	4.874E-05	0.7477	1.568E-08	0.0002	0.000E+00	0.0000	1.414E-05	0.2170	0.000E+00	0.0000	0.000E+00	0.0000	2.289E-06	0.0351

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+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-06	0.0204
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	5.941E-06	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	0.000E+00	0.0000	3.960E-05	0.6074
Ra-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	1.149E-06	0.0176
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	5.338E-07	0.0082
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	2.369E-06	0.0363
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.292E-06	0.0505
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.034E-06	0.0159
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.962E-06	0.0301
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.979E-06	0.1224
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	6.518E-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	
Ac-227	1.405E-04	4.819E+00	0.000E+00	0.000E+00	2.619E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.438E+00
Pa-231	2.516E-08	3.420E-03	0.000E+00	0.000E+00	4.689E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.889E-03
Pb-210	5.744E-04	7.897E+01	0.000E+00	0.000E+00	1.071E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.968E+01
Ra-226	4.520E-04	2.479E+02	0.000E+00	0.000E+00	8.424E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.563E+02
Ra-228	3.449E-05	1.884E+01	0.000E+00	0.000E+00	6.429E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.949E+01
Th-228	6.364E-05	1.104E+00	0.000E+00	0.000E+00	1.186E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.290E+00
Th-230	3.264E-03	4.479E+01	0.000E+00	0.000E+00	6.084E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.056E+02
Th-232	3.454E-05	4.739E-01	0.000E+00	0.000E+00	6.438E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.118E+00
U-234	6.738E-03	2.310E+02	0.000E+00	0.000E+00	1.256E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.566E+02
U-235	3.963E-04	1.359E+01	0.000E+00	0.000E+00	7.388E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.098E+01
U-238	6.738E-03	2.310E+02	0.000E+00	0.000E+00	1.256E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.566E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.152E-06	0.0177	5.655E-10	0.0000	5.949E-08	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	3.234E-08	0.0005
Pa-231	1.832E-10	0.0000	3.403E-13	0.0000	1.382E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.881E-11	0.0000
Pb-210	2.011E-08	0.0003	4.918E-10	0.0000	7.572E-06	0.1165	0.000E+00	0.0000	0.000E+00	0.0000	1.026E-06	0.0158
Ra-226	3.488E-05	0.5369	3.958E-10	0.0000	3.952E-06	0.0608	0.000E+00	0.0000	0.000E+00	0.0000	1.343E-07	0.0021
Ra-228	1.375E-06	0.0212	4.517E-11	0.0000	8.082E-07	0.0124	0.000E+00	0.0000	0.000E+00	0.0000	2.758E-08	0.0004
Th-228	2.543E-06	0.0391	1.603E-10	0.0000	9.369E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	8.765E-09	0.0001
Th-230	2.400E-08	0.0004	3.330E-09	0.0001	1.599E-07	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	2.172E-07	0.0033
Th-232	1.066E-10	0.0000	4.486E-11	0.0000	1.891E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.569E-09	0.0000
U-234	1.516E-08	0.0002	5.560E-09	0.0001	6.549E-07	0.0101	0.000E+00	0.0000	0.000E+00	0.0000	3.560E-07	0.0055
U-235	1.897E-06	0.0292	2.941E-10	0.0000	3.939E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	2.141E-08	0.0003
U-238	6.686E-06	0.1029	4.726E-09	0.0001	8.271E-07	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	4.496E-07	0.0069
Total	4.860E-05	0.7479	1.561E-08	0.0002	1.408E-05	0.2168	0.000E+00	0.0000	0.000E+00	0.0000	2.276E-06	0.0350

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+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-06	0.0192
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.406E-10	0.0000
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	8.619E-06	0.1327
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	3.897E-05	0.5998
Ra-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	2.211E-06	0.0340
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	2.562E-06	0.0394
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	4.045E-07	0.0062
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.611E-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.032E-06	0.0159
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.958E-06	0.0301
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.967E-06	0.1226
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	6.497E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.152E-06	0.0177	5.653E-10	0.0000	0.000E+00	0.0000	5.946E-08	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	3.232E-08	0.0005
Pb-210	1.305E-08	0.0002	3.191E-10	0.0000	0.000E+00	0.0000	4.899E-06	0.0754	0.000E+00	0.0000	0.000E+00	0.0000	6.659E-07	0.0102
Ra-226	3.301E-05	0.5080	5.408E-10	0.0000	0.000E+00	0.0000	6.314E-06	0.0972	0.000E+00	0.0000	0.000E+00	0.0000	4.743E-07	0.0073
Ra-228	8.096E-07	0.0125	4.328E-11	0.0000	0.000E+00	0.0000	1.530E-07	0.0024	0.000E+00	0.0000	0.000E+00	0.0000	7.063E-09	0.0001
Th-228	2.571E-07	0.0040	1.621E-11	0.0000	0.000E+00	0.0000	6.522E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.859E-10	0.0000
Th-230	1.907E-06	0.0293	3.356E-09	0.0001	0.000E+00	0.0000	4.708E-07	0.0072	0.000E+00	0.0000	0.000E+00	0.0000	2.376E-07	0.0037
Th-232	2.852E-06	0.0439	1.909E-10	0.0000	0.000E+00	0.0000	6.651E-07	0.0102	0.000E+00	0.0000	0.000E+00	0.0000	3.096E-08	0.0005
U-234	1.556E-08	0.0002	5.560E-09	0.0001	0.000E+00	0.0000	6.550E-07	0.0101	0.000E+00	0.0000	0.000E+00	0.0000	3.560E-07	0.0055
U-235	1.898E-06	0.0292	2.947E-10	0.0000	0.000E+00	0.0000	3.955E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	2.144E-08	0.0003
U-238	6.686E-06	0.1029	4.726E-09	0.0001	0.000E+00	0.0000	8.271E-07	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	4.496E-07	0.0069
Total	4.860E-05	0.7479	1.561E-08	0.0002	0.000E+00	0.0000	1.408E-05	0.2168	0.000E+00	0.0000	0.000E+00	0.0000	2.276E-06	0.0350

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+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	0.0191
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	5.579E-06	0.0859
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	3.980E-05	0.6125
Ra-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	9.705E-07	0.0149
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	2.586E-07	0.0040
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	2.619E-06	0.0403
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.548E-06	0.0546
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.032E-06	0.0159
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.959E-06	0.0302
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.967E-06	0.1226
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	6.497E-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	
Ac-227	1.111E-04	3.809E+00	0.000E+00	0.000E+00	2.070E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.879E+00
Pa-231	8.343E-08	1.141E-02	0.000E+00	0.000E+00	1.555E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.297E-02
Pb-210	5.499E-04	7.561E+01	0.000E+00	0.000E+00	1.025E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.586E+01
Ra-226	4.589E-04	2.517E+02	0.000E+00	0.000E+00	8.553E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.602E+02
Ra-228	3.444E-05	1.881E+01	0.000E+00	0.000E+00	6.419E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.945E+01
Th-228	3.676E-05	7.347E-01	0.000E+00	0.000E+00	6.852E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.420E+00
Th-230	3.264E-03	4.479E+01	0.000E+00	0.000E+00	6.084E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.056E+02
Th-232	3.454E-05	4.739E-01	0.000E+00	0.000E+00	6.438E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.118E+00
U-234	6.704E-03	2.299E+02	0.000E+00	0.000E+00	1.250E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.548E+02
U-235	3.944E-04	1.352E+01	0.000E+00	0.000E+00	7.351E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.087E+01
U-238	6.704E-03	2.299E+02	0.000E+00	0.000E+00	1.250E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.548E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	9.112E-07	0.0141	4.472E-10	0.0000	4.704E-08	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	2.557E-08	0.0004
Pa-231	2.534E-10	0.0000	4.706E-13	0.0000	1.912E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.602E-11	0.0000
Pb-210	1.960E-08	0.0003	4.794E-10	0.0000	7.381E-06	0.1139	0.000E+00	0.0000	0.000E+00	0.0000	1.000E-06	0.0154
Ra-226	3.539E-05	0.5459	4.015E-10	0.0000	4.010E-06	0.0618	0.000E+00	0.0000	0.000E+00	0.0000	1.363E-07	0.0021
Ra-228	1.374E-06	0.0212	4.515E-11	0.0000	8.079E-07	0.0125	0.000E+00	0.0000	0.000E+00	0.0000	2.757E-08	0.0004
Th-228	2.373E-06	0.0366	1.496E-10	0.0000	8.935E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	8.178E-09	0.0001
Th-230	2.400E-08	0.0004	3.330E-09	0.0001	1.599E-07	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	2.172E-07	0.0034
Th-232	1.066E-10	0.0000	4.486E-11	0.0000	1.891E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.569E-09	0.0000
U-234	1.509E-08	0.0002	5.532E-09	0.0001	6.516E-07	0.0101	0.000E+00	0.0000	0.000E+00	0.0000	3.542E-07	0.0055
U-235	1.888E-06	0.0291	2.926E-10	0.0000	3.919E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	2.130E-08	0.0003
U-238	6.653E-06	0.1026	4.702E-09	0.0001	8.230E-07	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	4.473E-07	0.0069
Total	4.865E-05	0.7503	1.542E-08	0.0002	1.393E-05	0.2149	0.000E+00	0.0000	0.000E+00	0.0000	2.241E-06	0.0346

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.843E-07	0.0152
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.711E-10	0.0000
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	8.402E-06	0.1296
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	3.954E-05	0.6098
Ra-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	2.210E-06	0.0341
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	2.390E-06	0.0369
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	4.045E-07	0.0062
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.611E-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.026E-06	0.0158
U-235	0.000E+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-06	0.0301
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.928E-06	0.1223
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	6.483E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	9.103E-07	0.0140	4.468E-10	0.0000	0.000E+00	0.0000	4.700E-08	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	2.555E-08	0.0004
Pb-210	1.047E-08	0.0002	2.561E-10	0.0000	0.000E+00	0.0000	3.932E-06	0.0606	0.000E+00	0.0000	0.000E+00	0.0000	5.344E-07	0.0082
Ra-226	3.279E-05	0.5058	5.847E-10	0.0000	0.000E+00	0.0000	7.001E-06	0.1080	0.000E+00	0.0000	0.000E+00	0.0000	5.702E-07	0.0088
Ra-228	3.855E-07	0.0059	2.097E-11	0.0000	0.000E+00	0.0000	6.599E-08	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	3.159E-09	0.0000
Th-228	2.035E-08	0.0003	1.283E-12	0.0000	0.000E+00	0.0000	5.163E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.014E-11	0.0000
Th-230	2.632E-06	0.0406	3.368E-09	0.0001	0.000E+00	0.0000	6.178E-07	0.0095	0.000E+00	0.0000	0.000E+00	0.0000	2.491E-07	0.0038
Th-232	3.341E-06	0.0515	2.174E-10	0.0000	0.000E+00	0.0000	7.527E-07	0.0116	0.000E+00	0.0000	0.000E+00	0.0000	3.508E-08	0.0005
U-234	1.578E-08	0.0002	5.533E-09	0.0001	0.000E+00	0.0000	6.518E-07	0.0101	0.000E+00	0.0000	0.000E+00	0.0000	3.543E-07	0.0055
U-235	1.889E-06	0.0291	2.935E-10	0.0000	0.000E+00	0.0000	3.943E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	2.135E-00	0.0003
U-238	6.653E-06	0.1026	4.703E-09	0.0001	0.000E+00	0.0000	8.230E-07	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	4.474E-07	0.0069
Total	4.865E-05	0.7503	1.542E-08	0.0002	0.000E+00	0.0000	1.393E-05	0.2149	0.000E+00	0.0000	0.000E+00	0.0000	2.241E-06	0.0346

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.833E-07	0.0152
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	4.477E-06	0.0690
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	4.036E-05	0.6226
Ra-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	4.546E-07	0.0070
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	2.047E-08	0.0003
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	3.502E-06	0.0540
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.129E-06	0.0637
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.027E-06	0.0158
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.950E-06	0.0301
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.928E-06	0.1223
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	6.483E-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+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	
Ac-227	5.680E-05	1.948E+00	0.000E+00	0.000E+00	1.059E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.006E+00
Pa-231	2.467E-07	3.380E-02	0.000E+00	0.000E+00	4.598E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.840E-02
Pb-210	5.099E-04	7.014E+01	0.000E+00	0.000E+00	9.504E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.964E+01
Ra-226	4.783E-04	2.623E+02	0.000E+00	0.000E+00	8.915E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.712E+02
Ra-228	3.440E-05	1.879E+01	0.000E+00	0.000E+00	6.411E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.943E+01
Th-228	3.440E-05	7.020E-01	0.000E+00	0.000E+00	6.412E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.343E+00
Th-230	3.265E-03	4.480E+01	0.000E+00	0.000E+00	6.085E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.056E+02
Th-232	3.454E-05	4.739E-01	0.000E+00	0.000E+00	6.438E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.118E+00
U-234	6.609E-03	2.266E+02	0.000E+00	0.000E+00	1.232E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.498E+02
U-235	3.888E-04	1.333E+01	0.000E+00	0.000E+00	7.246E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.058E+01
U-238	6.609E-03	2.266E+02	0.000E+00	0.000E+00	1.232E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.498E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.671E-07	0.0071	2.292E-10	0.0000	2.411E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	1.311E-08	0.0002
Pa-231	4.500E-10	0.0000	8.358E-13	0.0000	3.397E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.620E-11	0.0000
Pb-210	1.888E-08	0.0003	4.617E-10	0.0000	7.111E-06	0.1086	0.000E+00	0.0000	0.000E+00	0.0000	9.634E-07	0.0147
Ra-226	3.682E-05	0.5624	4.178E-10	0.0000	4.172E-06	0.0637	0.000E+00	0.0000	0.000E+00	0.0000	1.418E-07	0.0022
Ra-228	1.374E-06	0.0210	4.514E-11	0.0000	8.076E-07	0.0123	0.000E+00	0.0000	0.000E+00	0.0000	2.756E-08	0.0004
Th-228	2.357E-06	0.0360	1.486E-10	0.0000	8.894E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	8.124E-09	0.0001
Th-230	2.401E-08	0.0004	3.330E-09	0.0001	1.599E-07	0.0024	0.000E+00	0.0000	0.000E+00	0.0000	2.173E-07	0.0033
Th-232	1.066E-10	0.0000	4.486E-11	0.0000	1.891E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.569E-09	0.0000
U-234	1.487E-08	0.0002	5.453E-09	0.0001	6.424E-07	0.0098	0.000E+00	0.0000	0.000E+00	0.0000	3.492E-07	0.0053
U-235	1.861E-06	0.0284	2.885E-10	0.0000	3.863E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	2.100E-08	0.0003
U-238	6.558E-06	0.1002	4.635E-09	0.0001	8.113E-07	0.0124	0.000E+00	0.0000	0.000E+00	0.0000	4.410E-07	0.0067
Total	4.950E-05	0.7560	1.506E-08	0.0002	1.378E-05	0.2104	0.000E+00	0.0000	0.000E+00	0.0000	2.185E-06	0.0334

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.045E-07	0.0077
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.368E-10	0.0000
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	8.094E-06	0.1236
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-05	0.6283
Ra-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	2.209E-06	0.0337
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	2.374E-06	0.0363
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	4.045E-07	0.0062
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.611E-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.012E-06	0.0155
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.921E-06	0.0293
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.815E-06	0.1194
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	6.548E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.648E-07	0.0071	2.281E-10	0.0000	0.000E+00	0.0000	2.400E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	1.304E-08	0.0002
Pb-210	5.583E-09	0.0001	1.366E-10	0.0000	0.000E+00	0.0000	2.096E-06	0.0320	0.000E+00	0.0000	0.000E+00	0.0000	2.849E-07	0.0044
Ra-226	3.218E-05	0.4915	6.632E-10	0.0000	0.000E+00	0.0000	8.243E-06	0.1259	0.000E+00	0.0000	0.000E+00	0.0000	7.462E-07	0.0114
Ra-228	3.500E-08	0.0005	1.911E-12	0.0000	0.000E+00	0.0000	5.863E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.833E-10	0.0000
Th-228	1.450E-11	0.0000	9.145E-16	0.0000	0.000E+00	0.0000	3.680E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.999E-14	0.0000
Th-230	4.677E-06	0.0714	3.407E-09	0.0001	0.000E+00	0.0000	1.102E-06	0.0168	0.000E+00	0.0000	0.000E+00	0.0000	2.911E-07	0.0044
Th-232	3.696E-06	0.0564	2.367E-10	0.0000	0.000E+00	0.0000	8.125E-07	0.0124	0.000E+00	0.0000	0.000E+00	0.0000	3.797E-08	0.0006
U-234	1.690E-08	0.0003	5.455E-09	0.0001	0.000E+00	0.0000	6.428E-07	0.0098	0.000E+00	0.0000	0.000E+00	0.0000	3.493E-07	0.0053
U-235	1.863E-06	0.0285	2.904E-10	0.0000	0.000E+00	0.0000	3.909E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	2.111E-08	0.0003
U-238	6.558E-06	0.1002	4.636E-09	0.0001	0.000E+00	0.0000	8.114E-07	0.0124	0.000E+00	0.0000	0.000E+00	0.0000	4.410E-07	0.0067
Total	4.950E-05	0.7560	1.506E-08	0.0002	0.000E+00	0.0000	1.378E-05	0.2104	0.000E+00	0.0000	0.000E+00	0.0000	2.185E-06	0.0334

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.021E-07	0.0077
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	2.387E-06	0.0365
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	4.117E-05	0.6288
Ra-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	4.115E-08	0.0006
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	1.459E-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	6.074E-06	0.0928
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.547E-06	0.0694
U-234	0.000E+00	0.0000	0.000E+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-06	0.0155
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.924E-06	0.0294
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.815E-06	0.1194
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	6.548E-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+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	
Ac-227	5.930E-06	2.034E-01	0.000E+00	0.000E+00	1.105E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.140E-01
Pa-231	7.816E-07	1.072E-01	0.000E+00	0.000E+00	1.457E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.217E-01
Pb-210	5.157E-04	7.096E+01	0.000E+00	0.000E+00	9.611E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.057E+01
Ra-226	5.435E-04	2.981E+02	0.000E+00	0.000E+00	1.013E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.082E+02
Ra-228	3.439E-05	1.879E+01	0.000E+00	0.000E+00	6.410E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.943E+01
Th-228	3.439E-05	7.018E-01	0.000E+00	0.000E+00	6.410E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.343E+00
Th-230	3.267E-03	4.482E+01	0.000E+00	0.000E+00	6.089E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.057E+02
Th-232	3.454E-05	4.739E-01	0.000E+00	0.000E+00	6.437E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.118E+00
U-234	6.287E-03	2.156E+02	0.000E+00	0.000E+00	1.172E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.327E+02
U-235	3.698E-04	1.268E+01	0.000E+00	0.000E+00	6.893E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.957E+01
U-238	6.287E-03	2.156E+02	0.000E+00	0.000E+00	1.172E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.327E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	5.252E-08	0.0007	2.578E-11	0.0000	2.714E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.474E-09	0.0000
Pa-231	1.094E-09	0.0000	2.032E-12	0.0000	8.261E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.123E-10	0.0000
Pb-210	1.987E-08	0.0003	4.859E-10	0.0000	7.485E-06	0.1065	0.000E+00	0.0000	0.000E+00	0.0000	1.014E-06	0.0144
Ra-226	4.163E-05	0.5922	4.723E-10	0.0000	4.717E-06	0.0671	0.000E+00	0.0000	0.000E+00	0.0000	1.603E-07	0.0023
Ra-228	1.374E-06	0.0195	4.514E-11	0.0000	8.076E-07	0.0115	0.000E+00	0.0000	0.000E+00	0.0000	2.756E-08	0.0004
Th-228	2.357E-06	0.0335	1.486E-10	0.0000	8.893E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	8.123E-09	0.0001
Th-230	2.402E-08	0.0003	3.332E-09	0.0000	1.600E-07	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	2.174E-07	0.0031
Th-232	1.066E-10	0.0000	4.486E-11	0.0000	1.891E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.568E-09	0.0000
U-234	1.415E-08	0.0002	5.187E-09	0.0001	6.110E-07	0.0087	0.000E+00	0.0000	0.000E+00	0.0000	3.321E-07	0.0047
U-235	1.770E-06	0.0252	2.744E-10	0.0000	3.675E-08	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	1.998E-08	0.0003
U-238	6.238E-06	0.0887	4.409E-09	0.0001	7.717E-07	0.0110	0.000E+00	0.0000	0.000E+00	0.0000	4.195E-07	0.0060
Total	5.348E-05	0.7607	1.443E-08	0.0002	1.460E-05	0.2077	0.000E+00	0.0000	0.000E+00	0.0000	2.203E-06	0.0313

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.674E-08	0.0008
Pa-231	0.000E+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-09	0.0000
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	8.520E-06	0.1212
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	4.651E-05	0.6616
Ra-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	2.209E-06	0.0314
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	2.374E-06	0.0338
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	4.048E-07	0.0058
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.611E-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.625E-07	0.0137
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.827E-06	0.0260
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.434E-06	0.1057
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	7.030E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.422E-08	0.0006	2.170E-11	0.0000	0.000E+00	0.0000	2.283E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.241E-09	0.0000
Pb-210	6.181E-10	0.0000	1.512E-11	0.0000	0.000E+00	0.0000	2.321E-07	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	3.154E-08	0.0004
Ra-226	3.013E-05	0.4285	7.086E-10	0.0000	0.000E+00	0.0000	9.065E-06	0.1289	0.000E+00	0.0000	0.000E+00	0.0000	8.817E-07	0.0125
Ra-228	7.310E-12	0.0000	3.992E-16	0.0000	0.000E+00	0.0000	1.224E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.915E-14	0.0000
Th-228	1.402E-22	0.0000	8.839E-27	0.0000	0.000E+00	0.0000	3.558E-25	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.833E-25	0.0000
Th-230	1.154E-05	0.1641	3.560E-09	0.0001	0.000E+00	0.0000	3.062E-06	0.0436	0.000E+00	0.0000	0.000E+00	0.0000	4.776E-07	0.0068
Th-232	3.731E-06	0.0531	2.386E-10	0.0000	0.000E+00	0.0000	8.183E-07	0.0116	0.000E+00	0.0000	0.000E+00	0.0000	3.825E-08	0.0005
U-234	2.647E-08	0.0004	5.193E-09	0.0001	0.000E+00	0.0000	6.139E-07	0.0087	0.000E+00	0.0000	0.000E+00	0.0000	3.327E-07	0.0047
U-235	1.779E-06	0.0253	2.805E-10	0.0000	0.000E+00	0.0000	3.800E-08	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	2.032E-08	0.0003
U-238	6.238E-06	0.0887	4.411E-09	0.0001	0.000E+00	0.0000	7.719E-07	0.0110	0.000E+00	0.0000	0.000E+00	0.0000	4.196E-07	0.0060
Total	5.348E-05	0.7607	1.443E-08	0.0002	0.000E+00	0.0000	1.460E-05	0.2077	0.000E+00	0.0000	0.000E+00	0.0000	2.203E-06	0.0313

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.777E-08	0.0007
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	2.643E-07	0.0038
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	4.007E-05	0.5700
Ra-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	8.594E-12	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	1.411E-22	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	1.508E-05	0.2145
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.587E-06	0.0653
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.783E-07	0.0139
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.838E-06	0.0261
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.434E-06	0.1057
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	7.030E-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+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	
Ac-227	1.771E-06	6.096E-02	0.000E+00	0.000E+00	3.301E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.398E-02
Pa-231	2.028E-06	2.781E-01	0.000E+00	0.000E+00	3.780E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.159E-01
Pb-210	6.757E-04	9.298E+01	0.000E+00	0.000E+00	1.260E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.056E+02
Ra-226	7.080E-04	3.883E+02	0.000E+00	0.000E+00	1.320E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.015E+02
Ra-228	3.439E-05	1.878E+01	0.000E+00	0.000E+00	6.409E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.942E+01
Th-228	3.439E-05	7.017E-01	0.000E+00	0.000E+00	6.409E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.343E+00
Th-230	3.271E-03	4.488E+01	0.000E+00	0.000E+00	6.097E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.058E+02
Th-232	3.453E-05	4.738E-01	0.000E+00	0.000E+00	6.437E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.117E+00
U-234	5.449E-03	1.869E+02	0.000E+00	0.000E+00	1.016E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.884E+02
U-235	3.205E-04	1.099E+01	0.000E+00	0.000E+00	5.975E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.697E+01
U-238	5.449E-03	1.869E+02	0.000E+00	0.000E+00	1.016E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.884E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.402E-08	0.0003	1.179E-11	0.0000	1.245E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.742E-10	0.0000
Pa-231	2.592E-09	0.0000	4.815E-12	0.0000	1.958E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.662E-10	0.0000
Pb-210	2.592E-08	0.0003	6.339E-10	0.0000	9.765E-06	0.1148	0.000E+00	0.0000	0.000E+00	0.0000	1.323E-06	0.0156
Ra-226	5.376E-05	0.6320	6.099E-10	0.0000	6.091E-06	0.0716	0.000E+00	0.0000	0.000E+00	0.0000	2.070E-07	0.0024
Ra-228	1.374E-06	0.0161	4.513E-11	0.0000	8.075E-07	0.0095	0.000E+00	0.0000	0.000E+00	0.0000	2.755E-08	0.0003
Th-228	2.357E-06	0.0277	1.486E-10	0.0000	8.892E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	8.122E-09	0.0001
Th-230	2.405E-08	0.0003	3.337E-09	0.0000	1.602E-07	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	2.177E-07	0.0026
Th-232	1.065E-10	0.0000	4.486E-11	0.0000	1.891E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.568E-09	0.0000
U-234	1.226E-08	0.0001	4.496E-09	0.0001	5.296E-07	0.0062	0.000E+00	0.0000	0.000E+00	0.0000	2.879E-07	0.0034
U-235	1.534E-06	0.0180	2.379E-10	0.0000	3.185E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	1.731E-08	0.0002
U-238	5.407E-06	0.0636	3.822E-09	0.0000	6.689E-07	0.0079	0.000E+00	0.0000	0.000E+00	0.0000	3.636E-07	0.0043
Total	6.452E-05	0.7586	1.339E-08	0.0002	1.807E-05	0.2124	0.000E+00	0.0000	0.000E+00	0.0000	2.455E-06	0.0289

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.596E-08	0.0003
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.822E-09	0.0001
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	1.111E-05	0.1307
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	6.006E-05	0.7061
Ra-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	2.209E-06	0.0260
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	2.374E-06	0.0279
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	4.053E-07	0.0048
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.610E-09	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.343E-07	0.0098
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.584E-06	0.0186
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.444E-06	0.0758
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	8.506E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	5.328E-11	0.0000	2.615E-14	0.0000	0.000E+00	0.0000	2.751E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.495E-12	0.0000
Pb-210	1.148E-12	0.0000	2.809E-14	0.0000	0.000E+00	0.0000	4.312E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.861E-11	0.0000
Ra-226	2.494E-05	0.2932	5.964E-10	0.0000	0.000E+00	0.0000	7.654E-06	0.0900	0.000E+00	0.0000	0.000E+00	0.0000	7.503E-07	0.0088
Ra-228	2.234E-22	0.0000	1.220E-26	0.0000	0.000E+00	0.0000	3.741E-23	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.807E-24	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	2.879E-05	0.3384	3.965E-09	0.0000	0.000E+00	0.0000	8.339E-06	0.0980	0.000E+00	0.0000	0.000E+00	0.0000	9.939E-07	0.0117
Th-232	3.730E-06	0.0439	2.386E-10	0.0000	0.000E+00	0.0000	8.182E-07	0.0096	0.000E+00	0.0000	0.000E+00	0.0000	3.824E-08	0.0004
U-234	9.456E-08	0.0011	4.511E-09	0.0001	0.000E+00	0.0000	5.521E-07	0.0065	0.000E+00	0.0000	0.000E+00	0.0000	2.908E-07	0.0034
U-235	1.561E-06	0.0183	2.544E-10	0.0000	0.000E+00	0.0000	3.505E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	1.825E-08	0.0002
U-238	5.407E-06	0.0636	3.826E-09	0.0000	0.000E+00	0.0000	6.694E-07	0.0079	0.000E+00	0.0000	0.000E+00	0.0000	3.639E-07	0.0043
Total	6.452E-05	0.7586	1.339E-08	0.0002	0.000E+00	0.0000	1.807E-05	0.2124	0.000E+00	0.0000	0.000E+00	0.0000	2.455E-06	0.0289

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.755E-11	0.0000
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	4.910E-10	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	3.334E-05	0.3920
Ra-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	2.626E-22	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	3.812E-05	0.4482
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.587E-06	0.0539
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.420E-07	0.0111
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.614E-06	0.0190
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.444E-06	0.0758
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	8.506E-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+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	
Ac-227	3.820E-06	1.315E-01	0.000E+00	0.000E+00	7.120E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.027E-01
Pa-231	4.069E-06	5.580E-01	0.000E+00	0.000E+00	7.585E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.339E-01
Pb-210	1.067E-03	1.468E+02	0.000E+00	0.000E+00	1.989E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.667E+02
Ra-226	1.092E-03	5.990E+02	0.000E+00	0.000E+00	2.036E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.194E+02
Ra-228	3.437E-05	1.878E+01	0.000E+00	0.000E+00	6.407E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.942E+01
Th-228	3.437E-05	7.015E-01	0.000E+00	0.000E+00	6.407E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.342E+00
Th-230	3.276E-03	4.495E+01	0.000E+00	0.000E+00	6.106E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.060E+02
Th-232	3.452E-05	4.736E-01	0.000E+00	0.000E+00	6.434E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.117E+00
U-234	3.304E-03	1.133E+02	0.000E+00	0.000E+00	6.159E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.749E+02
U-235	1.944E-04	6.665E+00	0.000E+00	0.000E+00	3.623E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.029E+01
U-238	3.304E-03	1.133E+02	0.000E+00	0.000E+00	6.159E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.749E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
 and water-dependent water, fish, plant, meat, milk pathways

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

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

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 Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.992E-08	0.0004	2.450E-11	0.0000	2.586E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.401E-09	0.0000
Pa-231	5.028E-09	0.0000	9.339E-12	0.0000	3.798E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.163E-10	0.0000
Pb-210	4.047E-08	0.0003	9.900E-10	0.0000	1.525E-05	0.1276	0.000E+00	0.0000	0.000E+00	0.0000	2.066E-06	0.0173
Ra-226	8.207E-05	0.6870	9.311E-10	0.0000	9.299E-06	0.0778	0.000E+00	0.0000	0.000E+00	0.0000	3.160E-07	0.0026
Ra-228	1.373E-06	0.0115	4.511E-11	0.0000	8.071E-07	0.0068	0.000E+00	0.0000	0.000E+00	0.0000	2.754E-08	0.0002
Th-228	2.356E-06	0.0197	1.485E-10	0.0000	8.889E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	8.119E-09	0.0001
Th-230	2.408E-08	0.0002	3.341E-09	0.0000	1.605E-07	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	2.180E-07	0.0018
Th-232	1.065E-10	0.0000	4.484E-11	0.0000	1.890E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.567E-09	0.0000
U-234	7.436E-09	0.0001	2.726E-09	0.0000	3.211E-07	0.0027	0.000E+00	0.0000	0.000E+00	0.0000	1.746E-07	0.0015
U-235	9.303E-07	0.0078	1.442E-10	0.0000	1.931E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.050E-08	0.0001
U-238	3.279E-06	0.0274	2.317E-09	0.0000	4.056E-07	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	2.205E-07	0.0018
Total	9.013E-05	0.7545	1.072E-08	0.0001	2.628E-05	0.2200	0.000E+00	0.0000	0.000E+00	0.0000	3.045E-06	0.0255

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		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.393E-08	0.0005
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.352E-09	0.0001
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	1.736E-05	0.1453
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	9.169E-05	0.7674
Ra-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	2.208E-06	0.0185
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	2.373E-06	0.0199
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	4.059E-07	0.0034
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.608E-09	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.059E-07	0.0042
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.602E-07	0.0080
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.907E-06	0.0327
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	1.195E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
 and water dependent water, fish, plant, meat, milk pathways

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

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

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
 and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.235E-21	0.0000	1.588E-24	0.0000	0.000E+00	0.0000	1.670E-22	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.077E-23	0.0000
Pb-210	3.175E-22	0.0000	7.766E-24	0.0000	0.000E+00	0.0000	1.192E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.621E-20	0.0000
Ra-226	1.288E-05	0.1078	3.079E-10	0.0000	0.000E+00	0.0000	3.951E-06	0.0331	0.000E+00	0.0000	0.000E+00	0.0000	3.873E-07	0.0032
Ra-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-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	6.867E-05	0.5748	4.897E-09	0.0000	0.000E+00	0.0000	2.058E-05	0.1723	0.000E+00	0.0000	0.000E+00	0.0000	2.193E-06	0.0184
Th-232	3.729E-06	0.0312	2.385E-10	0.0000	0.000E+00	0.0000	8.179E-07	0.0068	0.000E+00	0.0000	0.000E+00	0.0000	3.823E-08	0.0003
U-234	5.962E-07	0.0050	2.776E-09	0.0000	0.000E+00	0.0000	4.945E-07	0.0041	0.000E+00	0.0000	0.000E+00	0.0000	1.935E-07	0.0016
U-235	9.852E-07	0.0082	1.781E-10	0.0000	0.000E+00	0.0000	2.570E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.242E-08	0.0001
U-238	3.279E-06	0.0274	2.325E-09	0.0000	0.000E+00	0.0000	4.067E-07	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	2.210E-07	0.0018
Total	9.013E-05	0.7545	1.072E-08	0.0001	0.000E+00	0.0000	2.628E-05	0.2200	0.000E+00	0.0000	0.000E+00	0.0000	3.045E-06	0.0255

Total Excess Cancer Risk CNRSI(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.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.494E-21	0.0000
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	1.358E-19	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	1.721E-05	0.1441
Ra-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-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	9.145E-05	0.7655
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.585E-06	0.0384
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.287E-06	0.0108
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.024E-06	0.0086
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.909E-06	0.0327
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	1.195E-04	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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APPENDIX B
COPIES OF BORING LOGS AND FIELD LOGBOOK ENTRIES FOR SAMPLES
(On the CDROM on the Back Cover of this Report)

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PROJECT TITLE:

FUSRAP

WORK SITE:

I-200 ROW, UP-38, UP-58, Pershall Row, UP-1C
Proetz Lumber, UP-2L, Ameron UE, UP-57, 58 ROW
SLOS Plant 6 Area 4-2, UP-12, Ball field Hotspot, Lash Sq,
metal

DELIVERY ORDER:

CONTRACT #:

DAC W43-DD-D-0515

START DATE:

JANUARY 04, 2001

END DATE:

MAY 29, 2001



An Employee-Owned Company

Science Applications International Corporation

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Look Team Members: L. W. Ross, J. L. Larnes

Sample ID: HT200437

Station ID: 14T200437

Collection Date: 1/29/01

Collection Time: 0930

Property Name PROETZ LUMBER

Sample Location: SE CORNER NORTH FENCE

Northings (units):	102 9731

Easting (units): 909158

Elevation (units): NA

Sample Type: HOMO (GRAB)

Sample Collection Method: TROWEL

Sample Depth: 0 to 0.5

Soil Type: FINE TO COARSE GRAY GRAVEL Rad Screen Instrument: 44-9 B
w/ 1.5% sand

Rad Screen Bkg: 42cm 51

Rad Screen: 42cm

Comments: 2x2 Resolving 10K BEFORE sampling - 8K IN BOWL
15K IN JAR AFTER sample removed

Recorded by

QA by:

Task Team Members

Sample ID: HTB 00438

Station ID: NT600437

Collection Date: 1/29/01

Collection Time: 0935

Property Name: PROETS LUMBER

Sample Location: SE CORNER MUDAR FENCE

Nothing (units): 1029731

Easting (units): 909156

Elevation (units): NA

Sample Type: HOMO (GRAB)

Sample Collection Method: TROWEL

Sample Depth: 0.5' to 1.0'

Soil Type: PINE GRAVEL AND SOME SOIL Rad Screen Instrument: 44-7 'B'
GRAY TO DARK GRAY

Rad Screen Bkg.: 51 cm

Rad Screen: 49

Comments: 9500 counts w/ 2x2 of sample in bowl
12k in note after sample was removed

Recorded by:

QA by:

1526.20031107.018

FP-053

PROJECT TITLE:

FUSRAP

WORK SITE:

SLDS, SLAPS, North Co VP's

DELIVERY ORDER:

CONTRACT #:

DAC W43-00-D-0815

START DATE:

10-01-02

END DATE:

SAIL An Employee-Owned Company
Science Applications International Corporation

180 Oak Ridge Turnpike, P.O. Box 1547, Oak Ridge, Tennessee 37831 (615) 481-0800

Task Team Members

BOSS-KEETON
COC No. SA 06192003-044

Sample ID: HTZ 75405 (Composite) Station ID: HTZ 75405

Collection Date: 6/19/03 Collection Time: 2050

Property Name: DT-10 Sample Location: SUIPL NORTH WALL

Northing (units): SEE COMMENTS Easting (units): SEE COMMENTS

Elevation (units): NA Sample Type: COMPOSITE

Sample Collection Method: HAND TROWEL Sample Depth: 0-0.5'

Soil Type: BLACK CINDERS Rad Screen Instrument: 449 J

Rad Screen Bkg.: 50cpm Rad Screen: 96cpm

Comments:

Recorded by: [Signature] QA by: J. Bange

Task Team Members

BOSS-KEETON
COC No. SA 06192003-044

Sample ID: HTZ 75406 Composite Station ID: HTZ 75406

Collection Date: 6/19/03 Collection Time: 2055

Property Name: DT-10 Sample Location: SOUTH SIDE SU1 P1

Northing (units): SEE COMMENTS Easting (units): SEE COMMENTS

Elevation (units): NA Sample Type: COMPOSITE

Sample Collection Method: HAND TROWEL Sample Depth: 0-0.5'

Soil Type: BLACK CINDERS/SOME BRICK Rad Screen Instrument: 449 J

Rad Screen Bkg.: 71cpm Rad Screen: 76cpm

Comments:

Recorded by: [Signature] QA by: J. Bange

Task Team Members

BOSS-KEETON
COC No. SA 06192003-044

Sample ID: HTZ 75407 Composite Station ID: HTZ 75407

Collection Date: 6/19/03 Collection Time: 2100

Property Name: DT-10 Sample Location: EAST END SU1 P1

Northing (units): SEE COMMENTS Easting (units): SEE COMMENTS

Elevation (units): NA Sample Type: COMPOSITE

Sample Collection Method: HAND TROWEL Sample Depth: 0-0.5'

Soil Type: BLACK CINDERS/BRICK PIECES Rad Screen Instrument: 449 J

Rad Screen Bkg.: 50cpm Rad Screen: 65cpm

Comments:

Recorded by: [Signature] QA by: J. Bange

180

Task Team Members

Neumann, Martinez, Vaughn

COC No. SA09292003-02H

Sample ID: HTZ 76755

Station ID: HTZ 76755

Collection Date: 9-29-03

Collection Time: 0943

Property Name: SLOS - Thomas & Proetz

Sample Location: SU-1C - N.E. corner

Northing (units): 1029882.27

Easting (units): 908434

Elevation (units): NA

Sample Type: Hornio Grab

Sample Collection Method: Hand Ase - Frouel

Sample Depth: 0-0.5'

Soil Type: Cindery, black

Rad Screen Instrument: 44-9E

Rad Screen Bkg.: 79cpm

Rad Screen: 117cpm

Comments: 18K @ surface

Recorded by: Vaughn

QA by: J. Borge

181

Task Team Members

Neumann, Martinez, Vaughn

COC No. SA09292003-02H

Sample ID: HTZ 76757

Station ID: HTZ 76757

Collection Date: 9-29-03

Collection Time: 0952

Property Name: SLOS - Thomas & Proetz

Sample Location: SU-1C - S. middle area

Northing (units): 1029876.28

Easting (units): 908433.15

Elevation (units): NA

Sample Type: Hornio Grab

Sample Collection Method: Frouel

Sample Depth: 0-0.5'

Soil Type: Rock, gravel, cindery

Rad Screen Instrument: 44-9E

Rad Screen Bkg.: 70cpm

Rad Screen: 110cpm

Comments: 11K @ surface

Recorded by: Vaughn

QA by: J. Borge

1526.20031205.002

FP-061

PROJECT TITLE:

SIDS Systematics

WORK SITE:

DELIVERY ORDER:

CONTRACT #:

START DATE:

9/27-01

END DATE:



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Task Team Members

Keeton, Boss

COC No. SA06192003-03H

Sample ID: SLD77212

Station ID: SLD77212

Collection Date: 6-19-03

Collection Time: 2000

Property Name: DT-10 SUIPI

Sample Location: In NW corner of
SU

Northing (units): *

Easting (units): *

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Light Brown Silty
Clay

Rad Screen Instrument: 44-9 "J"

Rad Screen Bkg.: 50 cpm

Rad Screen: 60 cpm

Comments: * sample taken 3.83 ft from NW corner of bldg. epa
10/13/03

Recorded by:

Todd Keeton

QA by:

M. J. L.

Task Team Members

Keeton, Boss

COC No. SA06192003-03H

Sample ID: SLD77213

Station ID: SLD77213

Collection Date: 6-19-03

Collection Time: 2100

Property Name: DT-10 SUIPI

Sample Location: In SE corner of
SU

Northing (units): *

Easting (units): *

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Cinders some
Brick

Rad Screen Instrument: 44-9 "J"

Rad Screen Bkg.: 71 cpm

Rad Screen: 48 cpm

Comments: Chemical sample also taken and sent to
Severn Trent

* sample taken 38.52 ft from NW corner of bldg. 10/13/03

Recorded by:

Todd Keeton

QA by:

M. J. L.

Task Team Members

BOSS-NEUMAN-FINKELBEIN COC No. SA 08142003-03H
 Sample ID: SLD78047 Station ID: SLD78047
 Collection Date: 8-14-03 Collection Time: 1015
 Property Name: SLD5 DT-10 Sample Location: RAILROAD SPIRE
 Northing (units): 1029558.843 Easting (units): 908681.674
 Elevation (units): NA Sample Type: HOMO 6RAS
 Sample Collection Method: HAND AUGER Sample Depth: 0-0.5 ft
 Soil Type: GRAYISH SILTY DUSTY GRAVEL mix Rad Screen Instrument: 44-9 "J"
 44-10 "C"
 Rad Screen Bkg.: 40cpm ea Rad Screen: 48cpm
 7218 14684cpm 11/14/03 6684cpm
 Comments:
 Recorded by: O'Brien QA by: J. Hill

Task Team Members

BOSS-NEUMAN-FINKENBEIN COC No. SA 07142003-03H
 Sample ID: SLD78048 Station ID: SLD78047
 Collection Date: 8/14/03 Collection Time: 1030
 Property Name: SLD5 DT-10 Sample Location: RAILROAD SPIRE
 Northing (units): 1029558.843 Easting (units): 908681.674
 Elevation (units): NA Sample Type: HOMO 6RAS
 Sample Collection Method: HAND AUGER Sample Depth: 1.5-2.0 FL
 Soil Type: BLACK SANDY SILTY MIX w/ SOME GRAVEL Rad Screen Instrument: 44-9 "J"
 44-10 "C"
 Rad Screen Bkg.: 40cpm Rad Screen: 67cpm
 7218cpm 7599cpm
 Comments:
 Recorded by: O'Brien QA by: J. Hill

Task Team Members

BOSS-NEUMAN-FINKENBEIN COC No. SA 08142003-03H
 Sample ID: SLD78049 Station ID: SLD78049
 Collection Date: 8/14/03 Collection Time: 1040
 Property Name: SLD5 DT-10 Sample Location: RR SPIRE
 Northing (units): 1029558.843 1029598.502 Easting (units): 908681.674 908677.554
 Elevation (units): NA Sample Type: HOMO 6RAS
 Sample Collection Method: HAND AUGER Sample Depth: 0-0.5 ft
 Soil Type: BLACK CINDERY SILTY MIX w/ GRAVEL Rad Screen Instrument: 44-9 "J"
 44-10 "C"
 Rad Screen Bkg.: 40cpm Rad Screen: 62cpm
 8094cpm 7926cpm
 Comments:
 Recorded by: O'Brien QA by: J. Hill

Task Team Members

BOSS-FINKENBEIN-NEUMAN COC No. SA 08142003-03H
 Sample ID: SLD78050 Station ID: SLD78049
 Collection Date: 8/14/03 Collection Time: 1055
 Property Name: SLD5 DT-10 Sample Location: RR SPIRE
 Northing (units): 1029598.502 Easting (units): 908677.554
 Elevation (units): NA Sample Type: HOMO 6RAS
 Sample Collection Method: HAND AUGER Sample Depth: 1.5-2.0 ft
 Soil Type: BLACK SILTY SANDY CLAY Rad Screen Instrument: 44-9 "J"
 44-10 "C"
 Rad Screen Bkg.: 40cpm Rad Screen: 93cpm
 9094cpm 7854cpm
 Comments:
 Recorded by: O'Brien QA by: J. Hill

Task Team Members

BOSS-NEUMAN-FINKENBINE

COC No. SA 08142003

Sample ID: SLD78051

Station ID: SLD78051

Collection Date: 8-14-03

Collection Time: 1105

Property Name: SLD5 DT-10

Sample Location: RR spur

Northing (units): 1029650.486

Easting (units): 908723.966

Elevation (units): NA

Sample Type: HOMO GRA3

Sample Collection Method: HAND AUGER

Sample Depth: 0-0.5ft

Soil Type: BLACK SANDY SILTY CLAYERS w/ gravel

Rad Screen Instrument: 44-9 "J"

44-10 "C"

Rad Screen Bkg.: 53 cpm

Rad Screen: 84 cpm "J"

7177 cpm

7875 cpm "C"

Comments: TWO INCHES OF ASPHALT REMOVED BEFORE SAMPLING

Recorded by: [Signature]

QA by: [Signature]

Task Team Members

BOSS-NEUMAN-FINKENBINE

COC No. SA 08142003

Sample ID: SLD78052

Station ID: SLD78051

Collection Date: 8-14-03

Collection Time: 1125

Property Name: SLD5 DT-10

Sample Location: RR spur

Northing (units): 1029650.486

Easting (units): 908723.966

Elevation (units): NA

Sample Type: HOMO GRA3

Sample Collection Method: HAND AUGER

Sample Depth: 1.5-2.0ft

Soil Type: BLACK SANDY SILTY CLAYERS w/ some white chalky substance

Rad Screen Instrument: 44-9 "J"

44-10 "C"

Rad Screen Bkg.: 53 cpm

Rad Screen: 76 cpm "J"

7477 cpm

7878 cpm "C"

Comments:

Recorded by: [Signature]

QA by: [Signature]

Task Team Members

BOSS-NEUMAN-FINKENBINE

COC No. SA 08142003

Sample ID: SLD78053

Station ID: SLD78051

Collection Date: 8-14-03

Collection Time: 1135

Property Name: SLD5 DT-10

Sample Location: RR spur

Northing (units): 1029650.486

Easting (units): 908723.966

Elevation (units): NA

Sample Type: HOMO GRA3

Sample Collection Method: HAND AUGER

Sample Depth: 3.5-4.0ft

Soil Type: N/A

Rad Screen Instrument: 44-9 "J"

44-10 "C"

Rad Screen Bkg.: 53 cpm

Rad Screen: 62 cpm

7177 cpm

7503 cpm

Comments:

Recorded by: [Signature]

QA by: [Signature]

Task Team Members

Boss-Neuman-Finkenbier

COC No. SA 08152003-03H

Sample ID: SLD78287

Station ID: SLD78287

Collection Date: 8-15-03

Collection Time: 1120

Property Name: SLD5 DT-10

Sample Location: ¹⁰²RA Spur concrete pull

Northing (units): 1029802.30

Easting (units): 908875.11

Elevation (units): NA

Sample Type: Homo 6203

Sample Collection Method: HAND AUGER

Sample Depth: 0-0.5 ft

Soil Type: BLACK CINDERES SOME LEAVES

Rad Screen Instrument: 44-9 "J"
44-10 "C"

Rad Screen Bkg.: 39 cpm

Rad Screen: 69

Comments: 6736 cpm
LITTLE BEAVER USED TO BORE FROM 0.5 to 1.5 ft
WENT THRU ROCK LAYERRecorded by: *OB*QA by: *CH*

Task Team Members

Boss-Neuman-Finkenbier

COC No. SA - 08152003

Sample ID: SLD78286

Station ID: SLD78287

Collection Date: 8-15-03

Collection Time: 1130

Property Name: SLD5 DT-10

Sample Location: ¹⁰²RA Spur concrete pull

Northing (units): 1029802.30

Easting (units): 908875.11

Elevation (units): NA

Sample Type: Homo 6203

Sample Collection Method: HAND AUGER

Sample Depth: 1.5-2.0 ft

Soil Type: MARBLED GRAY+BLACK SILTY CLAY

Rad Screen Instrument: 44-9 "J"
44-10 "C"Rad Screen Bkg.: 39 cpm
6736 cpmRad Screen: 54 cpm
6264 cpm

Comments:

Recorded by: *OB*QA by: *CH*

Task Team Members

Boss-Neuman-Finkenbier

COC No. SA 08152003-08H

Sample ID: SLD78289

Station ID: SLD78287

Collection Date: 8-15-03

Collection Time: 1140

Property Name: SLD5 DT-10

Sample Location: ¹⁰²RA Spur concrete pull

Northing (units): 1029802.30

Easting (units): 908875.11

Elevation (units): NA

Sample Type: Homo 6203

Sample Collection Method: HAND AUGER

Sample Depth: 3.5-4.0 ft

Soil Type: REDDISH BROWN SILTY CLAY

Rad Screen Instrument: 44-9 "J"
44-10 "C"

Rad Screen Bkg.: 39 cpm

Rad Screen: 72 cpm

Comments: 6736 cpm

5590 cpm

Recorded by: *OB*QA by: *CH*

Task Team Members

Boss-Neuman-Finkenbier

COC No. SA 08152003-03H

Sample ID: SLD78290

Station ID: SLD78287

Collection Date: 8-15-03

Collection Time: 1155

Property Name: SLD5 DT-10

Sample Location: concrete Rd characterization

Northing (units): 1029802.30

Easting (units): 908875.11

Elevation (units): NA

Sample Type: Homo 6203

Sample Collection Method: HAND AUGER

Sample Depth: 5.5-6.0

Soil Type: DARK GRAY SILTY CLAY

Rad Screen Instrument: 44-9 "J"
44-10 "C"Rad Screen Bkg.: 39 cpm
6736 cpmRad Screen: 61 cpm
6410 cpm

Comments:

Recorded by: *OB*QA by: *CH*

Task Team Members

M. Lyarla, C. Finkenbine

COC No. SA09152003-04H

Sample ID: SLD78955

Station ID: SLD78954

Collection Date: 9/15/03

Collection Time: 1105

Property Name: SLD5

Sample Location: Thomas & Proetz

Northing (units): ^{CP2} ~~1029837.82~~

Easting (units): 908890.18

Elevation (units): N/A

Sample Type: grab

Sample Collection Method: 4 row cl/Auger

Sample Depth: 0.5 - 1.0

Soil Type: Dark, brick, dry

Rad Screen Instrument: 44-9 J

Rad Screen Bkg.: 41

Rad Screen: 83

Comments:

Recorded by: C. Finkenbine

QA by: *CH*

Task Team Members

M. Lyarla, C. Finkenbine

COC No. SA09152003-04H

Sample ID: SLD78954

Station ID: SLD78954

Collection Date: 9/15/03

Collection Time: 1103

Property Name: SLD5

Sample Location: Thomas & Proetz

* Northing (units): 1029837.82

Easting (units): 908890.18

Elevation (units): N/A

Sample Type: grab

Sample Collection Method: Travel/Auger

Sample Depth: 0.0 - 0.5

Soil Type: Dark, brick, asphalt

Rad Screen Instrument: 44-9 J

Rad Screen Bkg.: 41

Rad Screen: 87

Comments: * estimated by location

Recorded by: C. Finkenbine

QA by: *CH*

Task Team Members

M. Lyarla, C. Finkenbine

COC No. SA09152003-04H

Sample ID: SLD78956

Station ID: SLD78954

Collection Date: 9/15/03

Collection Time: 1134

Property Name: SLD5

Sample Location: Thomas & Proetz

Northing (units): 1029837.82

Easting (units): 908890.18

Elevation (units): N/A

Sample Type: grab

Sample Collection Method: Travel/Auger

Sample Depth: 3.5 - 4.0

Soil Type: Dark, brick, dry

Rad Screen Instrument: 44-9 J

Rad Screen Bkg.: 54

Rad Screen: 54

Comments:

Recorded by: C. Finkenbine

QA by: *CH*

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Task Team Members

M. Lyda C. Pinkerling

COC No. SA09152003-04H

Sample ID: SLD78957

Station ID: SLD78954

Collection Date: 9/15/03

Collection Time: 1:58

Property Name: SLD 5

Sample Location: Thomas 1 Plot 2

Northing (units): ~~N/A~~ 91503 1020837.82

Easting (units): 908890.78

Elevation (units): N/A

Sample Type: grab

Sample Collection Method: hand
auger

Sample Depth: 5.0-5.5

Soil Type: Black, Dark

Rad Screen Instrument: 44-9J

Rad Screen Bkg.: ~~50~~ 41

Rad Screen: 58

Comments:

Recorded by: C. Pinkerling

QA by: alt Jell

Task Team Members

Neumann, Mlyerla, Elol, Vaughn

COC No. SA09262003-01H

Sample ID: SLD 78900MV

Station ID: SLD 78900 79000

Collection Date: 9-26-03

Collection Time: 1025

Property Name: SLDs

Sample Location: Thomas & Proetz

Northing (units): 1029815.21

Easting (units): 908936.89

Elevation (units): NA

Sample Type: Homogeneous

Sample Collection Method: Hand Auger

Sample Depth: 0-0.5'

Soil Type: Dark brown silty clay

Rad Screen Instrument: 44-9L
NA E 2x2 F

Rad Screen Bkg.: 58 cpm

Rad Screen: 61 cpm
11305 cpmComments: 0.5-1.0 = 72 cpm 12k
1.0-1.5 = 71 cpm 12k
1.5-2.0 =

Recorded by: Vaughn

QA by:

ck jll

Task Team Members

Neumann, Mlyerla, Elol, Vaughn

COC No. SA09262003-01H

Sample ID: SLD 78900MV

Station ID: SLD 78900 79000

Collection Date: 9-26-03

Collection Time: 1031

Property Name: SLDs

Sample Location: Thomas & Proetz

Northing (units): 1029815.21

Easting (units): 908936.89

Elevation (units): NA

Sample Type: Homogeneous

Sample Collection Method: Hand Auger

Sample Depth: 1.5-2.0'

Soil Type: Black, cindery
silty clayRad Screen Instrument: 44-9L
NA E 2x2 F

Rad Screen Bkg.: 58 cpm

Rad Screen: 82 cpm
11894 cpm

Comments:

2.0-2.5' = re Assess

Recorded by: Vaughn

QA by:

ck jll

Task Team Members

Neumann, Elol, Mlyerla, Vaughn

COC No. SA09262003-01H

Sample ID: SLD 79006

Station ID: SLD 79006

Collection Date: 9-26

Collection Time: 1040

Property Name: SLDs

Sample Location: Thomas & Proetz

Northing (units): 1029845.67

Easting (units): 908954.67

Elevation (units): NA

Sample Type: Homogeneous

Sample Collection Method: Hand Auger

Sample Depth: 0-0.5'

Soil Type: Brown, red, cindery

Rad Screen Instrument: 44-9L
NA E 2x2 F

Rad Screen Bkg.: 61 cpm

Rad Screen: 88 cpm
11817 cpmComments: 0.5-1.0 = 95 cpm 12k
1.0-1.5 = 77 cpm 12k

Recorded by: Vaughn

QA by:

ck jll

Task Team Members

Neumann, Ebl, M. Myerla, Vaughn

COC No. SA09262003-01H

* Sample ID: SLD 79007

Station ID: SLD 79006

Collection Date: 9-26-03

Collection Time: 1045

Property Name: SLD5

Sample Location: Thomas & Proetz

Northing (units): 1029845.67

Easting (units): 908954.67

Elevation (units): N/A

Sample Type: Homogab

Sample Collection Method: Hand Auger

Sample Depth: 1.5-2.0'

Soil Type: Brick, rock, cinders

Rad Screen Instrument: 44-9L
NAI 2x2 F

Rad Screen Bkg.: 61cpm

Rad Screen: 75cpm
14585 cpmComments: * QC this interval, SLD 79007-1, SLD 79007-2
2.0-2.5' 69cpm

Recorded by: Vaughn

QA by: JH JH

Task Team Members

Neumann, Ebl, Myerla, Vaughn

COC No. SA09262003-01H

Sample ID: SLD 79007W

Station ID: SLD 79007W SLD 78997

Collection Date: 9-26-03

Collection Time: 1050

Property Name: SLD5

Sample Location: Thomas & Proetz

Northing (units): 1029845.67

Easting (units): 908919.34

Elevation (units): N/A

Sample Type: Homogab

Sample Collection Method: Hand Auger

Sample Depth: 0-0.5'

Soil Type: Rocks, dark brown
silty clay

Rad Screen Instrument: 44-9L

Rad Screen Bkg.: 63

Rad Screen: 63cpm
14530 cpmComments: * This was metal sample at this interval 61cpm
2.5-1.0' = 75cpm
1.0-1.5' = 79cpm

Recorded by: Vaughn

QA by: JH JH

Task Team Members

Neumann, Ebl, Myerla, Vaughn

COC No. SA09262003-01H

Sample ID: SLD 78998

Station ID: SLD 78997

Collection Date: 9-26-03

Collection Time: 1055

Property Name: SLD5

Sample Location: Thomas & Proetz

Northing (units): 1029845.67

Easting (units): 908919.34

Elevation (units): N/A

Sample Type: Homo

Sample Collection Method: Hand Auger

Sample Depth: 1.5-2.0'

Soil Type: Rock, dark brown

Rad Screen Instrument: 44-9L
NAI 2x2 F

Rad Screen Bkg.: 63cpm

Rad Screen: 70cpm

Comments: 2.0-2.5' = 71cpm

Recorded by: Vaughn

QA by: JH JH

Task Team Members

Neumann, Elbl, M. Hella, Vaughn

COC No. SA09262003-01H

Sample ID: SLD 78999

Station ID: SLD 78997

Collection Date: 9-26-03

Collection Time: 1100

Property Name: SLD5

Sample Location: Thomas & Pratt²
SV-1C

Northing (units): 1029845.67

Easting (units): 908919.34

Elevation (units): NA

Sample Type: HOMO Grab

Sample Collection Method: Hand Auger

Sample Depth: 2.5-3.0'

Soil Type: Dark brown silty
rock, brickRad Screen Instrument: 44-9 L
NAE 2x2 E

Rad Screen Bkg: 63 cpm

Rad Screen: 65 cpm
15099 cpm

Comments:

Recorded by: Vaughn

QA by:

JH Ehl

Task Team Members

Neumann, Martinez, Vaughn

COC No. SA09292003-01H

Sample ID: SLD 79003

Station ID: SLD 79003

Collection Date: 1000 9-29-03

Collection Time: 1000

Property Name: SLD5-Thomas & Pratt²Sample Location: N. W. Corner
SV-1C

Northing (units): 1029876.07

Easting (units): 908936.89

Elevation (units): NA

Sample Type: HOMO Grab

Sample Collection Method: Hand Auger

Sample Depth: 0-0.5'

Soil Type: Black Cudery silty
clayRad Screen Instrument: 44-9 E
NAE 2x2 E

Rad Screen Bkg: 11 cpm

Rad Screen: 85 cpm
15729 cpmComments: 0.5-1.0' = 58 12K
1.0-1.5' = 74 12K

Recorded by: Vaughn

QA by:

JH Ehl

Task Team Members

Neumann, Martinez, Vaughn

COC No. SA09292003-01H

Sample ID: SLD 79004

Station ID: SLD 79003

Collection Date: 9-29-03

Collection Time: 1003

Property Name: SLD5-Thomas & Pratt²

Sample Location: N. W. Corner

Northing (units): 1029876.07

Easting (units): 908936.89

Elevation (units): NA

Sample Type: HOMO Grab

Sample Collection Method: Hand Auger

Sample Depth: 1.5-2.0'

Soil Type: Black, Cudery

Rad Screen Instrument: 44-9 E
NAE 2x2 E

Rad Screen Bkg: 71 cpm

Rad Screen: 66 cpm
Total 16079

Comments: 2.0-2.5' = 88 cpm

Recorded by: Vaughn

QA by:

JH Ehl

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Task Team Members

Neumann, Martinez, VaughnCOC No. SA09292003-03HSample ID: SLD 78994Station ID: SLD 78994Collection Date: 9-29-03Collection Time: 1030Property Name: SLDS Thomas & ProetzSample Location: SU-2CNorthing (units): 1029837.58Easting (units): 908831.72Elevation (units): NASample Type: HomograbSample Collection Method: Hand AugerSample Depth: 0-0.5'Soil Type: Gray, black silty clayRad Screen Instrument: 44-9E
NAI 2x2 FRad Screen Bkg.: 65 cpmRad Screen: 660 cpm
7900Comments: 0.5-1.0' = 91 cpm
1.0-1.5' = 61 cpm HKRecorded by: VaughnQA by: CH I.H.

Task Team Members

Neumann, Martinez, VaughnCOC No. SA09292003-03HSample ID: SLD 78995Station ID: SLD 78994Collection Date: 9-29-03Collection Time: 1033Property Name: SLDS Thomas & ProetzSample Location: SU-2CNorthing (units): 1029837.58Easting (units): 908831.72Elevation (units): NASample Type: HomograbSample Collection Method: Hand AugerSample Depth: 1.5-2.0'Soil Type: Black, gray silty clayRad Screen Instrument: 44-9E
NAI 2x2 FRad Screen Bkg.: 65 cpmRad Screen: 58 cpm
7392 cpmComments: 2.0-2.5' = 62 cpmRecorded by: VaughnQA by: CH I.H.

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Task Team Members

Neumann, Martinez, VaughnCOC No. SA09292003-03HSample ID: SLD 78996Station ID: SLD 78994Collection Date: 9-29-03Collection Time: 1037Property Name: SLDS Thomas & ProetzSample Location: SU-2CNorthing (units): 1029837.58Easting (units): 908831.72Elevation (units): NASample Type: HomograbSample Collection Method: Hand AugerSample Depth: 2.5-3.0'Soil Type: Black, gray silty clayRad Screen Instrument: 44-9E
NAI 2x2 FRad Screen Bkg.: 65 cpmRad Screen: 61
7037 cpmComments: 2.0-2.5' = 110 cpmRecorded by: VaughnQA by: CH I.H.

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Task Team Members: MB, SB, MV

COC# SA 11172004-014

Sample ID: SLO85183

Station ID: SLO85182

Collection Date: 11-17-04

Collection Time: 1225

Property Name: SLOS Thomas & Procter

Sample Location: SU 16

Northing (units): 1029758.26

Easting (units): 908620.80

Elevation (units): NA

Sample Type: Grab

Sample Collection Method: Hand Auger

Sample Depth: 1.0-1.5'

Soil Type: Brick, black
Cindery

Rad Screen Instrument: 44-96, 44-10C

Rad Screen Bkg.: 35, 7992

Rad Screen: 81, 7908

Comments:

Recorded by: MVarela

QA by: [Signature]

FP-110

SITE: _____

ERY ORDER: _____

RACT #: _____

DATE: _____

ATE: _____

LS

SAIC Science Applications
International Corporation
An Employee-Owned Company
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COC No.: SA 11102004-01H

Task Team Members: Stephen Bange, Melissa Vaughn, Matt Bange

Sample ID: HTZ 84055

Station ID: HTZ 84055

Collection Date: 11-10-04

Collection Time: 1400

Property Name: SLDS, Thomas + Proetz

Sample Location: SU 40

Northing (units): see below

Easting (units): see below

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Lindery Fill, some yellow rock

Rad Screen Instrument: 44-9 "L" 44-10 "B"

Rad Screen Bkg.: 43cpm, 9534cpm

Rad Screen: 98cpm, 11000cpm

Comments: Composite

A 1029639.62 908728.59 2m² area

B 1029644.27 908727.96

Recorded by:

QA by:

COC No.: SA 11102004-01H

Task Team Members: Stephen Bange, Matt Bange, Melissa Vaughn

Sample ID: HTZ 84056

Station ID: HTZ 84056

Collection Date: 11-10-04

Collection Time: 1405

Property Name: SLDS, Thomas + Proetz

Sample Location: SU 40

Northing (units): 1029615.95

Easting (units): 908712.62

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Lindery Fill

Rad Screen Instrument: 44-9 "L" 44-10 "B"

Rad Screen Bkg.: 43cpm, 9534cpm

Rad Screen: 83cpm, 10400cpm

Comments: 1/2 m² area

Recorded by:

QA by:

COC No.: SA 1110 2004-01H

Task Team Members: MB, SB, MV

Sample ID: HT2 8406b

Station ID: HT2 8406b

Collection Date: 11-10-04

Collection Time: 1510, 1514 for 2nd sample

Property Name: SLOS, Thomas + Procter

Sample Location: SU 1D

Northing (units): 1029564.47

Easting (units): 908703.97

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Brown^{light} + black cinders
and sand fill

Rad Screen Instrument: 44-9" L, 44-10" B

Rad Screen Bkg.: 43cpm, 9534cpm

Rad Screen: ~~119cpm~~, ~~12,000cpm~~ TK 11-10-04
2nd sample 74cpm, 10,500cpm

Comments: 1/2 m² area

Sample dug up, new HT2 sample taken with new Rad screens and
different time everything else the same

Recorded by:

Rob Kuntz

QA by:

James R. 2/68

COC No.: SA11102004-01H

Task Team Members: MV, MB, SB

Sample ID: HTZ 84061

Station ID: HTZ 84061

Collection Date: 11-10-04

Collection Time: 1520, 1550

Property Name: SLDs, Thomas + Proetz

Sample Location: SU 10

Northing (units): 1029550.90

Easting (units): 908705.58

Elevation (units): 1029550.16

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black cinders, some small red brick pieces

Rad Screen Instrument: 44-9" L, 44-10" B

Rad Screen Bkg.: 43cpm, 9534cpm

Rad Screen: 79cpm, 9800cpm, 74cpm, 10,000cpm

Comments:

1m² area
1st sample dug up new sample taken, new time + new rad screens, new coordinates

Recorded by:

QA by:

COC No.: SA11172004-01H

Task Team Members: MV, MB, SB

Sample ID: HTZ 84062

Station ID: HTZ 84062

Collection Date: 11-17-04

Collection Time: 1100

Property Name: SLDs, Thomas + Proetz

Sample Location: SU 10

Northing (units): 1029394.49

Easting (units): 908713.50

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black cinders, some red

Rad Screen Instrument: 44-9" L, 44-10" B

Rad Screen Bkg.: 33cpm

Rad Screen: 81cpm

Comments: 1m² area

Recorded by:

QA by:

COC No.: SA11172004-01H

Task Team Members: SB, MB, MV

Sample ID: HTZ 84063

Station ID: HTZ 84063

Collection Date: 11-17-04

Collection Time: 1155

Property Name: SLDs Thomas + Proetz

Sample Location: SU 1E

Northing (units): 1029773.76

Easting (units): 908663.85

Elevation (units): NA

Sample Type: Grab

Sample Collection Method: Hand Auger

Sample Depth: 0-0.5'

Soil Type: Rocky black

Rad Screen Instrument: 44-9" L, 44-10" C

Rad Screen Bkg.: 55, 8104cpm

Rad Screen: 58, 7740cpm

Comments:

0.5-1.0': 103, 8588 w/NaI cr2
1.0-1.5': 98, 9250
1.5-2.0': 114, 8169

Recorded by:

QA by:

COC No.: SA11172004-01H

Task Team Members: SB, MB, MV

Sample ID: HTZ 84064

Station ID: HTZ 84063

Collection Date: 11-17-04

Collection Time: 1205

Property Name: SLDs Thomas + Proetz

Sample Location: SU 1E

Northing (units): 1029773.76

Easting (units): 908663.85

Elevation (units): NA

Sample Type: Grab

Sample Collection Method: Hand Auger

Sample Depth: 1.5-2.0'

Soil Type: Cinderly black

Rad Screen Instrument: 44-9" L, 44-10" C

Rad Screen Bkg.: 55, 8104cpm

Rad Screen: 114cpm

Comments:

Recorded by:

QA by:

COC No.: SA11172004-01H

Task Team Members: SB, TK
 Sample ID: HT284065 Station ID: HT284065
 Collection Date: 11-17-04 Collection Time: 1230
 Property Name: SLDS DT-10 Sample Location: SU1e, east end
 Northing (units): composite Easting (units): composite
 A 1029800.86 A 908727.18
 Elevation (units): NA Sample Type:
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Black cinders, some black fill dirt Rad Screen Instrument: 44-9 G
 Rad Screen Bkg.: 29 cpm Rad Screen: 82 cpm
 Comments: B 1029797.10 908725.18
 C 1029794.45 908727.39
 2m² area

Recorded by: [Signature]

QA by: Joseph R. Elko

COC No.: SA11172004-01H

Task Team Members: SB, TK
 Sample ID: HT284066 Station ID: HT284066
 Collection Date: 11-17-04 Collection Time: 1235
 Property Name: SLDS DT-10 Sample Location: SU1e, east end
 Northing (units): composite Easting (units): composite
 A 1029798.56 A 908719.40
 Elevation (units): NA Sample Type: Hand Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Red brick, other fill materials, black cinders Rad Screen Instrument: 44-9 G
 Rad Screen Bkg.: 29 cpm Rad Screen: 103 cpm
 Comments: B 1029789.86 908721.59
 C 1029790.74 908723.67
 1m² area

Recorded by: [Signature]

QA by: Joseph R. Elko

COC No.: SA11172004-01H

Task Team Members: MV, MB, SB, TK
 Sample ID: HT284067 Station ID: HT284067
 Collection Date: 11-17-04 Collection Time: 1245
 Property Name: SLDS DT-10 Sample Location: SU1e, west end
 Northing (units): 1029781.31 Easting (units): 908668.48
 Elevation (units): NA Sample Type: Hand Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Brown + Black fill material Rad Screen Instrument: 44-9 G
 Rad Screen Bkg.: 29 cpm Rad Screen: 81 cpm
 Comments: 1m²

Recorded by: [Signature]

QA by: Joseph R. Elko

COC No.: SA11172004-01H

Task Team Members: MV, MB, SB, TK
 Sample ID: HT284068 Station ID: HT284068
 Collection Date: 11-17-04 Collection Time: 1250
 Property Name: SLDS DT-10 Sample Location: SU1e, west end
 Northing (units): 1029778.59 Easting (units): 908691.64
 Elevation (units): NA Sample Type: Hand Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Black cinders Rad Screen Instrument: 44-9 G
 Rad Screen Bkg.: 29 cpm Rad Screen: 81 cpm
 Comments: 2m²

Recorded by: [Signature]

QA by: Joseph R. Elko

COC No.: SA11232004-01H

Task Team Members: MELISSA VAUGHN, STEVE BANGE, ANTONIO MARTINEZ

Sample ID: HT2 84069 Station ID: HT284069

Collection Date: 11-23-04 Collection Time: 0956

Property Name: DT10 SUZA Sample Location: EAST END BY FENCE

Northing (units): 1029718.10 Easting (units): 909131.33 ^{POST} 11-23-04

Elevation (units): 0-0.5 NA Sample Type: HOMO GLASS

Sample Collection Method: TROWL Sample Depth: 0-0.5

Soil Type: BLACK CINDER, URBAN FILL Rad Screen Instrument: 44-9 "G"

Rad Screen Bkg.: 35 cpm Rad Screen: 80 cpm

Comments: 44-10 "C" 17K

Recorded by: Antonio W. Martinez

QA by: [Signature]

COC No.: SA11232004-01H

Task Team Members: MELISSA VAUGHN, STEVE BANGE, ANTONIO MARTINEZ

Sample ID: HT284070 Station ID: HT284070

Collection Date: 11-23-04 Collection Time: 1000

Property Name: DT10 SUZA Sample Location: SOUTH WALL

Northing (units): 1029708.96 Easting (units): 909126.84

Elevation (units): NA Sample Type: HOMO GLASS

Sample Collection Method: TROWL Sample Depth: 0-0.5

Soil Type: BLACK CINDER, URBAN FILL Rad Screen Instrument: 44-9 "G"

Rad Screen Bkg.: 35 cpm Rad Screen: 66 cpm

Comments: 44-10 "C" 18.5K

Recorded by: Antonio W. Martinez

QA by: [Signature]

COC No.: SA11292004-01H

Task Team Members: MV, TK, SB

Sample ID: HT2 84071 Station ID: HT284071

Collection Date: 11-29-04 Collection Time: 1130

Property Name: SLOS DT-10 Sample Location: SU-1F East end

Northing (units): 1029812.61 Easting (units): 908789.26

Elevation (units): NA Sample Type: HOMO Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Cinders, Fill material Rad Screen Instrument: 44-9 "G"

Rad Screen Bkg.: 41 cpm Rad Screen: 54 cpm

Comments:

Recorded by: [Signature]

QA by: Joseph R. EAL

COC No.: SA11292004-01H

Task Team Members: MV, TK, SB

Sample ID: HT2 84072 Station ID: HT2 84072

Collection Date: 11-29-04 Collection Time: 1010

Property Name: SLOS DT-10 Sample Location: SU-1F East end

Northing (units): 1029826.61 Easting (units): 908825.79

Elevation (units): NA Sample Type: HOMO Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Cinders, Fill material Rad Screen Instrument: 44-9 "G"

Rad Screen Bkg.: 41 cpm Rad Screen: 69 cpm

Comments:

Recorded by: [Signature]

QA by: Joseph R. EAL

COC No.: SA11292004-D1H

Task Team Members: MV, SB, TK

Sample ID: HTZ 84073 Station ID: HTZ 84073

Collection Date: 11-29-04 Collection Time: 1011

Property Name: SLOS DT-10 Sample Location: SU-1F

Northing (units): 1029823.96 Easting (units): 908789.92

Elevation (units): NA Sample Type: Hand Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Linbers, F.II material Rad Screen Instrument: 44-9 "G"

Rad Screen Bkg.: 41cpm Rad Screen: 96cpm

Comments:

Recorded by: [Signature] QA by: Joseph R. Etzel

COC No.: SA11292004-D1H

Task Team Members: MV, TK, SB

Sample ID: HTZ 84074 Station ID: HTZ 84074

Collection Date: 11-29-04 Collection Time: 1110

Property Name: SLOS DT-10 Sample Location: SU-1F West end

Northing (units): 1029810.43 Easting (units): 908765.18

Elevation (units): NA Sample Type: Hand Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Brown Dirt, Fill material Rad Screen Instrument: 44-9 "G"

Rad Screen Bkg.: 41cpm Rad Screen: 76cpm

Comments:

Recorded by: [Signature] QA by: Joseph R. Etzel

COC No.: SA11292004-D1H

Task Team Members: MV, TK, SB

Sample ID: HTZ 84075 Station ID: HTZ 84075

Collection Date: 11-29-04 Collection Time: 1115

Property Name: SLOS DT-10 Sample Location: SU-1F West end South wall

Northing (units): 1029800.78 SB Easting (units): 908771.34 SB 11/29/04

Elevation (units): 1029804.18 Sample Type: Hand Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Linbers, F.II material Rad Screen Instrument: 44-9 "G"

Rad Screen Bkg.: 41cpm Rad Screen: 81cpm

Comments: Taken in wall of SW

Recorded by: [Signature] QA by: Joseph R. Etzel

COC No.: SA11292004-D1H

Task Team Members: MV, TK, SB

Sample ID: HTZ 84076 Station ID: HTZ 84076

Collection Date: 11-29-04 Collection Time: 1140

Property Name: SLOS DT-10 Sample Location: SU-1F

Northing (units): 1029812.76 Easting (units): 908783.37

Elevation (units): NA Sample Type: Hand Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Linbers Fill material Rad Screen Instrument: 44-9 "G"

Rad Screen Bkg.: 41cpm Rad Screen: 70cpm

Comments:

Recorded by: [Signature] QA by: Joseph R. Etzel

COC No.: SA12022004-01H

Task Team Members: MV, SB, TK
 Sample ID: HTZ 84077 Station ID: HTZ 84077
 Collection Date: 12-2-04 Collection Time: 1245
 Property Name: SLOS DT-10 Sample Location: SU-1g
 Northing (units): 1029645.18 Easting (units): 908730.38
 Elevation (units): NA Sample Type: Hand Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Black Cinders Rad Screen Instrument: 44-9" L
 Rad Screen Bkg.: 50cpm Rad Screen: 95cpm
 Comments: 1m²
 Shaw X, Y 1029642.04 908726.36 used in data base

Recorded by: [Signature] QA by: Joseph R. Ehl

COC No.: SA12022004-01H

Task Team Members: MV, SB, TK
 Sample ID: HTZ 84078 Station ID: HTZ 84078
 Collection Date: 12-2-04 Collection Time: 1305
 Property Name: SLOS DT-10 Sample Location: SU-1g
 Northing (units): 1029676.66 Easting (units): 908757.71
 Elevation (units): NA Sample Type: Hand Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Black cinders Rad Screen Instrument: 44-9" L
 Rad Screen Bkg.: 50cpm Rad Screen: 119cpm
 Comments: Shaw X, Y 1029674.48 908755.81 used in data base

Recorded by: [Signature] QA by: Joseph R. Ehl

COC No.: SA12022004-01H

Task Team Members: MV, TK, SB
 Sample ID: HTZ 84079 Station ID: HTZ 84079
 Collection Date: 12-2-04 Collection Time: 1310
 Property Name: SLOS DT-10 Sample Location: SU-1g
 Northing (units): 1029658.10 Easting (units): 908740.24
 Elevation (units): NA Sample Type: Hand Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Black Cinders Rad Screen Instrument: 44-9" L
 Rad Screen Bkg.: 50cpm Rad Screen: 104cpm
 Comments: Shaw X, Y 1029656.63 908736.91 used in data base

Recorded by: [Signature] QA by: Joseph R. Ehl

COC No.: SA12022004-01H

Task Team Members: MV, TK, SB
 Sample ID: HTZ 84080 Station ID: HTZ 84080
 Collection Date: 12-2-04 Collection Time: 1315
 Property Name: SLOS Sample Location: SU-1g
 Northing (units): 1029646.53 Easting (units): 908732.05
 Elevation (units): NA Sample Type: Hand Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Black Cinders Rad Screen Instrument: 44-9" L
 Rad Screen Bkg.: 50cpm Rad Screen: 104cpm
 Comments: Shaw X, Y 1029645.89 908727.31 used in data base

Recorded by: [Signature] QA by: Joseph R. Ehl

COC No.: SA12022004-D1H

Task Team Members: MV, SB, TK

Sample ID: HT284081

Station ID: HT284081

Collection Date: 12-2-04

Collection Time: 1320

Property Name: SLOS DT-10

Sample Location: SU-1g

Northing (units): 1029676.57

Easting (units): 908764.72

Elevation (units): NA

Sample Type: Hand Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Cinders, Fill material

Rad Screen Instrument: 44-9 "L"

Rad Screen Bkg.: 50cpm

Rad Screen: 79cpm

Comments: taken in wall

Shaw, Y 1029671.75 908763.15 used in data base

IMZ

Recorded by: [Signature]

QA by: Joseph R. Elrod

COC No.: SA12022004-D1H

Task Team Members: MV, SB, TK

Sample ID: HT284082

Station ID: HT284082

Collection Date: 12-2-04

Collection Time: 1322

Property Name: SLOS DT-10

Sample Location: SU-1g

Northing (units): 1029680.00

Easting (units): 908772.79

Elevation (units): NA

Sample Type: Hand Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Cinders

Rad Screen Instrument: 44-9 "L"

Rad Screen Bkg.: 50cpm

Rad Screen: 70cpm

Comments: taken in floor

Shaw, Y 1029677.12 908766.72 used in data base

IMZ

Recorded by: [Signature]

QA by: Joseph R. Elrod

COC No.: SA12022004-D1H

Task Team Members: MV, SB, TK

Sample ID: HT284083

Station ID: HT284083

Collection Date: 12-2-04

Collection Time: 1325

Property Name: SLOS DT-10

Sample Location: SU-1g

Northing (units): 1029692.09

Easting (units): 908767.37

Elevation (units): NA

Sample Type: Hand Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black cinders

Rad Screen Instrument: 44-9 "L"

Rad Screen Bkg.: 50cpm

Rad Screen: 93cpm

Comments: taken in wall

Shaw, Y 1029688.90 908764.07 used in data base

IMZ

Recorded by: [Signature]

QA by: Joseph R. Elrod

COC No.: SA12022004-D1H

Task Team Members: MV, SB, TK

Sample ID: HT284084

Station ID: HT284084

Collection Date: 12-2-04

Collection Time: 1325

Property Name: SLOS DT-10

Sample Location: SU-1g

Northing (units): 1029681.05

Easting (units): 908758.46

Elevation (units): NA

Sample Type: Hand Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Cinders

Rad Screen Instrument: 44-9 "L"

Rad Screen Bkg.: 50cpm

Rad Screen: 110cpm

Comments: taken in wall

Shaw, Y 1029677.51 908765.17 used in data base

IMZ

Recorded by: [Signature]

QA by: Joseph R. Elrod

COC No.: ¹²⁻⁸⁻⁰⁴ SA12082004-01H

Task Team Members: MV, TK, MB, SB

Sample ID: HT284085 Station ID: HT284085

Collection Date: 12-8-04 Collection Time: 1150

Property Name: SL05 DT-10 Sample Location: SU2B

Northing (units): 1029793.44 Easting (units): 908997.65

Elevation (units): NA Sample Type: Hand Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Cinders Rad Screen Instrument: 44-9 "L"

Rad Screen Bkg.: 47cpm Rad Screen: 100cpm

Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Elko

COC No.: SA12082004-01H

Task Team Members: MV, TK, MB, SB

Sample ID: HT284086 Station ID: HT284086

Collection Date: 12-8-04 Collection Time: 1155

Property Name: SL05 DT-10 Sample Location: SU2B

Northing (units): 1029784.09 Easting (units): 908975.44

Elevation (units): NA Sample Type: Hand

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Cinders Rad Screen Instrument: 44-9 "L"

Rad Screen Bkg.: 47cpm Rad Screen: 116cpm

Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Elko

COC No.: SA12082004-01H

Task Team Members: MV, MB, SB, TK

Sample ID: HT284087 Station ID: HT284087

Collection Date: 12-8-04 Collection Time: 1157

Property Name: SL05 DT-10 Sample Location: SU2B

Northing (units): 1029776.31 Easting (units): 908956.40

Elevation (units): NA Sample Type: Hand Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Cinders Rad Screen Instrument: 44-9 "L"

Rad Screen Bkg.: 47cpm Rad Screen: 94cpm

Comments: 2m²

Recorded by: [Signature] QA by: Joseph R. Elko

COC No.: SA12082004-01H

Task Team Members: TK, MV, SB, MB

Sample ID: HT284088 Station ID: HT284088

Collection Date: 12-8-04 Collection Time: 1200

Property Name: SL05 DT-10 Sample Location: SU2B

Northing (units): 1029777.42 Easting (units): 908953.08

Elevation (units): NA Sample Type: Hand Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Cinders, Fill Material Rad Screen Instrument: 44-9 "L"

Rad Screen Bkg.: 47cpm Rad Screen: 120cpm

Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Elko

Task Team Members: MV, MB, SB, TK COC No.: SA-12132004-01H
 Sample ID: HTZ 84089 Station ID: HTZ 84089
 Collection Date: 12-13-04 Collection Time: 1100
 Property Name: SLDS DT-10 Sample Location: SU-2C
 Northing (units): 1029841.70 Easting (units): 909105.72
 Elevation (units): NA Sample Type: Homd Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Fill Material Rad Screen Instrument: 44-9"E
 Rad Screen Bkg.: 55cpm Rad Screen: 98cpm
 Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Etl

Task Team Members: MV, MB, SB, TK COC No.: SA12132004-01H
 Sample ID: HTZ 84090 Station ID: HTZ 84090
 Collection Date: 12-13-04 Collection Time: 1105
 Property Name: SLDS DT-10 Sample Location: SU-2C
 Northing (units): 1029837.47 Easting (units): 909101.10
 Elevation (units): NA Sample Type: Homd Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Fill Material, mostly black clinders Rad Screen Instrument: 44-9"E
 Rad Screen Bkg.: 55cpm Rad Screen: 98cpm
 Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Etl

Task Team Members: MV, SB, MB, TK COC No.: SA12132004-01H
 Sample ID: HTZ 84091 Station ID: HTZ 84091
 Collection Date: 12-13-04 Collection Time: 1120
 Property Name: SLDS DT-10 Sample Location: SU-2C
 Northing (units): 1029826.49 Easting (units): 909096.63
 Elevation (units): NA Sample Type: Homd Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Black clinders Rad Screen Instrument: 44-9"E
 Rad Screen Bkg.: 55cpm Rad Screen: 108cpm
 Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Etl

Task Team Members: MV, SB, TK, MB COC No.: SA12132004-01H
 Sample ID: HTZ 84092 Station ID: HTZ 84092
 Collection Date: 12-13-04 Collection Time: 1130
 Property Name: SLDS DT-10 Sample Location: SU-2C
 Northing (units): 1029824.36 Easting (units): 909127.44
 Elevation (units): NA Sample Type: Homd Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Black clinders Rad Screen Instrument: 44-9"E
 Rad Screen Bkg.: 55cpm Rad Screen: 98cpm
 Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Etl

COC No.: SA12132004-01H

Task Team Members: MV, TK, SB, MB

Sample ID: HT284093 Station ID: HT284093

Collection Date: 12-13-04 Collection Time: 1135

Property Name: SLOS DT-10 Sample Location: SU-2C

Northing (units): 1029810.89 Easting (units): 408th 909037.12

Elevation (units): NA Sample Type: Homo Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Cinders, some
Gravel Rad Screen Instrument: 44-9"E

Rad Screen Bkg.: 55cpm Rad Screen: 82cpm

Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Elbel

COC No.: SA12132004-01H

Task Team Members: MV, MB, SB, TK

Sample ID: HT284094 Station ID: HT284094

Collection Date: 12-13-04 Collection Time: 1150

Property Name: SLOS DT-10 Sample Location: SU-2C

Northing (units): 1029834.31 Easting (units): 909119.86

Elevation (units): NA Sample Type: Homo Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Cinders Rad Screen Instrument: 44-9"E

Rad Screen Bkg.: 55cpm Rad Screen: 163cpm

Comments: 2m²

Recorded by: [Signature] QA by: Joseph R. Elbel

COC No.: SA12152004-01H

Task Team Members: MV, MB, SB, TK

Sample ID: HT284095 Station ID: HT284095

Collection Date: 12-15-04 Collection Time: 1125

Property Name: SLOS DT-10 Sample Location: SU-2d

Northing (units): 1029921.60 Easting (units): 909082.31

Elevation (units): NA Sample Type: Homo Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Sandy Brown Fill
Material Rad Screen Instrument: 44-9"E

Rad Screen Bkg.: 49cpm Rad Screen: 78cpm

Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Elbel

COC No.: SA12152004-01H

Task Team Members: MV, MB, SB, TK

Sample ID: HT284096 Station ID: HT284096

Collection Date: 12-15-04 Collection Time: 1130

Property Name: SLOS DT-10 Sample Location: SU-2d

Northing (units): 1029920.78 Easting (units): 909074.65

Elevation (units): NA Sample Type: Homo Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Brown and Black
Fill material Rad Screen Instrument: 44-9"E

Rad Screen Bkg.: 49cpm Rad Screen: 69cpm

Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Elbel

93 New IDs
HT285283

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COC No.: SA12152004-01H

Task Team Members: MV, MB, SB, TK

Sample ID: HT285283¹²⁻¹⁵⁻⁰⁴ Station ID: HT285283

Collection Date: 12-15-04 Collection Time: 1145

Property Name: SLOS OT-10 Sample Location: SU-2d

Northing (units): 1029914.67 Easting (units): 909066.36

Elevation (units): NA Sample Type: Home Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Brown Fill Material Rad Screen Instrument: 44-9°F

Sandy

Rad Screen Bkg.: 49cpm Rad Screen: 77cpm

Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Ehlke

COC No.: SA12152004-01H

Task Team Members: MV, MB, SB, TK

Sample ID: HT285284 Station ID: HT285284

Collection Date: 12-15-04 Collection Time: 1155

Property Name: SLOS OT-10 Sample Location: SU-2d

Northing (units): 1029938.19 Easting (units): 909076.62

Elevation (units): NA Sample Type: Home Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Brown Fill Material Rad Screen Instrument: 44-9°F

Sandy

Rad Screen Bkg.: 49cpm Rad Screen: 87cpm

Comments: 1m²

Recorded by: [Signature] QA by: Joseph R. Ehlke

35

COC No.: SA12202004-02H

Task Team Members: MV, TK, MB, SB

Sample ID: HT285285 Station ID: HT285285

Collection Date: 12-20-04 Collection Time: 1350

Property Name: SLOS OT-10 Sample Location: SU1h

Northing (units): 1029706.45 Easting (units): 908813.19

Elevation (units): NA Sample Type: Home Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Cinders Rad Screen Instrument: 44-9

Rad Screen Bkg.: 37cpm Rad Screen: 77cpm

Comments: 2m²

Recorded by: [Signature] QA by: Joseph R. Ehlke

COC No.: SA12202004-02H

Task Team Members: MV, TK, SB, MB

Sample ID: HT285286 Station ID: HT285286

Collection Date: 12-20-04 Collection Time: 1355

Property Name: SLOS OT-10 Sample Location: SU1h

Northing (units): 1029701.71 Easting (units): 908778.78

Elevation (units): NA Sample Type: Home Grab

Sample Collection Method: Trowel Sample Depth: 0-0.5

Soil Type: Black Cinders, some cobb. Rad Screen Instrument: 44-9

Fill material

Rad Screen Bkg.: 37cpm Rad Screen: 70cpm

Comments: side wall 12-20-04 1/2m²

Recorded by: [Signature] QA by: Joseph R. Ehlke

COC No.: SA12202004-02H

Task Team Members: MV, SB, TK, MB

Sample ID: HT285287

Station ID: HT285287

Collection Date: 12-20-04

Collection Time: 1425

Property Name: SLOS DT-10

Sample Location: SU-1h

Northing (units): 1029745.06

Easting (units): 908839.22

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Cinders
Fill Material

Rad Screen Instrument: 44-9 "G"

Rad Screen Bkg.: 37cpm

Rad Screen: 101cpm

Comments: 1m²

Recorded by: [Signature]

QA by:

Joseph R. Eitel

COC No.: SA12302004-02H

Task Team Members: MV, SB, TK, MB

Sample ID: HT285288

Station ID: HT285288

Collection Date: 12-20-04

Collection Time: 1425

Property Name: SLOS DT-10

Sample Location: SU-1h

Northing (units): 1029731.39

Easting (units): 908821.93

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Cinders

Rad Screen Instrument: 44-9 "G"

Rad Screen Bkg.: 37cpm

Rad Screen: 111cpm

Comments: 1m²

Recorded by: [Signature]

QA by:

Joseph R. Eitel

COC No.: SA12282004-01H

Task Team Members: MV, MB, SB, TK

Sample ID: HT285289

Station ID: HT285289

Collection Date: 12-28-04

Collection Time: 1040

Property Name: SLOS DT-10

Sample Location: SU-2e

Northing (units): 1029756.37

Easting (units): 908907.44

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Cinders, Red
Brick Pieces

Rad Screen Instrument: 44-10 F

Rad Screen Bkg.: 6185cpm

Rad Screen: 8200cpm

Comments: 2m²

Recorded by: [Signature]

QA by:

Joseph R. Eitel

COC No.: SA12282004-01H

Task Team Members: MV, MB, SB, TK

Sample ID: HT285290

Station ID: HT285290

Collection Date: 12-28-04

Collection Time: 1050

Property Name: SLOS DT-10

Sample Location: SU-2e

Northing (units): 1029729.92

Easting (units): 908876.00

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Cinders, Fill
Material

Rad Screen Instrument: 44-10 F

Rad Screen Bkg.: 6185cpm

Rad Screen: 7000cpm

Comments: 1m² taken in floor, approximate coordinates
no satellites

Recorded by: [Signature]

QA by:

Joseph R. Eitel

COC No.: 5A1282004-DIH

Task Team Members: MV, SB, MB, TK
 Sample ID: HT285291 Station ID: HT285291
 Collection Date: 12-28-04 Collection Time: 1058
 Property Name: SLOS DT-10 Sample Location: SU-2E
 Northing (units): see below Easting (units): see below
 Elevation (units): NA Sample Type: Composite
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Limer's Black Brick pieces other fill material Rad Screen Instrument: 44-10 F
 Rad Screen Bkg.: 6185 cpm Rad Screen: 8000 cpm
 Comments: A 1029733.166 908872.00
 B 1029730.24 908872.00
 Im²

Recorded by: [Signature] QA by: Joseph R. Ethel

COC No.:

Task Team Members: MV, TK, MB, SB
 Sample ID: HT285292 Station ID: HT285292
 Collection Date: 1-5-05 Collection Time: 1350
 Property Name: SLOS DT-10 Sample Location: SU-2F
 Northing (units): 1029787.43 Easting (units): 909090.17
 Elevation (units): NA Sample Type: Hand Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Brown Soil Silty Fill Material Rad Screen Instrument: 44-9 G
 Rad Screen Bkg.: 48 cpm Rad Screen: 62 cpm
 Comments: Y_{2m}²

Recorded by: [Signature] QA by: Joseph R. Ethel

COC No.:

Task Team Members: MB, TK, SB, MV
 Sample ID: HT285293 Station ID: HT285293
 Collection Date: 1-6-05 Collection Time: 0950
 Property Name: SLOS DT-10 Sample Location: SU-2F
 Northing (units): 1029749.82 Easting (units): 908920.16
 Elevation (units): NA Sample Type: Hand Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Dark Brown Fill Material Rad Screen Instrument: 44-9 G
 Rad Screen Bkg.: 64 cpm Rad Screen: 63 cpm
 Comments: Im²

Recorded by: [Signature] QA by: Joseph R. Ethel

COC No.:

Task Team Members: MB, TK, SB, MV
 Sample ID: HT285294 Station ID: HT285294
 Collection Date: 1-6-05 Collection Time: 1000
 Property Name: SLOS DT-10 Sample Location: SU-2F
 Northing (units): 1029746.44 Easting (units): 908943.89
 Elevation (units): NA Sample Type: Hand Grab
 Sample Collection Method: Trowel Sample Depth: 0-0.5
 Soil Type: Dark Brown Fill Material Rad Screen Instrument: 44-9 G
 Rad Screen Bkg.: 64 cpm Rad Screen: 90 cpm
 Comments: Im²

Recorded by: [Signature] QA by: Joseph R. Ethel

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1524-20050621.004

COC No.:

Task Team Members: MB, TK, SB, MV

Sample ID: HT2 85293

Station ID: HT2 85293

Collection Date: 1-6-05

Collection Time: 0950

Property Name: SLOS DT-10

Sample Location: SU-2F

Northing (units): 1029749.82

Easting (units): 908920.16

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Dark Brown Fill Material

Rad Screen Instrument: 44-9 G

Rad Screen Bkg: 64cpm

Rad Screen: 63cpm

Comments: 1m²Recorded by: *Adrian Kuter*

QA by: Joseph R. Eitel

COC No.:

Task Team Members: MB, TK, SB, MV

Sample ID: HT2 85294

Station ID: HT2 85294

Collection Date: 1-6-05

Collection Time: 1000

Property Name: SLOS DT-10

Sample Location: SU-2F

Northing (units): 1029746.44

Easting (units): 908943.84

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Dark Brown Fill Material

Rad Screen Instrument: 44-9 G

Rad Screen Bkg: 64cpm

Rad Screen: 90cpm

Comments: 1m²Recorded by: *Adrian Kuter*

QA by: Joseph R. Eitel

COC No.: SA01202005-02H

Task Team Members: MV, JE, TK, SB

Sample ID: HT2 85297

Station ID: HT2 85297

Collection Date: 1-20-05

Collection Time: 1445

Property Name: SLOS DT-10

Sample Location: SU-2g in floor West End

Northing (units): 1029868.18

Easting (units): 908944.62

Elevation (units): NA

Sample Type: Homo Grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black Cinders

Rad Screen Instrument: 44-9E

Rad Screen Bkg: 45cpm

Rad Screen: 80cpm

Comments: 2m²Recorded by: *Adrian Kuter*

QA by: Stephen Bann

COC No.: SA01202005-02H

Task Team Members: MV, JE, TK, SB

Sample ID: HT2 85298

Station ID: HT2 85298

Collection Date: 1-20-05

Collection Time: 1446

Property Name: SLOS DT-10

Sample Location: SU-2g East End

Northing (units): 1029888.40

Easting (units): 909034.35

Elevation (units): NA

Sample Type: Homo grab

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Black cinders, pieces of red brick

Rad Screen Instrument: 44-9E

Rad Screen Bkg: 45cpm

Rad Screen: 68cpm

Comments: 1m²Recorded by: *Adrian Kuter*

QA by: Stephen Bann

COC No.: SA01202005-02H

Task Team Members: MV, TK, JE, SB

Sample ID: HTZ85299

Station ID: HTZ85299

Collection Date: 1-20-05

Collection Time: 1450

Property Name: SLD5

Sample Location: SW-2g West end

Northing (units): see below

Easting (units): see below

Elevation (units): NA

Sample Type: Composite

Sample Collection Method: Trowel

Sample Depth: 0-0.5

Soil Type: Dark brown fill
material

Rad Screen Instrument: 44-g E

Rad Screen Bkg.: 45cpm

Rad Screen: 83cpm

Comments: 4 locations

A	1029885.30	908954.76
B	1029885.80	908953.73
C	1029885.90	908952.48
D	1029884.70	908951.30

2m²

Recorded by:

Todd Kinton

QA by:

Hester Bann

Task Team Members: MV, TK, SB, JE COC No.: SA02012005-01H

Sample ID: HT285305

Collection Date: 2-1-05

Property Name: SLD3 OT-10

Northing (units): 1029853.70

Elevation (units): N/A

Sample Collection Method: Trowel

Soil Type: Sandy brown fill, bricks

Rad Screen Bkg.: 53cpm

Comments: Composite at base of wall 3 locations

Recorded by: [Signature]

QA by: [Signature]

Task Team Members: MV, TK, SB, JE COC No.: SA02012005-01H

Sample ID: HT285306

Collection Date: 2-1-05

Property Name: SLD3 OT-10

Northing (units): 1029864.87

Elevation (units): N/A

Sample Collection Method: Trowel

Soil Type: Brown fill material

Rad Screen Bkg.: 53cpm

Comments: 2m²

Recorded by: [Signature]

QA by: [Signature]

Station ID: HT285305

Collection Time: 1330

Sample Location: SU-2h Southeast wall

Easting (units): 909022.79

Sample Type: Home Grab composite

Sample Depth: 0-0.5 at base of wall

Rad Screen Instrument: 44-9 A

Rad Screen: 117cpm

Task Team Members: MV, TK, SB, JK

Sample ID: HT285307

Collection Date: 2-1-05

Property Name: SLD3 OT-10

Northing (units): 1029846.28

Elevation (units): N/A

Sample Collection Method: Trowel

Soil Type: Dark brown fill mat.

Rad Screen Bkg.: 53cpm

Comments: Taken in wall 1 m²

Recorded by: [Signature]

COC No.: SA02012005-01H

Station ID: HT285307

Collection Time: 1345

Sample Location: SU-2h NW corner

Easting (units): 908988.16

Sample Type: Home Grab

Sample Depth: 0-0.5

Rad Screen Instrument: 44-9 A

Rad Screen: 157cpm

QA by: [Signature]

COC No.: SA02042005-01H

Task Team Members: S. Bange, T. Keeton, M. Vaughn
 Sample ID: HT2 85309 Station ID: HT2 85309
 Collection Date: 2-4-05 Collection Time: 0955
 Property Name: DT-10 Sample Location: Wall SU2H
 Northing (units): 1029807.70 Easting (units): 908993.10
 Elevation (units): NA Sample Type: Hemo Grab
 Sample Collection Method: Frowel Sample Depth: 0-0.5'
 Soil Type: Black Curdery brick Rad Screen Instrument: 44-9G
 Rad Screen Bkg.: 41 cpm Rad Screen: 58 cpm
 Comments:

Recorded by: M. Vaughn QA by: Stephen Roney

COC No.: SA02042005-01H

Task Team Members: S. Bange, T. Keeton, M. Vaughn
 Sample ID: HT2 85310 Station ID: HT2 85310
 Collection Date: 2-4-05 Collection Time: 1000
 Property Name: DT-10 Sample Location: SU2H
 Northing (units): 1029807.40 Easting (units): 908991.60
 Elevation (units): NA Sample Type: Hemo Grab
 Sample Collection Method: Frowel Sample Depth: 0-0.5'
 Soil Type: Black Curdery brick Rad Screen Instrument: 44-9G
 Rad Screen Bkg.: 41 cpm Rad Screen: 61 cpm
 Comments:

Recorded by: M. Vaughn QA by: Stephen Roney

FP-114

WORK SITE: FUSRAP

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CONTRACT #: _____

START DATE: 2/4/05

END DATE: 3/21/05

 **Science Applications
International Corporation**
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28	HT2 85365, HT2 85366		
29	HT2 85367, HT2 85368		
30	HT2 85369, HT2 85370		

COC No.: SA02042005-01H

Task Team Members: S. Baraf, T. Keeton, M. Vaughn

Sample ID: HTZ 85311 Station ID: HTZ 85311

Collection Date: 2-4-05 Collection Time: 1005

Property Name: DT-10 Sample Location: wall SU 2H

Northing (units): 1029808.90 Easting (units): 908994.90

Elevation (units): NA Sample Type: Homograb

Sample Collection Method: trowel Sample Depth: 0-0.5

Soil Type: Black, brick, cinders Rad Screen Instrument: 44-9G

Rad Screen Bkg.: 41 Rad Screen: 49

Comments:

Recorded by: M. Vaughn QA by: [Signature]

COC No.: SA02042005-01H

Task Team Members: S. Baraf, T. Keeton, M. Vaughn

Sample ID: HTZ 85312 Station ID: HTZ 85312

Collection Date: 2-4-05 Collection Time: 1007

Property Name: DT-10 Sample Location: Floor SU 2H

Northing (units): 1029808.90 Easting (units): 908992.40

Elevation (units): NA Sample Type: Homograb

Sample Collection Method: trowel Sample Depth: 0-0.5'

Soil Type: Black brick cinders Rad Screen Instrument: 44-9G

Rad Screen Bkg.: 41 cpm Rad Screen: 61 cpm

Comments:

Recorded by: M. Vaughn QA by: [Signature]

Task Team Members:

SAMPLE LOGBOOK

FP-146

1526.20060706.007

WORK SITE:

FUSRAP

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4-27-06

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**Science Applications
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8421 St. John Industrial Drive

Suite 200

St. Louis, MO 63114

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ARCHIVE NO. 10

6-11-06

Task Team Members: *David Lawson*
Eric Schriener
Stephen Bump

Sample ID: *HT2 94774* Station ID: *HT2 94774*

Collection Date: *06-07-06* Collection Time: *1159*

Property Name: *SLDS DT-10* Sample Location: *50-2i*

Northing (units): *102930.40* Easting (units): *909049.81*

Elevation (units): *N/A* Sample Type: *Grab*

Sample Collection Method: *Travel* Sample Depth: *0.0-0.5'*

Soil Type: *Fill Material* Rad Screen Instrument: *44-9 D*

Rad Screen Bkg.: *51cpm* Rad Screen: *76cpm*

Sampling Parameters: ☒ RAD ☐ Metals ☐ VOC/SVOC PID Screen: *N/A*

Comments:

Recorded by: *David Bump* QA by: *Mark H. H. 6-9-06*

Task Team Members: *DL SB GS* COC No.: *SA06072006-01H*

Sample ID: *HT2 94775* Station ID: *HT2 94775*

Collection Date: *06-07-06* Collection Time: *1158*

Property Name: *SLDS DT-10* Sample Location: *50-2i*

Northing (units): *102930.44* Easting (units): *908996.50*

Elevation (units): *N/A* Sample Type: *Grab*

Sample Collection Method: *Travel* Sample Depth: *0.0-0.5'*

Soil Type: *Fill Material* Rad Screen Instrument: *44-9 D*

Rad Screen Bkg.: *51cpm* Rad Screen: *90cpm*

Sampling Parameters: ☒ RAD ☐ Metals ☐ VOC/SVOC PID Screen: *N/A*

Comments:

Recorded by: *David Bump* QA by: *Mark H. H. 6-9-06*

Task Team Members: *SB DL GS* COC No.: *SA06072006-01H*

Sample ID: *HT2 94776* Station ID: *HT2 94776*

Collection Date: *06-07-06* Collection Time: *1200*

Property Name: *DT-10 SLDS* Sample Location: *50-1i*

Northing (units): *1029883.41* Easting (units): *908936.72*

Elevation (units): *N/A* Sample Type: *Grab*

Sample Collection Method: *Travel* Sample Depth: *0.0-0.5'*

Soil Type: *Fill Material* Rad Screen Instrument: *44-9 D*

Rad Screen Bkg.: *51cpm* Rad Screen: *57cpm*

Sampling Parameters: ☒ RAD ☐ Metals ☐ VOC/SVOC PID Screen: *N/A*

Comments:

Recorded by: *David Bump* QA by: *Mark H. H. 6-9-06*

Task Team Members: *SB DL GS* COC No.: *SA06072006-01H*

Sample ID: *HT2 94777* Station ID: *HT2 94777*

Collection Date: *06-07-06* Collection Time: *1205*

Property Name: *SLDS DT-10* Sample Location: *50-1i*

Northing (units): *1029883.39* Easting (units): *908935.80*

Elevation (units): *N/A* Sample Type: *Grab*

Sample Collection Method: *Travel* Sample Depth: *0.0-0.5'*

Soil Type: *Fill Material* Rad Screen Instrument: *44-9 D*

Rad Screen Bkg.: *51cpm* Rad Screen: *86cpm*

Sampling Parameters: ☒ RAD ☐ Metals ☐ VOC/SVOC PID Screen: *N/A*

Comments:

Recorded by: *David Bump* QA by: *Mark H. H. 6-9-06*

COC No.: SA06072006-01A

Task Team Members: SB DL ES

Sample ID: HT2 94778 Station ID: HT2 94778

Collection Date: 6-7-06 Collection Time: 1206

Property Name: SWS DT-10 Sample Location: SU-1C

Northing (units): 1029877.02 Easting (units): 908915.50

Elevation (units): N/A Sample Type: Fill Material

Sample Collection Method: travel Sample Depth: 0.0-0.5'

Soil Type: Fill Material Rad Screen Instrument: 44-9D

Rad Screen Bkg.: 51cpm Rad Screen: 71cpm

Sampling Parameters: ☒ RAD ☐ Metals ☐ VOC/SVOC PID Screen: N/A

Comments:

Recorded by: *Debra Bang* QA by: *Mark A. Sta 6-9-06*

COC No.: SA06072006-01H

Task Team Members: SB DL ES

Sample ID: HT2 94779 Station ID: HT2 94779

Collection Date: 6-7-06 Collection Time: 1208

Property Name: SWS DT-10 Sample Location: SU-1C

Northing (units): 1027869.31 Easting (units): 908902.32

Elevation (units): N/A Sample Type: Grab

Sample Collection Method: travel Sample Depth: 0.0-0.5'

Soil Type: Fill Material Rad Screen Instrument: 44-9D

Rad Screen Bkg.: 51cpm Rad Screen: 125cpm

Sampling Parameters: ☒ RAD ☐ Metals ☐ VOC/SVOC PID Screen: N/A

Comments:

Recorded by: *Debra Bang* QA by: *Mark A. Sta 6-8-06*

COC No.: SA06072006-01H

Task Team Members: SB DL ES

Sample ID: HT2 94780 Station ID: HT2 94780

Collection Date: 6-7-06 Collection Time: 1211

Property Name: SWS DT-10 Sample Location: SU-1C

Northing (units): 1029863.83 Easting (units): 908883.22

Elevation (units): N/A Sample Type: Grab

Sample Collection Method: travel Sample Depth: 0.0-0.5'

Soil Type: Fill Material Rad Screen Instrument: 44-9D

Rad Screen Bkg.: 51cpm Rad Screen: 86cpm

Sampling Parameters: ☒ RAD ☐ Metals ☐ VOC/SVOC PID Screen: N/A

Comments:

Recorded by: *Debra Bang* QA by: *Mark A. Sta 6-9-06*

COC No.: SA06072006-02H

Task Team Members: SB DL ES

Sample ID: HT2 94781 Station ID: HT2 94781

Collection Date: 6-7-06 Collection Time: 1250

Property Name: GSS SU-2 SWS Sample Location: SU-2

Northing (units): 1029335.30 Easting (units): 909107.37

Elevation (units): N/A Sample Type: Grab

Sample Collection Method: travel Sample Depth: 0.0-0.5'

Soil Type: Silty Clay Rad Screen Instrument: 44-9D

Rad Screen Bkg.: 43cpm Rad Screen: 72cpm

Sampling Parameters: ☒ RAD ☐ Metals ☐ VOC/SVOC PID Screen: N/A

Comments:

Recorded by: *Debra Bang* QA by: *Mark A. Sta 6-8-06*

FP-125

1524.20060706.023

WORK SITE:

SLDS

DELIVERY ORDER:

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COC No.: SA06072006-01H	
Task Team Members: David Lawson Stephen Rong	
Sample ID: SLD95119	Station ID: SLD95119
Collection Date: 6-7-06	Collection Time: 1030
Property Name: SLDs DT-10	Sample Location: SU-11 north side Bldg
Northing (units): 1029876.07	Easting (units): 908901.79
Elevation (units): N/A	Sample Type: Grab
Sample Collection Method: shovel	Sample Depth: 0.0-0.5'
Soil Type: Fill Material	Rad Screen Instrument: 44-9 SB 6-7-06 44-10 51cpm D 44-DM
Rad Screen Bkg.: 44-9 51cpm 44-10 15K cpm	Rad Screen: 44-9 79cpm 44-10 7517cpm
Comments: 0.5-1.0 67cpm, 8181cpm 1.0-1.5 61cpm 7413cpm 2.0-2.5 67cpm, 7233cpm	
QC Archive as of 6-7-06	
Recorded by: Stephen Rong	QA by: Mark Rong 6-9-06

COC No.: SA06072006-01H

Task Team Members: SB DL

Sample ID: ~~SD 95120~~ Station ID: ~~SLD 95119~~

Collection Date: 6-7-06 Collection Time: 1035

Property Name: SLOS DT-10 Sample Location: SU-11

Northing (units): 1029076.07 Easting (units): 908901.79

Elevation (units): N/A Sample Type: Gmb

Sample Collection Method: Auger Sample Depth: 1.5-2.0'

Soil Type: Fill Material Rad Screen Instrument: 44-9 D 44-M M

Rad Screen Bkg.: 51cpm, 15kcpm Rad Screen: 69cpm, 74kcpm

Comments:

Recorded by: Mark Bough QA by: Mark Bough 6-9-06

COC No.: SA06072006-01H

Task Team Members: SB DL

Sample ID: SLD 95121 Station ID: SLD 95119

Collection Date: 6-7-06 Collection Time: 1048

Property Name: SLOS DT-10 Sample Location: SU-11

Northing (units): 1029076.07 Easting (units): 908901.79

Elevation (units): N/A Sample Type: Gmb

Sample Collection Method: Auger Sample Depth: 2.5-3.0'

Soil Type: Fill Material mixed w/ clay Rad Screen Instrument: 44-9 D 44-M M

Rad Screen Bkg.: 51cpm, 15kcpm Rad Screen: 66cpm, 8493cpm

Comments:

Recorded by: Mark Bough QA by: Mark Bough 6-9-06

COC No.: SA06072006-01H

Task Team Members: Stephen Bough David Lanson Gail Schriener

Sample ID: ~~SD 95120~~ Station ID: SLD 95122

Collection Date: 6-7-06 Collection Time: 1218

Property Name: SLOS DT-10 Sample Location: SU-26

Northing (units): 1029932.77 Easting (units): 909092.17

Elevation (units): N/A Sample Type: Gmb 1.06

Sample Collection Method: tunnel Sample Depth: 0.0-0.5'

Soil Type: F.I. Material Rad Screen Instrument: 44-9 D 44-M M

Rad Screen Bkg.: 51cpm, 15kcpm Rad Screen: 60cpm, 8116cpm

Comments: 0.0-0.5-1.0 68cpm 7287cpm 2.5-3.0 300cpm 3867cpm
 1.0-1.5 89cpm 8360cpm 694cpm 8125cpm
 1.5-2.0 82cpm 8073cpm
 2.0-2.5 72cpm 8164cpm

Recorded by: Mark Bough QA by: Mark Bough 6-9-06

COC No.: SA06072006-01H

Task Team Members: SB DL

Sample ID: SLD 95123 Station ID: SLD 95122

Collection Date: 6-7-06 Collection Time: 1227

Property Name: DT-10 SLOS Sample Location: SU-26

Northing (units): 1029932.77 Easting (units): 909092.17

Elevation (units): N/A Sample Type: Gmb

Sample Collection Method: Auger Sample Depth: 2.0-3.0 1.5-2.0'

Soil Type: Fill Material Rad Screen Instrument: 44-9 D 44-M M

Rad Screen Bkg.: 51cpm, 15kcpm Rad Screen: 82cpm, 8073cpm

Comments:

Recorded by: Mark Bough QA by: Mark Bough 6-9-06

COC No.: SA 06072006-01H

Task Team Members: SB ES DK

Sample ID: SLD95124 Station ID: SLD95122

Collection Date: 6-7-06 Collection Time: 1231

Property Name: SLD5 BT-10 Sample Location: SU-26

Northing (units): 1029932.77 Easting (units): 909042.17

Elevation (units): N/A Sample Type: Grab

Sample Collection Method: Auger Sample Depth: 2.0-2.5'

Soil Type: Fill Material Rad Screen Instrument: 44-9 D 44-10 K

Rad Screen Bkg.: 51 cpm 15K cpm Rad Screen: 72 cpm 8K64 cpm

Comments:

Recorded by: Mark Peen

QA by: Mark Peen

COC No.: SA 06212006-01H

Task Team Members: S. Bays T. Keeton

Sample ID: SLD95244 Station ID: SLD95244

Collection Date: 6-21-06 Collection Time: 0910

Property Name: GSS Sample Location: SU-3 South hole

Northing (units): 1029226.40 Easting (units): 909595.45

Elevation (units): N/A Sample Type: Grab

Sample Collection Method: Auger Sample Depth: 0.0-0.5'

Soil Type: Fill Material Rad Screen Instrument: 44-9 A 44-10 K

Rad Screen Bkg.: 30 cpm 5,000 cpm Rad Screen: 71 cpm 65K cpm

Comments: AL location

0.5-1.0' 6K cpm 1.5-2.0' 63 cpm 6K cpm
1.0-1.5' 60 cpm SB 6-21-06 70 cpm 5.5K cpm

Recorded by: S. Bays

QA by: Mark Peen

6-23-06

HTRW DRILLING LOG		DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 7207</u>	
1. COMPANY NAME <u>FUDRAP/SLDS</u>		2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		3. SHEET <u>1</u> OF <u>1</u>	
4. PROJECT <u>IT Corporation</u>		5. LOCATION <u>THOMAS AND PROKE (DT-10)</u>			
6. NAME OF DRILLER <u>PAE HART</u>		7. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
8. SIZE AND TYPE OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 INCH SPT RODS</u>		9. HOLE LOCATION <u>CLASS 2</u>			
10. <u>Not 2nd Detector</u> <u>Photo Ionization Detector</u>		11. SURFACE ELEVATION			
12. OVERBURDEN THICKNESS		13. DATE STARTED <u>3/19/01</u>		14. DATE COMPLETED <u>3/19/01</u>	
15. DEPTH DRILLED INTO ROCK		16. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
17. TOTAL DEPTH OF HOLE <u>2.0 ft BGS</u>		18. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
19. GEOTECHNICAL SAMPLES <u>0</u>		20. DISTURBED <u>-</u>		21. UNDISTURBED <u>-</u>	
22. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS	
23. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL	
24. OTHER (SPECIFY)		OTHER (SPECIFY)		OTHER (SPECIFY)	
25. TOTAL CORE RECOVERY		26. SIGNATURE OF INSPECTOR <u>[Signature]</u>		27. TOTAL CORE RECOVERY	
LOCATION SKETCH/COMMENTS					
SCALE:					
↑ N					
N 908879.8449 E 1029621.018					
EST		HOLE NO. <u>SLD 7207</u>			

HTRW DRILLING LOG						
PROJECT <i>FUSRAP/5405</i>			INSPECTOR <i>Chris Lick</i>		WELL NUMBER <i>340 7207</i>	
BLK. NO.	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD LOGGING RESULTS	SECTION SAMPLE OR CORE COR. NO.	ANALYTICAL SAMPLE NO.	REMARKS
<i>G.W.</i> <i>CH</i> <i>G.W.</i>	<i>1</i>	<i>GRAVEL</i>	<i>4700</i>	<i>0.5</i> <i>ton/ft</i>	<i>340</i>	<i>1.8</i> <i>2.0 Recovers</i> <i>Pishap split</i> <i>spoon</i>
		<i>TAN. MED GRAVEL</i>	<i>NGI</i>		<i>7207A</i>	
	<i>Dry, FILL, poorly</i>	<i>0.0</i>	<i>1048</i>			
		<i>GRAVEL</i>	<i>PID</i>			
		<i>FAT CLAY</i>	<i>5100</i>			
		<i>BROWN - DRY</i>	<i>NGI</i>			
	<i>2</i>	<i>SIAS</i>	<i>010</i>		<i>340</i>	
		<i>Black, MED-FINE GRAVEL</i>	<i>PIP</i>		<i>7208A</i>	
		<i>Dry, FILL well</i>			<i>1050</i>	
		<i>TID</i>	<i>1100</i>	<i>hrs</i>	<i>3/</i>	<i>19/61</i>
	<i>3</i>					<i>Drum: 1</i> <i>(DT-10)</i> <i>4300 counts</i> <i>NGI Background</i> <i>Bentonite caps</i> <i>for BF.</i> <i>Note - 7207A</i> <i>Means the</i> <i>Boring was</i> <i>made one time</i>

FUSRAP/5405

340 7207

HTRW DRILLING LOG		DISTRICT <u>ST. LOUIS</u>		HOLE NUMBER <u>SLD 7209</u>	
1. COMPANY NAME <u>IT Corporation</u>		2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>		4. LOCATION <u>THOMAS AND Proetz (DT 110)</u>			
5. NAME OF DRILLER <u>PAT HART</u>		6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT		8. HOLE LOCATION			
<u>Hollow Stem Auger</u>		<u>CLASS 2</u>			
<u>3.5 IMA 3001 SPAN</u>		9. SURFACE ELEVATION			
<u>Nat 2x2 Detector</u>		10. DATE STARTED <u>13/1/14</u>			
<u>Photo-Tomograph Detector</u>		11. DATE COMPLETED <u>31/1/14</u>			
12. OVERBURDEN THICKNESS		13. DEPTH OF GROUNDWATER ENCOUNTERED			
		<u>NIA</u>			
13. DEPTH DRILLED INTO ROCK		14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED			
		<u>NIA</u>			
14. TOTAL DEPTH OF HOLE <u>2.5 ft BGS</u>		15. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)			
		<u>NIA</u>			
16. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	17. TOTAL NUMBER OF CORE BOXES		
<u>0</u>					
18. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)
			<u>RAD</u>		
19. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	20. SIGNATURE OF INSPECTOR	
				<u>[Signature]</u>	
LOCATION SKETCH/COMMENTS			SCALE:		
PROJECT <u>FUSRAP/SLDS</u>			HOLE NO. <u>SLD 7209</u>		

HTRW DRILLING LOG

PROJECT *FUSRAP/SLDS*

INSPECTOR *Chris Loh*

WELL NUMBER *SLD 7209*

SHEET *2* OF *2*

BLK. NO.	DEPTH (ft)	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	DEPTH SAMPLE OR CORE NO. (ft)	ANALYTICAL SAMPLE NO. (ft)	REMARKS
<i>GW</i>		<i>Asphalt</i>	<i>5100 NAT.</i>		<i>5100 7209 FWA 1452</i>	<i>Anger Asphalt</i>
	<i>1</i>	<i>GRAVEL, SAND TAN, MED-GRAINED, Dry, FILL well graded</i>	<i>5300 NAT 0.0 PID</i>	<i>0.5- long/ 6-12</i>	<i>5100 7209 1500</i>	<i>2.0 2.0 Recover</i>
	<i>2</i>	<i>Brick Red</i>	<i>5600 NAT 0.0 PID</i>			<i>Push spec soon.</i>
		<i>Silt, Black, Red Med-Fine Grained, FILL</i>	<i>2.5</i>		<i>5100 7210 1510</i>	
	<i>3</i>	<i>TID</i>		<i>ft 1520 has</i>		<i>3/14/01 Dunn: (DT-10) 5100 counts NAT Background Bentonite chips for BF.</i>

PROJECT *FUSRAP/SLDS*

WELL NUMBER *SLD 7209*

HTRW DRILLING LOG				DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 7211</u>	
1. COMPANY NAME <u>IT CORPORATION</u>			2. DRILL SUBCONTRACTOR <u>Geotechnology</u>			SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>				4. LOCATION <u>Thomas AND Pirode (DT-N)</u>			
5. NAME OF DRILLER <u>PAE HARE</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
7. SIZE AND TYPE OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.15 INCH 30FT 1200W</u> <u>Not 2x2 Detector</u> <u>Photo - Ignition Detector</u>				8. HOLE LOCATION <u>CLASS 2</u>			
				9. SURFACE ELEVATION			
				10. DATE STARTED <u>3/14/01</u>		11. DATE COMPLETED <u>3/14/01 -</u>	
12. OVERBURDEN THICKNESS				13. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
14. DEPTH DRILLED INTO ROCK				15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
16. TOTAL DEPTH OF HOLE <u>2.5/1 365</u>				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>			
18. GEOTECHNICAL SAMPLES		DISTURBED		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) <u>RAO</u>	
						21. TOTAL CORE RECOVERY	
22. DEPOSITION OF HOLE		BACKFILLED		MONITORING WELL		23. SIGNATURE OF INSPECTOR <u>[Signature]</u>	
LOCATION SKETCH/COMMENTS							
SCALE:							
PROJECT <u>FUSRAP/SLDS</u>						HOLE NO. <u>SLD 7211</u>	

HTRW DRILLING LOG						WELL NUMBER SLD 7211
PROJECT FUSRAP/SLOS		INSPECTOR Chris Lock			SHEET of 2 SHEET 2	
BLK. NO.	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	SCREENING SAMPLE OR CORE BOX NO. (ft)	ANALYTICAL SAMPLE NO. (ft)	REMARKS
GW		Asphalt	4800 NAT		SLD 7211 1401	Anger Asphalt
	1	Brick Red.	5300 NAT O.D. PID	0.5 ton/ft	SLD 7211 1410	2.0 2.0 Recovery
	2	Slag Black- Red, Med- Fine	5700 NAT O.D. PID		SLD 7212 1410	Push split SPOON
	3	T.D. 2.5 ft		1420	hrs	3/14/01
		Drilling (DT-N) 5100 counts NAT Background Bentonite chip for BF.				

PROJECT

FUSRAP/SLOS

WELL

SLD 7211

HTRW DRILLING LOG				DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 7213</u>	
1. COMPANY NAME <u>IT CORPORATION</u>				2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>				4. LOCATION <u>Thomas AND Pivetz (DT10)</u>			
5. NAME OF DRILLER <u>DAB HART</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 IN Split Spoon</u> <u>NCE Detector</u> <u>Photo-Ionization Detector</u>				8. HOLE LOCATION <u>CLASS 2</u>			
				9. SURFACE ELEVATION			
				10. DATE STARTED <u>3/14/01</u>		11. DATE COMPLETED <u>3/14/01</u>	
12. OVERBURDEN THICKNESS				13. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
13. DEPTH DRILLED INTO ROCK				14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
14. TOTAL DEPTH OF HOLE <u>2.5 / 11 BGS</u>				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>			
15. GEOTECHNICAL SAMPLES <u>0</u>		DISTURBED		UNDISTURBED		16. TOTAL NUMBER OF CORE SECTIONS	
18. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) <u>RAD</u>	
						21. TOTAL CORE RECOVERY	
22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL		23. SIGNATURE OF INSPECTOR <u>[Signature]</u>	
LOCATION SKETCH/COMMENTS				SCALE:			
N 16296 826 697 E 908630.5013 SLD 7213 BUILDINGS 75 ↑ N							
PROJECT <u>FUSRAP/SLDS</u>						HOLE NO. <u>SLD 7213</u>	

HTRW DRILLING LOG						WELL NUMBER 540 7213
PROJECT FUSRAP/SLOS			INSPECTOR Chris Locke		SHEET 2 OF 2	
DATE	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	DETECTED SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	REMARKS
		Asphalt			5400 7213 1309	Auger Asphalt
	1	GRAVEL, TAN- MED GRAVEL DIG. FILL, WELL GRADED.	5500 NAI 0.0 PID	0.5 TUM/612	5400 7213 1320	2.0 2.0 Recovery
	2		5600 NAI 0.0 PID		5400 7214A 1347	PUSHED SPH. GROUND
	3	T.D. 2.5ft		1355	1115	3/14/61 Drum: 1 (DT-10) 5100 counts NAI BACKGROUND Bentonite cap for BE. Note- 7214A Denotes this one sample was taken from different boring. It was taken from 24-30" IN A Boring 6" Away from the ORIGINAL (Due to poor Recovery IN first Boring). Approved By Robert Parks USACE.

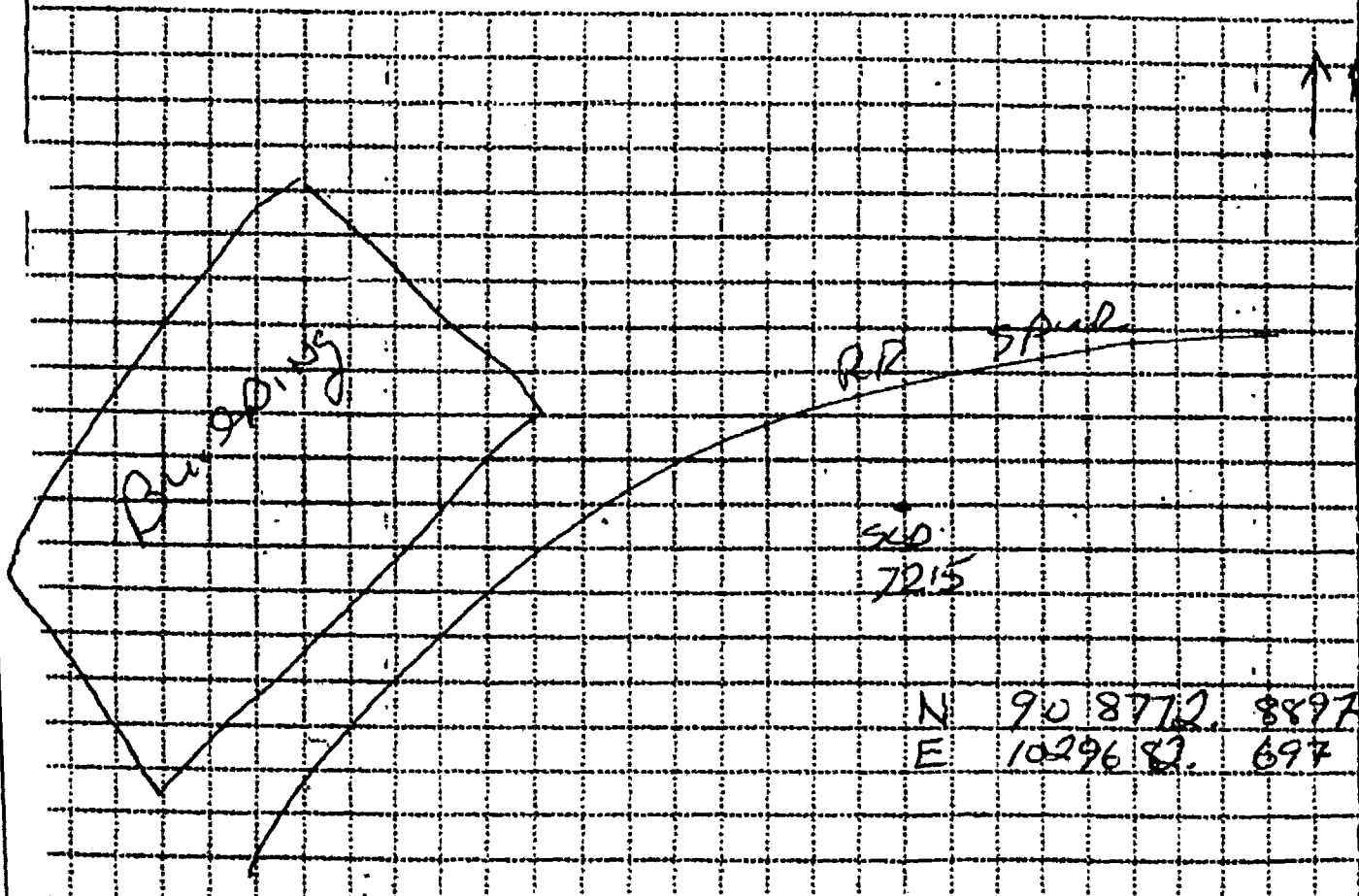
PROJECT FUSRAP/SLOS

WELL NO. 540 7213

HTRW DRILLING LOG		DISTRICT St. Louis		HOLE NUMBER SLD 7215	
1. COMPANY NAME FUSRAP/SLDS		2. DRILL SUBCONTRACTOR Geotechnology		SHEET 1 OF 2	
3. PROJECT IT Corporation		4. LOCATION C Thomas / Pivette (OT 70)			
5. NAME OF DRILLER PAE HART		6. MANUFACTURER'S DESIGNATION OF DRILL CME 55			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT Hollow Stem Auger Split Spoon 3.5 ft NQT 2x2 Detector Photo Transducer Detector		8. HOLE LOCATION CLASS 2			
		9. SURFACE ELEVATION			
		10. DATE STARTED 3/19/01		11. DATE COMPLETED 3/19/01	
12. OVERBURDEN THICKNESS		13. DEPTH GROUNDWATER ENCOUNTERED N/A			
14. DEPTH DRILLED INTO ROCK		15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A			
16. TOTAL DEPTH OF HOLE 215 ft BGS		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
18. GEOTECHNICAL SAMPLES 0	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES		
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY) RAO	OTHER (SPECIFY)	OTHER (SPECIFY)
21. DISPOSITION OF HOLE	BAG FILLED	MONITORING WELL	OTHER (SPECIFY)	22. SIGNATURE OF INSPECTOR <i>[Signature]</i>	
23. TOTAL CORE RECOVERY					

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT **FUSRAP/SLDS**

HOLE NO. **SLD 7215**

HTRW DRILLING LOG						
PROJECT		INSPECTOR			WELL NUMBER	
FUSRAP/SLDS		Chris Lock			3CD 7215	
BLK	DEPTH	DESCRIPTION OF MATERIALS	FIELD TECHNIQUE	DEPTH SAMPLE	ANALYTICAL	REMARKS
NO.	FT	NO.	NO.	NO.	NO.	
		Asphalt	4400 NAI		3400 7215 1418	Anger ASPHALT
GW	1	SLAG BLACK- RED, MED- FINE GRAINED, Dry- FILL. Densely GRAINED	4500 NAI OIO PTD		3400 7215 1428	1.7 / 2.0 Recovery
	2	Brick- RED, HARD	4800 NAI OIO PTD		3400 7216 1431	Pushed SPILT SPOON
	3	TID.	2.5 ft	1440 hrs	3/19/0	Drum: 1 (DT-10) 4300 counts NAI BACKGROUND Bentonite chips for BF.
Note - third sample taken at highest NAI count AREA (Note - below 1.5 Background for entire spoon.						

FUSRAP/SLDS

3CD 7215

HTRW DRILLING LOG				DISTRICT <u>ST. LOUIS</u>		HOLE NUMBER <u>SLD 7217</u>	
1. COMPANY NAME <u>IT Corporation</u>				2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		SHEET <u>1 of 2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>				4. LOCATION <u>Thomas And Proetz (DT-W)</u>			
5. NAME OF DRILLER <u>Pat Hart</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME SS</u>			
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>4 1/2" x 9'0" Auger</u> <u>3 1/2" INCH SPUR DRILL</u>				8. HOLE LOCATION <u>CLASS 2</u>			
				9. SURFACE ELEVATION			
				10. DATE STARTED <u>3/15/01</u>		11. DATE COMPLETED <u>3/15/01</u>	
12. OVERBURDEN THICKNESS				13. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
13. DEPTH DRILLED INTO ROCK				14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
14. TOTAL DEPTH OF HOLE <u>2.3 ft BGS</u>				15. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>			
16. GEOTECHNICAL SAMPLES <u>0</u>		DISTURBED		UNDISTURBED		17. TOTAL NUMBER OF CORE BOXES	
18. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) <u>RAO</u>	
20. DISPOSITION OF HOLE		BAGGED		MONITORING WELL		21. SIGNATURE OF INSPECTOR <u>[Signature]</u>	
LOCATION SKETCH/COMMENTS				SCALE:			
<u>N</u> ↑ <u>N 908915.279</u> <u>E 1029682.697</u> <u>SLD</u> <u>7217</u> <u>Building</u> <u>Angel Rodz</u>							
PROJECT <u>FUSRAP/SLDS</u>				HOLE NO. <u>SLD 7217</u>			

HTRW DRILLING LOG

PROJECT		INSPECTOR		WELL NUMBER	
FUSRAP/SUP		Chris Lock		SLD 7217	
DEPTH	DESCRIPTION OF MATERIALS	FIELD READING	SEATED SAMPLE	ANALYTICAL	REMARKS
FEET	FEET	COUNTS	OF CORE BOX NO.	SAMPLE NO.	
	Asphalt	4600 NCT		SLD 7217 0822	Auger Asphalt
1	Gravly sand, Tan, med-fine grained Dry, Full, well graded	4900 NCT 010 PID	015 ton/ft	SLD 7217 0831	1.8 2.0 Recovery
2	Slag, Black-red, med- fine grained, Dry, Full, well graded	5200 NCT 010 PID		SLD 7218 0834	Pushed split - grain
3	TID	2.5/1	0840 hrs	3/15/01	Drum 1 (DT-1) 4600 counts NCT Background Bentonite chips for BF.

4600

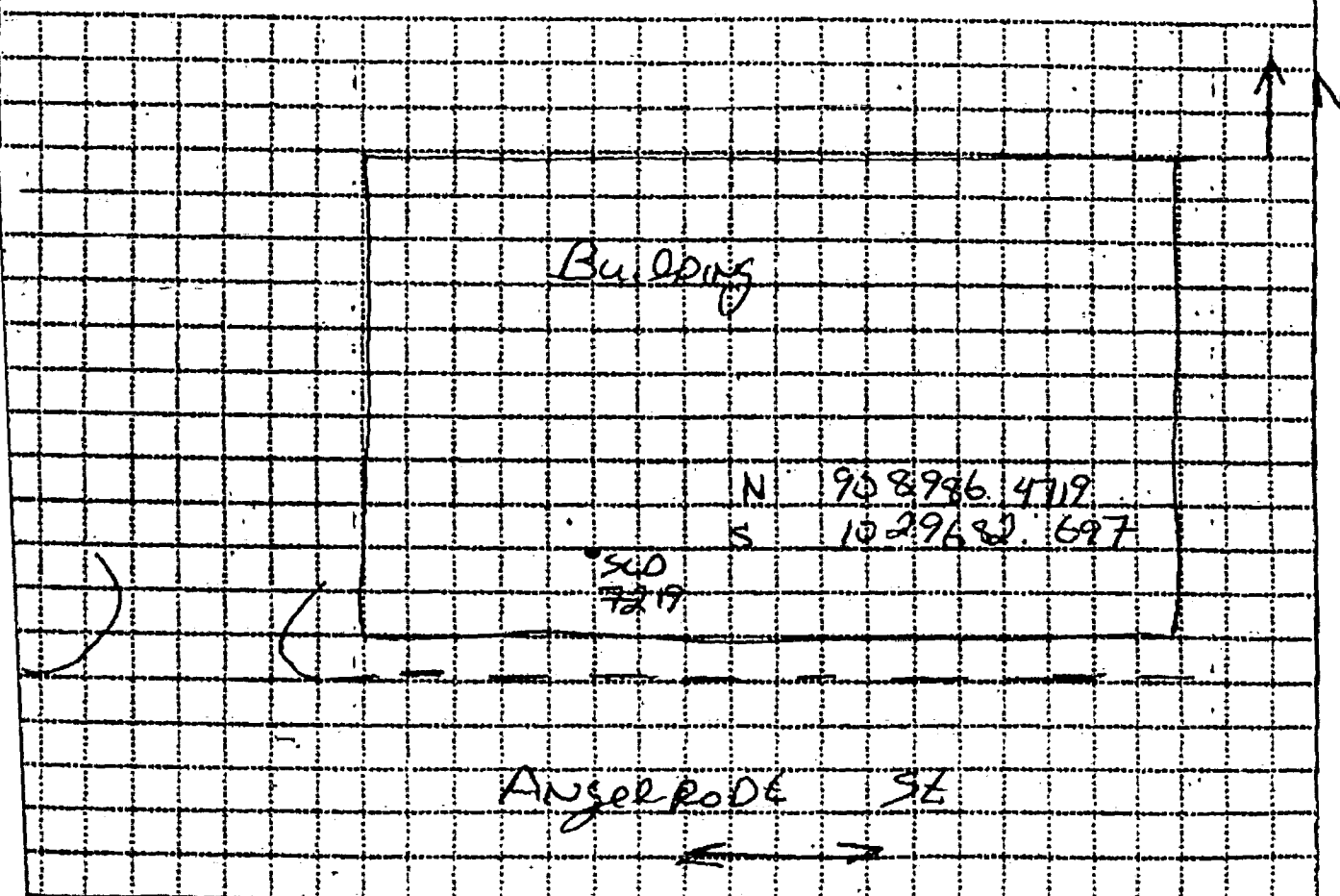
FUSRAP/SUP

SLD 7217

HTRW DRILLING LOG		DISTRICT St. Louis		HOLE NUMBER SLD 7219	
1. COMPANY NAME FUSRAP/SLD		2. DRILL SUBCONTRACTOR Geotechnology		SHEET 1 OF 2	
3. PROJECT IT Corporation		4. LOCATION THOMAS AND Proetz (DT-10)			
5. NAME OF DRILLER PAT HARD		6. MANUFACTURER'S DESIGNATION OF DRILL CME 55			
7. SIZE AND TYPE OF DRILLING AND SAMPLING EQUIPMENT Hollow Stem Auger 3.5 IN split SASON		8. HOLE LOCATION CLASS 2			
9. Nor 2x2 Detector		10. SURFACE ELEVATION			
11. Photo Ionization Detector		12. DATE STARTED 3/19/01		13. DATE COMPLETED 3/19/01	
14. OVERBURDEN THICKNESS		15. DEPTH GROUNDWATER ENCOUNTERED N/A			
16. DEPTH DRILLED INTO ROCK		17. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A			
18. TOTAL DEPTH OF HOLE 2.5 / + BGS		19. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
20. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	21. TOTAL NUMBER OF CORE BOXES		
22. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY) RAD	OTHER (SPECIFY)	OTHER (SPECIFY)
23. DISPOSITION OF HOLE	BACOFILLED	MONITORING WELL	OTHER (SPECIFY)	24. SIGNATURE OF INSPECTOR <i>[Signature]</i>	

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT **FUSRAP/SLD**

HOLE NO **SLD 7219**

HTRW DRILLING LOG						
PROJECT FUSRAP/SLDS			INSPECTOR Chris Lock		HOLE NUMBER 340 7219	
SCH. NO.	DEPTH	DESCRIPTION OF MATERIALS	FIELD TESTING RESULTS	ANALYTICAL SAMPLE NO.	ANALYTICAL SAMPLE NO.	REMARKS
6W	1	ASPHALT	4500 NCO	SLD 7219 1457		Anger Asphalt
		SLAG BLACK-RED, MED- FINE GRAINED, Dry, Fill, poorly graded	4500 NAI OIO PID	SLD 7219 1505		2.0 2.0 Recovery
		FAT CLAY - BROWN, Dry, Fill,	4700 NAI OIO PID	SLD 7220 1507		Pushed split SPOON
CA#	2					
	3	T.D	2.5 ft	151	5 hrs	3/19/01 Diam: 1 (DT-10) 4300 counts NAI Background Bentonite chips for BF.

PROJECT FUSRAP/SLDS

340 7219

HTRW DRILLING LOG				DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 7221</u>	
1. COMPANY NAME <u>IT Corporation</u>			2. DRILL SUBCONTRACTOR <u>Geotechnology</u>			SHEET <u>18</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>				4. LOCATION <u>THOMAS AND Proetz (DT-10)</u>			
5. NAME OF DRILLER <u>PAT HART</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 inch split spoon</u> <u>NGL 2x2 Detector</u> <u>Photo-Ionization Detector</u>				8. HOLE LOCATION <u>CLASS 2</u>			
				9. SURFACE ELEVATION			
				10. DATE STARTED <u>3/13/01</u>		11. DATE COMPLETED <u>3/13/01</u>	
12. OVERBURDEN THICKNESS				13. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
13. DEPTH DRILLED INTO ROCK				15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
14. TOTAL DEPTH OF HOLE <u>2.0 ft BGS</u>				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>			
16. GEOTECHNICAL SAMPLES <u>0</u>		DISTURBED		UNDISTURBED		18. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) <u>RAO</u>	
						21. TOTAL CORE RECOVERY	
22. DISPOSITION OF HOLE		BAGGED		MONITORING WELL		23. SIGNATURE OF INSPECTOR <u>Thom</u> <u>Proetz</u>	
LOCATION SKETCH/COMMENTS							
SCALE:							
<u>THOMAS AND Proetz</u> <u>Property</u> <u>MANHOLE</u> <u>Property</u> <u>N 909093.4274</u> <u>E 1029744.377</u> <u>Building</u> <u>SLD</u> <u>7221</u>							
PROJECT <u>FUSRAP/SLDS</u>						HOLE NO. <u>SLD 7221</u>	

HTRW DRILLING LOG

PROJECT		INSPECTOR		FILE NUMBER	
FUSRAP/SLOS		Chris Locke		SLO 7221	
DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	DETERMINED SAMPLE OR CORE SIZE (in)	ANALYTICAL SAMPLE NO.	REMARKS
1	GRAVEL, SAND TAN, MED GRAINED Dry, well GRADED. FILL	4/00 NGL 0.0 4700 NGL	0.5 ton/ft ³	SLOO 7221 1423	2.0/2.0 Recovery Pushed split SPOON.
2	SLAG, BLACK-RED, MED- FINE GRAINED, Dry FILL, well GRADED	0.0 PID		SLOO 7222 1426	-
3	T.D. 20 6'		1430	his	3/13/01 Dum: 1 (DT-10) 4500 counts NGL BACKGROUND Benthamer chips for BF.

FUSRAP/SLOS

SLO 7221

HTRW DRILLING LOG				DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 7223</u>	
1. COMPANY NAME <u>ITT CORPORATION</u>				2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>				4. LOCATION <u>THOMAS AND Proctor (OT-10)</u>			
5. NAME OF DRILLER <u>PAL HART</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 INCH SPLIT SPOON</u> <u>Not 2x2 Detector</u> <u>Photo-Ionization Detector</u>				8. HOLE LOCATION <u>CIAS 2</u>			
				9. SURFACE ELEVATION			
				10. DATE STARTED <u>3/20/01</u>		11. DATE COMPLETED <u>3/20/01</u>	
12. OVERBURDEN THICKNESS				13. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
13. DEPTH DRILLED INTO ROCK				14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
14. TOTAL DEPTH OF HOLE <u>2.0 ft BGS</u>				15. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>			
16. GEOTECHNICAL SAMPLES <u>0</u>		DISTURBED		UNDISTURBED		18. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) <u>RAD</u>	
22. DISPOSITION OF HOLE		BAG FILLED		MONITORING WELL		21. TOTAL CORE RECOVERY	
				OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR <u>John Taha</u>	
LOCATION SKETCH/COMMENTS							
SCALE:							
<u>Note - Moved Boring Due to overhead fire system. Adding 2x2 Detector. USACE</u> <u>N</u> <u>Anger Rod</u> <u>← →</u>							
PROJECT <u>FUSRAP/SLDS</u>						HOLE NO. <u>SLD 7223</u>	

HTRW DRILLING LOG

PROJECT		INSPECTOR		FILE NUMBER	
FUSRAP/SLOS		Chris Locke		SLO 7223	
REL. NO.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING TESTS	DETECT. SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.
		Asphalt.	4300 NAI		SLO 7223A 1316
GW	1	GRAVEL. TAN, MED. GRAINED, Dry, Full, well graded	4500 NAI 0.0		SLO 7223A 1322
	2	SLT, BLACK. RED, MED-FINE GRAINED, Dry, Full, poorly graded	PID 4400 NAI 0.0 PID		
	3	TID	2.5 ft	1335	

Auger Asphalt

1.7
2.0 Recovery

Pushed
split - spoon

hrs 3/20/01

Diana
(DT-10)

4700 counts
NAI Background
Bentrick Chip
for BF

Note - SLO 7223A
means the
Boring was
moved once.

FUSRAP/SLOS

SLO 7223

HTRW DRILLING LOG		DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 7227</u>	
1. COMPANY NAME <u>IT CORPORATION</u>		2. DRILL SUBCONTRACTOR <u>Gentechology</u>		3. SHEET <u>1</u> OF <u>1</u>	
3. PROJECT <u>FUSRAP/SLDS</u>		4. LOCATION <u>Thomas And Proetz (DT-10)</u>			
5. NAME OF DRILLER <u>PAT HART</u>		6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
7. SIZE AND TYPE OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 INCH SPIRE SPIN</u>		8. HOLE LOCATION <u>CLASS 2</u>			
<u>NSI 2x2 Detector</u> <u>Photo-Ionization Detector</u>		9. SURFACE ELEVATION			
10. OVERBURDEN THICKNESS		11. DATE STARTED <u>3/19/01</u>		12. DATE COMPLETED <u>3/19/01</u>	
13. DEPTH DRILLED INTO ROCK		14. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
15. TOTAL DEPTH OF HOLE <u>2.0 ft BGS</u>		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>		18. TOTAL NUMBER OF CORE LOGS			
19. GEOTECHNICAL SAMPLES		DISTURBED		UNDISTURBED	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS	
		OTHER (SPECIFY) <u>RAO</u>		OTHER (SPECIFY)	
21. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL	
		OTHER (SPECIFY)		22. SIGNATURE OF INSPECTOR <u>Chris Rob</u>	
LOCATION SKETCH/COMMENTS					
BUILDING SLD 7227 N E SLD 7227 N E					
PROJECT <u>FUSRAP/SLDS</u>					
HOLE NO. <u>SLD 7227</u>					

HTRW DRILLING LOG						
PROJECT FUSRAP/SLOS			INSPECTOR Chris Loh		SCL 7229	
LOG NO.	DEPTH	DESCRIPTION OF MATERIALS	FIELD LOGGING RESULTS	TESTED SAMPLE OR CORE LOG NO.	ANALYTICAL SAMPLE NO.	REMARKS
GW		GRAND, TAN, MED GRANUL, Dry, FILL, well grained	450 NFI	0.5 ton/67	200 7227 1000	2.0 2.0 Recovery
	1	WOOD BROWN	PID 5100 NFI	-	-	Pushed SPRT spoon
GW	2	DIAG, BLAKE, MED FINE GRANUL, Dry, poor grained	PID	-	3400 7228 1003	-
		T.D. 2.0 ft		1010	his	3/19/01
	3					Drum: 1 (DT-10) 4300 counts NFI Background Bentonite chip for BF

PROJECT FUSRAP/SLOS

SCL 7227

HTRW DRILLING LOG		DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SD 7229</u>	
1. COMPANY NAME <u>IT Corporation</u>		2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SDS</u>		4. LOCATION <u>THOMAS AND Proctor (DT-10)</u>			
5. NAME OF DRILLER <u>PAC HART</u>		6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 5.5</u>			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 INCH split spoon</u> <u>NOT 2nd Detector</u> <u>Photo Ionization Detector</u>		8. HOLE LOCATION <u>CLASS 2</u>			
		9. SURFACE ELEVATION			
		10. DATE STARTED <u>3/19/01</u>		11. DATE COMPLETED <u>3/19/01</u>	
12. OVERBURDEN THICKNESS		13. DEPTH OF GROUNDWATER ENCOUNTERED <u>N/A</u>			
13. DEPTH DRILLED INTO ROCK		14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
14. TOTAL DEPTH OF HOLE <u>2.5 ft BGS</u>		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>			
15. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	18. TOTAL NUMBER OF CORE BOXES		
19. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY) <u>RAO</u>	OTHER (SPECIFY)	OTHER (SPECIFY)
20. DISPOSITION OF HOLE	SACFILLED	MONITORING WELL	OTHER (SPECIFY)	21. SIGNATURE OF INSPECTOR <u>[Signature]</u>	
22. TOTAL CORE RECOVERY					

LOCATION SKETCH/COMMENTS SCALE:

HTRW DRILLING LOG

PROJECT		INSPECTOR		HOLE NUMBER	
FUSRAP/SLDS		Chris Lock		720 7229	
BLK. NO.	DEPTH (ft)	DESCRIPTION OF MATERIALS	FIELD TESTS/RESULTS	DETECT SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.
GW-SW	1	Asphalt	4200 NGI		SLD 7229A 0921
	2	SANDY GRAVEL, Brown, Med FINE GRAINED, DRY Well graded.	4600 NGI ON PID 4300 NGI ON PIP.	0.5 ton/hr	SLD 7229A 0934
	3	Brick Red			SLD 7229A 0936
		TID	2.5 ft		0945

Anger Ashnet

2.0
2.0 Recover

Pushed
split - spoon

h.s 3/19/0

DM: 1
(DT-10)
4300 counts
NGI Background
Bentonite chip
for BF

Note - 7229A
means the
Boring was
on road one
time.

FUSRAP/SLDS

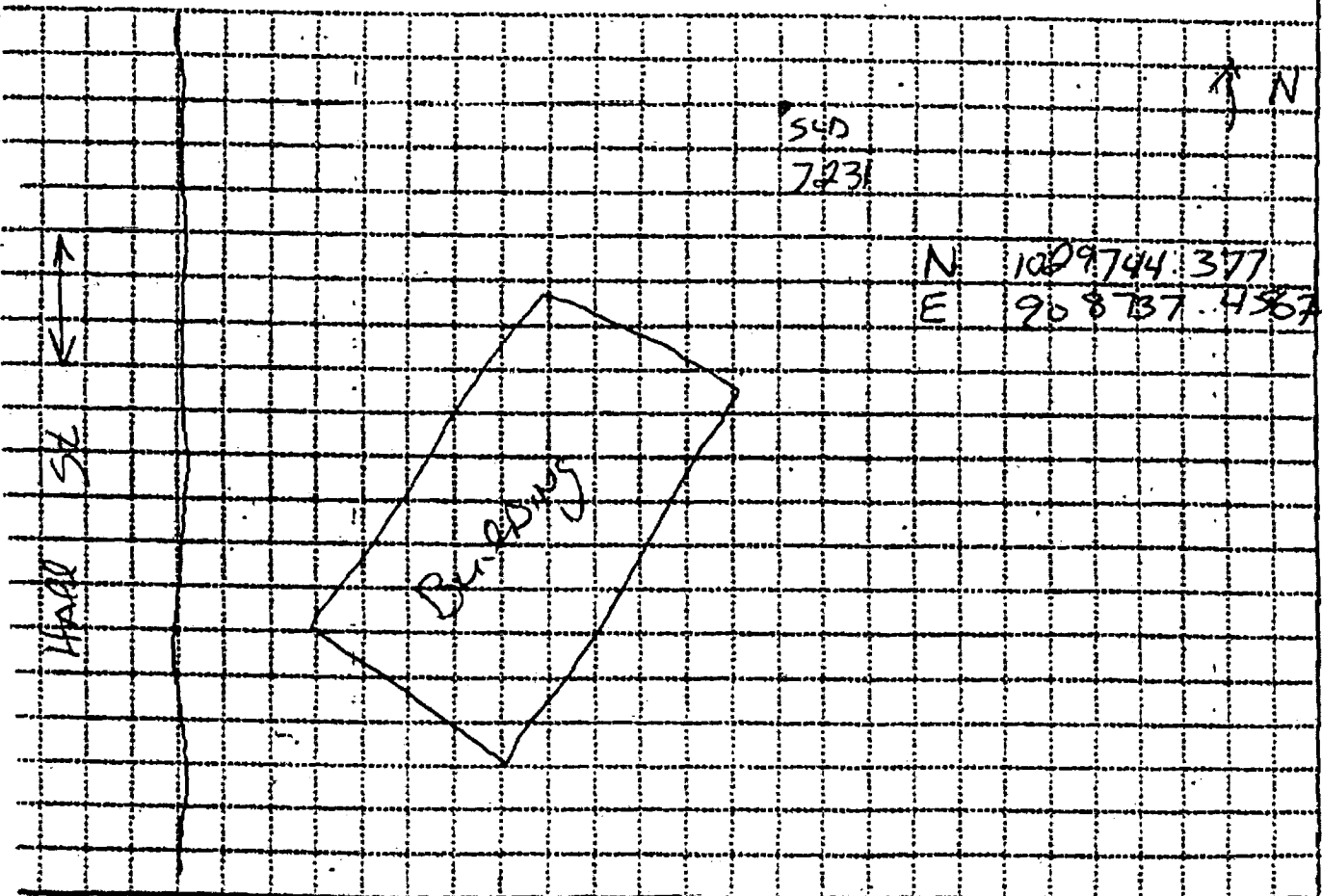
SLD 7229

4300

HTRW DRILLING LOG		DISTRICT <u>SL. Louis</u>		HOLE NUMBER <u>SLD 7231</u>	
1. COMPANY NAME <u>IT Corporation</u>		2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>			4. LOCATION <u>THOMAS AND Pioete (DT 10)</u>		
5. NAME OF DRILLER <u>PAE HARE</u>			6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>		
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 IN split spool</u> <u>Net 2x2 Detector</u> <u>Photo-Ionization Detector</u>			8. HOLE LOCATION <u>CLASS 2</u>		
			9. SURFACE ELEVATION		
			10. DATE STARTED <u>3/14/01</u>		11. DATE COMPLETED <u>3/14/01</u>
12. OVERBURDEN THICKNESS			13. DEPTH OF GROUNDWATER ENCOUNTERED <u>NIA</u>		
14. DEPTH DRILLED INTO ROCK			15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>NIA</u>		
16. TOTAL DEPTH OF HOLE <u>2.5/1 BGS</u>			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>NIA</u>		
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES		
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY) <u>RAO</u>	OTHER (SPECIFY)	OTHER (SPECIFY)
21. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	22. SIGNATURE OF INSPECTOR <u>[Signature]</u>	
23. TOTAL CORE RECOVERY					

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT <u>FUSRAP/SLDS</u>	HOLE NO. <u>SLD 7231</u>

HTRW DRILLING LOG

PROJECT		INSPECTOR		HOLE NUMBER	
FUSRAP/SUDS		Chris Lock		SUD 7231	
SHEET		SHEET		SHEET	
2		2		2	
DEPTH (ft)	DESCRIPTION OF MATERIALS	PROB. SCREENING ACTIVITY	DETERMINED SAMPLE OR CORE IDENT. NO.	ANALYTICAL SAMPLE NO.	REMARKS
	Asphalt	5100 NAI		5100 7231 1025	Auger split Asphalt
1	GRAVEL, TAN. MED GRAINED Dry, Fill, Well Graded	5300 NAI	0.5 ton/ft ³	5300 7231 1031	2.0 2.0 Recovery
2		FTD 5400 NAI			Push split SPAWN
	DIAG BLACK MED. FINE GRAV Dry	FTD		5400 7232 1032	
3		T.D.	2.5 ft	1040	his 3/14/01 Drum: 1 (DT-10) 5100 counts NAI Background Bentonite cap for BF

PROJECT FUSRAP/SUDS

SUD 7231

HTRW DRILLING LOG				DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>540 7233</u>	
1. COMPANY NAME <u>IT Corporation</u>			2. DRILL SUBCONTRACTOR <u>Geotechnology</u>			SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>				4. LOCATION <u>THOMAS AND Proetz (OT-N)</u>			
5. NAME OF DRILLER <u>PAT HART</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 inch split span</u> <u>NGT 2x2 Detector</u> <u>Photo Location Detector</u>				8. HOLE LOCATION <u>CLASS 2</u>			
				9. SURFACE ELEVATION			
				10. DATE STARTED <u>3/15/01</u>		11. DATE COMPLETED <u>3/15/01</u>	
12. OVERBURDEN THICKNESS				13. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
14. DEPTH DRILLED INTO ROCK				15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
16. TOTAL DEPTH OF HOLE				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>			
18. GEOTECHNICAL SAMPLES <u>0</u>		DISTURBED		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) <u>RAD</u>	
						21. TOTAL CORE RECOVERY	
22. DISPOSITION OF HOLE		BACCULLED		MONITORING WELL		23. SIGNATURE OF INSPECTOR <u>[Signature]</u>	
LOCATION SKETCH/COMMENTS							
SCALE:							
PROJECT <u>FUSRAP/SLDS</u>							
HOLE NO. <u>540 7233</u>							

HTRW DRILLING LOG						
PROJECT FUSRAP/SUDS			INSPECTOR Chris Locke		HOLE NUMBER SLD 7233	
SLD NO.	DEPTH	DESCRIPTION OF MATERIALS	FIELD CORRECTIONS DEPTH	DEPTH SAMPLE BY CORE SIZE NO.	ANALYTICAL SAMPLE NO.	REMARKS
		Asphalt	4500 NOI		SLD 7233 1001	Anger Asphalt
1		GRAVEL, TAN, MED-FINE GRAINED, DRY, FILL WELL GRAINED	5600 NOI 20.0	0.5 TON/FT ²	SLD 7233 1010	1.6 2.0 Recover
		Brick Red	PID 4800 NOI			Pushed split spoon
2		31AS BLACK-RED, MED-FINE GRAINED DRY, FILL	200 PIP		SLD 7234 1014	
3		- TID	2.5	ft	1020	his 3/15/00
						Drum: 1 (DT-10)
						4600 counts NOI Background
						Bentonite chip for BF.
						split / Dues

FUSRAP/SUDS

SLD 7233

HTRW DRILLING LOG		DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 7235</u>	
1. COMPANY NAME <u>IT Corporation</u>		2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>			4. LOCATION <u>THOMAS AND Proetz (DT-10)</u>		
5. NAME OF DRILLER <u>Pat Hoot</u>			6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME</u>		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Pipe</u> <u>3.5 IN 902.1 900N</u> <u>NET 2X2 Detector</u> <u>Photo-TOMIN Detector</u>			8. HOLE LOCATION <u>CPN CLASS 2</u>		
			9. SURFACE ELEVATION		
			10. DATE STARTED <u>3/21/01</u>		11. DATE COMPLETED <u>3/21/01</u>
12. OVERBURDEN THICKNESS			13. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>		
14. DEPTH DRILLED INTO ROCK			15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>		
16. TOTAL DEPTH OF HOLE <u>2.0 ft BGS</u>			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>		
18. GEOTECHNICAL SAMPLES		DISTURBED		UNDISTURBED	
19. SAMPLES FOR CHEMICAL ANALYSIS		VCC		METALS	
				OTHER (SPECIFY) <u>RAD</u>	
20. DISPOSITION OF HOLE		SACFILLED		MONITORING WELL	
				OTHER (SPECIFY)	
				21. TOTAL CORE RECOVERY	
				22. SIGNATURE OF INSPECTOR <u>[Signature]</u>	

LOCATION SKETCH/COMMENTS

SCALE:

Mallard road property

Thomas AND Proetz property

App'd by
Pat Hoot
USACE

Building

NOBET MOVED BONES to MISS
OVERHEAD of BUILDING

2.0 ft SLD 7235

OLD 7235

N 10 27806.057
E 90 8844.0838

PROJECT

HOLE NO.

SLD 7235

HTRW DRILLING LOG						
PROJECT FUSRAP/SLD			INSPECTOR Chris Lock		SLO 7235	
BLK. NO.	DEPTH	DESCRIPTION OF MATERIALS	FIELD LOGGING RESULTS	REMARKS SAMPLE NO. OF CORE OR NO.	ANALYST'S SAMPLE NO.	REMARKS
GW	1	GRAND, TAN-BROWN MED GRAINED, FINE, Dry, poorly graded	6100 No I O.I.U PID		SLO 7235A 1430	2.0/2.0-Recovery Pushed sp. + spoon
	2	SLAG BLACK-RED, MED GRAINED Dry, FINE, WELL GRADED Brick RED	6300 No I O.I.U PID		SLO 7236A 1433	
	3	T.D	2.0 ft	1440 hrs	3/21/6	
						Drum: -1 (DT-10) 6500 counts No I Background Bentonite Clay for BF Note - Third sample taken in zone of highest RAD reading (Not < 1.5 Background for entire spoon) Note SLO 7235A means the Boron was moved once.

FUSRAP/SLD.

SLO 7235

HTRW DRILLING LOG				DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 7237</u>	
1. COMPANY NAME <u>ITT Corporation</u>				2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>				4. LOCATION <u>THOMAS AND Proetz</u>			
5. NAME OF DRILLER <u>PAB HART</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 INCH split spoon</u> <u>Rot. 2K Detector</u> <u>Photo-Ionization Detector</u>				8. HOLE LOCATION <u>CLASS 2</u>			
				9. SURFACE ELEVATION			
				10. DATE STARTED <u>3/22/01</u>		11. DATE COMPLETED <u>3/22/01</u>	
12. OVERBURDEN THICKNESS				13. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
13. DEPTH DRILLED INTO ROCK				14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
14. TOTAL DEPTH OF HOLE <u>20 ft BGS</u>				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>			
15. GEOTECHNICAL SAMPLES <u>0</u>		DISTURBED		UNDISTURBED		18. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) <u>RAO</u>	
21. TOTAL CORE RECOVERY		22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL	
				OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR <u>[Signature]</u>	
LOCATION SKETCH/COMMENTS							
SCALE:							
Building 7237 N 908915.2779 E 1029806.057 Building ↑ N							
PROJECT <u>FUSRAP/SLDS</u>						HOLE NO. <u>SLD 7237</u>	

HTRW DRILLING LOG

PROJECT		INSPECTOR		HOLE NUMBER	
FUSRAP/SLDS		Chris Lock		SLD 7237	
BLDG. NO.	DEPTH (ft)	DESCRIPTION OF MATERIAL	FIELD RECORDING RESULTS	TESTED SAMPLE OR CORE OR NO.	ANALYTICAL SAMPLE NO.
GW	1	GRAVEL Brown - MED-FINE GRAINED, FILL, Dry, well GRADED.	4800 COUNT NET 0.0 PSD	0.5 12/6/72	SLD 7237 0840
	2	SLAG BLACK- RED MED-FINE GRAINED, FILL, well GRADED.	6800 COUNT 0.0 PSD		SLD 7238 0844
	3	TID	2.0	ft 0.550	hrs 3/22/01
					Drum: 1 (DT-10) 4800 count NET BACKGROUND Bentonite chips for BF

PROJECT

FUSRAP/SLDS

HOLE NO.

SLD 7237

HTRW DRILLING LOG				DISTRICT <u>St Louis</u>		HOLE NUMBER <u>SLD 7243</u>	
1. COMPANY NAME <u>IT Corporation</u>				2. DRILL SUBCONTRACTOR <u>Geotechology</u>		SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>				4. LOCATION <u>Thomas and Pioretz (DT-10)</u>			
5. NAME OF DRILLER <u>PAE HART</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 INCH split spoon</u> <u>NAL 2V2 detector</u> <u>Photo Ionization Detector</u>				8. HOLE LOCATION <u>CLASS 2</u>			
				9. SURFACE ELEVATION			
				10. DATE STARTED <u>3/13/01</u>		11. DATE COMPLETED <u>3/13/01</u>	
12. OVERBURDEN THICKNESS				13. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
14. DEPTH DRILLED INTO ROCK				15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
16. TOTAL DEPTH OF HOLE <u>2.0 ft BGS</u>				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>			
18. GEOTECHNICAL SAMPLES <u>0</u>		RETURNED		UNRETURNED		19. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) <u>RAD</u>	
						21. TOTAL CORE RECOVERY	
22. DISPOSITION OF HOLE		BACFILLED		MONITORING WELL		23. SIGNATURE OF INSPECTOR	
LOCATION SKETCH/COMMENTS SCALE: <u>N</u> ↑ <u>7.5 ft</u> <u>Thomas and Pioretz</u> <u>Property</u> <u>Mallikarodh</u> <u>Property</u> <u>N 909128.8601</u> <u>E 1029806.057</u> <u>SLD</u> <u>7243</u> <u>App'd by</u> <u>Colin Parks</u> <u>USACE</u>							
PROJECT <u>FUSRAP/SLDS</u>						HOLE NO. <u>SLD 7243</u>	

HTRW DRILLING LOG

PROJECT		INSPECTOR		HOLE NUMBER		
FUSRAP/S4PS		Chris Locke		S4D 7243		
BLK. NO.	DEPTH (ft)	DESCRIPTION OF MATERIALS	FIELD LOGGING RESULTS	DETAILED SAMPLE OR CORE NO. NO.	ANALYTICAL SAMPLE NO.	REMARKS
86W	1	GRAVEL	4300	-	S4D 7243A 1453	1.7 2.0 Recovery
		TAN, MED-FINE GRAINED	NAT			
		Dry, well graded	0.0			
-	2	SAND	PID	-	S4D 7244A 1455	Pushed SPRINT SAWN
		Black, MED-FINE GRAINED	4700			
		Dry, well graded.	NAT			
-	3	Black	0.0	1500	hrs	3/13/01
		Red.	PIP			
		T.D. 2.0	6+			
						Drum: 1 (DT-12) 4500 counts NAT Background Bentonite chips for BF. Note- sample number 7243A AND 7244A Indicate boring was moved one time. EVANB S4D 7243 original S4D 7243A 1 move S4D 7243B 2 move.

4500

FUSRAP/S4PS

S4D 7243

HTRW DRILLING LOG				DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 7245</u>	
1. COMPANY NAME <u>IT Corporation</u>				2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		SHEET <u>1</u> OF <u>2</u>	
3. PROJECT <u>FUSRAP/SLDS</u>				4. LOCATION <u>THOMAS AND Proetz (DT-10)</u>			
5. NAME OF DRILLER <u>PAT HARG</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME SS</u>			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 inch split spoon</u> <u>Nail 2x2 Detector</u> <u>Photo Ionization Detector</u>				8. HOLE LOCATION <u>CLASS 2</u>			
				9. SURFACE ELEVATION			
				10. DATE STARTED <u>3/13/01</u>		11. DATE COMPLETED <u>3/13/01</u>	
12. OVERBURDEN THICKNESS				13. DEPTH GROUNDWATER ENCOUNTERED <u>NIA</u>			
13. DEPTH DRILLED INTO ROCK				14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>NIA</u>			
14. TOTAL DEPTH OF HOLE <u>2.0 ft BGS</u>				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>NIA</u>			
15. GEOTECHNICAL SAMPLES <u>0</u>		DISTURBED		UNDISTURBED		18. TOTAL NUMBER OF CORE BOXES	
19. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) <u>BY RAD</u>	
20. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL		21. SIGNATURE OF INSPECTOR <u>[Signature]</u>	
LOCATION SKETCH/COMMENTS							
SCALE:							
THOMAS AND Proetz property SLD 7280 Mallick Road property N 90° 09' 3.42 E 102° 58' 67.736 SLD 7245 SLD 7279 ↑ N							
PROJECT <u>FUSRAP/SLDS</u>						HOLE NO. <u>SLD 7245</u>	

HTRW DRILLING LOG

PROJECT FUSRAP/SLOS					WELL NUMBER SLO 7245	
INSPECTOR Chris Locke					SHEET 2 OF 2	
SEN TO	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD LOGGING DATA (ft)	SECTION SAMPLE OR CORE DEN. NO.	ANALYTICAL SAMPLE NO.	REMARKS
GW	1	GRAVEL, TAN, MED-FINE GRAINED Dry, well GRADED Fill	4500 NAT 0.0 PID		SLOO 7245 1530	2.0/2.0 Recovery
GW	2	SLAG Black-Red, MED-FINE GRAINED, Dry, well GRADED, Fill	4600 NAT 0.0 PID	0.5 - tan/ft ²	SLOO 7246 1535	Push split SPDRN.
	3	T.D. 2.0 ft		1540 hrs		3/13/01 Diam. 1 (DT-10) 4500 counts NAT Background Bentonite chips for BF.

PROJECT FUSRAP/SLOS

WELL NO SLO 7245

HTRW DRILLING LOG		DISTRICT St. Louis		HOLE NUMBER SLD 7249	
1. COMPANY NAME IT CORPORATION		2. DRILL SUBCONTRACTOR Geotechnology		SHEET 2 OF 2	
3. PROJECT FUSRAP/SLDS			4. LOCATION THOMAS AND Pruett CDT-10		
5. NAME OF DRILLER DAE HART			6. MANUFACTURER'S DESIGNATION OF DRILL CME 55		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT Hollow stem Auger 3.5 IN SPIRIT 2000		8. HOLE LOCATION CLASS 2			
9. SURFACE ELEVATION					
12. OVERBURDEN THICKNESS			10. DATE STARTED 3/21/01		11. DATE COMPLETED 3/21/01
13. DEPTH DRILLED INTO ROCK			15. DEPTH GROUNDWATER ENCOUNTERED N/A		
14. TOTAL DEPTH OF HOLE 2.5 ft BGS			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A		
18. GEOTECHNICAL SAMPLES 0			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A		19. TOTAL NUMBER OF CORE BOXES
20. SAMPLES FOR CHEMICAL ANALYSIS		DISTURBED		UNOBTAINED	
		VOC		METALS	
				OTHER (SPECIFY) RAD	
22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL	
				OTHER (SPECIFY)	
21. SIGNATURE OF INSPECTOR <i>[Signature]</i>					
LOCATION SKETCH/COMMENTS					
SCALE:					
N N Building MAA Picknot N 1029867.736 E 908951.0389 SLD 7249					
PROJECT FUSRAP/SLDS			HOLE NO. SLD 7249		

540 7249
2 2

INSPECTOR *Chris Locke*

2

GLCH- 100	DEPTH (ft)	DESCRIPTION OF MATERIALS NO.	FIELD TENSILING RESULTS NO.	SECTION SAMPLE OR CORE LOG NO. NO.	ANALYTICAL SAMPLE NO. NO.	REMARKS NO.
		COVER	6600 NAT		SL01 7249 1002	Anger Asphalt
64	1	SLAG, BLACK-RED, MED. FINE GRAINED, D.G., FILL, POORLY GRADED.	6100 NAT 0.0 PID 6500	0-5 ton/ft	SL00 6724 1010	2.0 2.0 Recovery
	2		NAT 0.0 PID		SL00 7250 1013	Dash rd SPRT/-SPAWN.
	3				1020	3/21/01 Drum. (OT-12) 6500 counts NAT Background Bentonite chip for BF

FUSRAP/3LDS

SLD 7249

HTRW DRILLING LOG				DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SD 7280</u>	
1. COMPANY NAME <u>IT Corporation</u>				2. DRILL SUBCONTRACTOR <u>Geotechnology</u>		SHEET <u>110</u> SHEETS	
3. PROJECT <u>FUSRAP/SDS</u>				4. LOCATION <u>Thomas And Proetz (DT-10)</u>			
5. NAME OF DRILLER <u>PAE Hult</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 55</u>			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Hollow Stem Auger</u> <u>3.5 IN SPRT SPAN</u> <u>2x2 Deflector</u> <u>Photo-Ionization Deflector</u>				8. HOLE LOCATION <u>CLASS 1</u>			
				9. SURFACE ELEVATION			
				10. DATE STARTED <u>3/13/01</u>		11. DATE COMPLETED <u>3/13/01</u>	
12. OVERBURDEN THICKNESS				13. DEPTH GROUNDWATER ENCOUNTERED <u>NIA</u>			
13. DEPTH DRILLED INTO ROCK				14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>NIA</u>			
14. TOTAL DEPTH OF HOLE <u>2.0 ft BGS</u>				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>NIA</u>			
15. GEOTECHNICAL SAMPLES <u>0</u>		DISTURBED		UNDISTURBED		18. TOTAL NUMBER OF CORE BOXES	
19. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) <u>RAO</u>	
20. DEPOSITION OF HOLE		SAC FILLED		MONITORING WELL		21. SIGNATURE OF INSPECTOR <u>Mike Tuck</u>	
22. LOCATION SKETCH/COMMENTS							
<u>MARLICK RODE</u> <u>SD PROPERTY</u> <u>SD 7280</u> <u>SD 7280</u> <u>THOMAS AND PROETZ</u> <u>PROPERTY</u> SCALE: <u>N 909080.40</u> <u>E 1029902.82</u> <u>MARLICK RODE</u> <u>SD PROPERTY</u>							
PROJECT <u>FUSRAP/SDS</u>				HOLE NO. <u>SD 7280</u>			

HTRW DRILLING LOG

PROJECT *FUSRAP/SLAS*

INSPECTOR *Chris Lock*

WELL NUMBER *SLD 7280*

SHEET *2* OF *2*

SLD#	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	SEALED SAMPLE OR CORE DRILL NO.	ANALYTICAL SAMPLE NO.	REMARKS
	1	SLAG, Black RED, MED-FINE GRAINED, Dry, FILL, poorly graded	4900 NAI 0.0 PI 4700 NAI	0.5 ton/ft ²	SLD 7280 1014	1.8/2.0 Recovery Pushrod SPCL SPOON
	2		0.0 PI PTI		SLD 7280 1017	7296
	3	T.D. 2.0	6+	1025	hrs	3/13/01 Drum. 1 (DT-10) 4500 counts NAI BACKGROUND Bartok chv for BF-

4500

PROJECT *FUSRAP/SLAS*

WELL NUMBER *SLD 7280*

HTRW DRILLING LOG				DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 76967</u>	
1. COMPANY NAME <u>Shaw E & I</u>		2. DRILLING SUBCONTRACTOR <u>MES, Inc. P.S.</u>			SHEET <u>1</u> OF <u>2</u>		
3. PROJECT <u>FUSRAP/SLDS^{PS} FUSRAP/SLDS</u>		4. LOCATION <u>T & P</u>					
5. NAME OF DRILLER <u>Chris Anthony P.S.</u>		6. MANUFACTURER'S DESIGNATION OF DRILL <u>Diedrich D-120 P.S.</u>					
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>Diedrich D-120</u> <u>using ^{PS} HSA and</u> <u>2" x 2" split spoon,</u> <u>hard niger</u>		8. HOLE LOCATION <u>See location sketch</u>					
9. SURFACE ELEVATION <u>N/A</u>		10. DATE STARTED <u>6-5-03</u>					
11. DATE COMPLETED <u>6-5-03</u>		12. OVERBURDEN THICKNESS <u>N/A</u>					
13. DEPTH DRILLED INTO ROCK <u>N/A</u>		15. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>					
14. TOTAL DEPTH OF HOLE <u>55 FT BGS</u>		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>					
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>		18. GEOTECHNICAL SAMPLES					
☒ DISTURBED		☒ UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES <u>0</u>			
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC ☒		METALS ☒		OTHER (SPECIFY) <u>RAD</u>	
21. TOTAL CORE RECOVERY <u>0 %</u>		OTHER (SPECIFY) <u>0</u>		OTHER (SPECIFY) <u>0</u>		OTHER (SPECIFY) <u>0</u>	
22. DISPOSITION OF HOLE ☒ BACKFILLED ☒ MONITORING WELL ☒ N/A		23. SIGNATURE OF INSPECTOR <u>Gerald Allen</u>		24. SCALE: Not to Scale			
LOCATION SKETCH/COMMENTS Witnessed by: <u>Gerald Allen</u> ↑ R.R. H.H. Spr Planar Building Terms used to describe % Trace - ≤ 5 % Few - 5 - 10 % Little - 15 - 25 % Some - 20 - 35 % Mostly - 50 - 100 %							
PROJECT <u>FUSRAP/SLDS</u>						HOLE NO. <u>SLD 76967</u>	

1 Nov 98

HTRW DRILLING LOG (CONTINUATION SHEET)							WELL NUMBER SLD 76967
PROJECT FUS RAP / SLDs		INSPECTOR Philip Statler					SHEET 2 of 2 SHEETS
ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD BORING RESULTS (d)	GEOTECH. SAMPLE OR CORE LOG NO. (e)	QUALITY CHECK NO. (f)	BLOW COUNT (g)	REMARKS (h)
		asphalt cover		SLD			
		Concrete	-100	76967			
COVER	1	w/ some med. to fine gravel	0.0	cover material 6-5-03 1900			
	2	silty fine sand w/ some med. gravel, loose, poorly graded, dk. brn. to blk, moist, few cinders, few slag.	700 0.0	1-min. Count	SLD 76967 1830	N/A	
	3		707 0.0	1-min. Count	2025 archive 1835	N/A	
SM	3		928 0.0	1-min. Count	2520 archive 1840	N/A	SLD 76968 1840
	4		757 0.0	1-min. Count	3035 archive 1845	N/A	
	4		632 0.0	1-min. Count	3540 archive 1845	N/A	
	5		601 0.0	1-min. Count	4045 archive 1847	N/A	→ SLD 78695
CL	5	silty clay, soft, med. stiff plastic, dk. brn., moist, few cinders, few slag	832 0.0	1-min. Count	4550 archive 1850	N/A	
			951 0.0	1-min. Count	5055 archive 1853	N/A	SLD 76969 1853
		TD: 5.5' BGS 6-5-03 1853					Backgrounds NAT's 4800. PDP: 0.0 Backfilled boring w/

PROJECT FUS RAP / SLDs

WELL NO. SLD 76967

HTRW DRILLING LOG			DISTRICT <i>St. Louis</i>	HOLE NUMBER <i>SLD 80382B</i>								
1. COMPANY NAME <i>Shaw Environmental</i>		2. DRILLING SUBCONTRACTOR		SHEET <i>1</i> OF <i>2</i> SHEETS								
3. PROJECT <i>FUSRAP / SLDS</i>			4. LOCATION <i>Thomas and Proetz Vicinity Prop.</i>									
5. NAME OF DRILLER <i>Robert Bolin</i>			6. MANUFACTURER'S DESIGNATION OF DRILL <i>CME 75</i>									
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <i>CME 75 using 3/4" HSA and 3" x 2' split spoon.</i>			8. HOLE LOCATION <i>See location sketch</i>									
9. SURFACE ELEVATION <i>N/A</i>			10. DATE STARTED <i>12-17-03</i>									
11. DATE COMPLETED <i>12-17-03</i>			12. OVERBURDEN THICKNESS <i>N/A</i>									
13. DEPTH DRILLED INTO ROCK <i>N/A</i>			14. TOTAL DEPTH OF HOLE <i>4.0' BGS</i>									
15. DEPTH GROUNDWATER ENCOUNTERED <i>N/A</i>			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <i>N/A</i>									
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <i>N/A</i>			18. GEOTECHNICAL SAMPLES									
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; text-align: center;">DISTURBED</td> <td style="width:50%; text-align: center;">UNDISTURBED</td> </tr> <tr> <td style="text-align: center;">☐</td> <td style="text-align: center;">☐</td> </tr> </table>			DISTURBED	UNDISTURBED	☐	☐	19. TOTAL NUMBER OF CORE BOXES <i>0</i>					
DISTURBED	UNDISTURBED											
☐	☐											
20. SAMPLES FOR CHEMICAL ANALYSIS			21. TOTAL CORE RECOVERY <i>0%</i>									
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; text-align: center;">VOC</td> <td style="width:25%; text-align: center;">METALS</td> <td style="width:25%; text-align: center;">OTHER (SPECIFY)</td> <td style="width:25%; text-align: center;">OTHER (SPECIFY)</td> </tr> <tr> <td style="text-align: center;">☐</td> <td style="text-align: center;">☐</td> <td style="text-align: center;">☐</td> <td style="text-align: center;">☐</td> </tr> </table>			VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	☐	☐	☐	☐	22. DISPOSITION OF HOLE	
VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)									
☐	☐	☐	☐									
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; text-align: center;">BACKFILLED</td> <td style="width:50%; text-align: center;">MONITORING WELL</td> </tr> <tr> <td style="text-align: center;">☐</td> <td style="text-align: center;">☐</td> </tr> </table>			BACKFILLED	MONITORING WELL	☐	☐	23. SIGNATURE OF INSPECTOR <i>[Signature]</i>					
BACKFILLED	MONITORING WELL											
☐	☐											
LOCATION SKETCH/COMMENTS Witnessed by: <i>Susan Adams</i> ↑ N Metal Bldg. <i>SLD 80382</i> <i>SLD 80382B</i> <i>(0.5' SLD 80382)</i> Wood Bldg. SCALE: Not to Scale Terms used to describe % Trace — 4-5% Few — 5-10% Little — 15-25% Some — 20-35% Mostly — 50-100%												
PROJECT <i>FUSRAP / SLDS</i>			HOLE NO. <i>SLD 80382B</i>									

HTRW DRILLING LOG (CONTINUATION SHEET)

SLP 80382 B

PROJECT FUSRAP / SLOS

INSPECTOR Phillip Statter

SHEET 2 of 2

DEPTH DOWN FEET	DEPTH DOWN METERS	DESCRIPTION OF MATERIALS	FIELD LOG NO.	FIELD LOG DATE	FIELD LOG TIME	BLIND COUNT (#)	REMARKS
COVER		Asphalt cover					
1							Augered down to 2.2' BGS and drove spoon.
2							
3		Silty fine sand w/ some cinders, med. dense, poorly graded, blk, dry, few brick frags.	-200 0.0		1.8	15	
SM		some silty clay (blk), some limestone frags.	-400 0.0		2.0	15	
			-100 0.0			8	
4			-200 0.0			13	
					SLP 80384 12-17-03 1422		
					no recovery		

TD = 4.0' BGS
12-17-03
1425

Background:
Nat: 4900
PIB: 0.0
Backfilled boring w/ 2.0 bags of bottom ite chips.

PROJECT FUSRAP / SLOS

SLP 80382 B

HTRW DRILLING LOG				DISTRICT <i>St. Louis</i>		HOLE NUMBER <i>SLD 80378</i>																	
1. COMPANY NAME <i>Shaw Environmental</i>				2. DRILLING SUBCONTRACTOR		SHEET <i>1</i> OF <i>2</i> SHEETS																	
3. PROJECT <i>FUSRAP / SLDs</i>				4. LOCATION <i>Thomas and Proetz Vicinity Prop.</i>																			
5. NAME OF DRILLER <i>Robert Bolin</i>				6. MANUFACTURER'S DESIGNATION OF DRILL <i>CME 75</i>																			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <i>CME 75 using 3 1/4" HSA and 3" x 2" split spoons</i>				8. HOLE LOCATION <i>See location sketch</i>																			
9. SURFACE ELEVATION <i>N/A</i>				10. DATE STARTED <i>12-17-03</i>																			
11. DATE COMPLETED <i>12-17-03</i>				12. OVERBURDEN THICKNESS <i>N/A</i>																			
13. DEPTH DRILLED INTO ROCK <i>N/A</i>				15. DEPTH GROUNDWATER ENCOUNTERED <i>N/A</i>																			
14. TOTAL DEPTH OF HOLE <i>6.0' BGS</i>				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <i>N/A</i>																			
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <i>N/A</i>				18. GEOTECHNICAL SAMPLES																			
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; text-align: center;">DISTURBED</td> <td style="width:50%; text-align: center;">UNDISTURBED</td> </tr> <tr> <td style="text-align: center;"><i>0</i></td> <td style="text-align: center;"><i>0</i></td> </tr> </table>				DISTURBED	UNDISTURBED	<i>0</i>	<i>0</i>	19. TOTAL NUMBER OF CORE BOXES <i>0</i>															
DISTURBED	UNDISTURBED																						
<i>0</i>	<i>0</i>																						
20. SAMPLES FOR CHEMICAL ANALYSIS				21. TOTAL CORE RECOVERY																			
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; text-align: center;">VOC</td> <td style="width:25%; text-align: center;">METALS</td> <td style="width:25%; text-align: center;">OTHER (SPECIFY)</td> <td style="width:25%; text-align: center;">OTHER (SPECIFY)</td> </tr> <tr> <td style="text-align: center;"><i>0</i></td> <td style="text-align: center;"><i>0</i></td> <td style="text-align: center;"><i>0</i></td> <td style="text-align: center;"><i>0</i></td> </tr> </table>				VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; text-align: center;">RAD</td> <td style="width:25%; text-align: center;">OTHER (SPECIFY)</td> <td style="width:25%; text-align: center;">OTHER (SPECIFY)</td> <td style="width:25%; text-align: center;">OTHER (SPECIFY)</td> </tr> <tr> <td style="text-align: center;"><i>0</i></td> <td style="text-align: center;"><i>0</i></td> <td style="text-align: center;"><i>0</i></td> <td style="text-align: center;"><i>0</i></td> </tr> </table>				RAD	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)																				
<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>																				
RAD	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)																				
<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>																				
22. DISPOSITION OF HOLE <i>0</i>				23. SIGNATURE OF INSPECTOR <i>[Signature]</i>																			
LOCATION SKETCH/COMMENTS Witnessed by: <i>Susan Adams</i> SCALE: Not to scale Terms used to describe % Trace — 4.5% Few — 5-10% Little — 15-25% Some — 20-35% Mostly — 50-100%																							
<i>Office</i> <i>Carport</i> <i>wooden bldg.</i> <i>SLD 80378</i> <i>diesel tank</i> <i>gate</i> <i>fence</i>																							
PROJECT <i>FUSRAP / SLDs</i>						HOLE NO. <i>SLD 80378</i>																	

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT FUSRAP/SLDS

INSPECTOR Phillip Statler

SLD 80378

SHEET 2 OF 2

DEPTH (ft)	DESCRIPTION OF MATERIALS	WATER CONTENT (%)	SHRINKAGE (%)	SLD NO.	ROW COUNT	REMARKS
1	SM silty fine sand w/ some coarse gravel, med. dense to loose, poorly graded, dk. brn., dry.	200 0.0	1.7/ 2.0	80378 12-17-03 1110	21	
	some silty clay, H. brn.	200 0.0			3	
	some cinders, some slag.	400 0.0		SLD 80379 1112	11	
2		0 0.0	no recovery		4	
		0 0.0		TPL 0047 1126	4	
3	cl silty clay, med. stiff, med. plastic, H. brn, moist, few limestone frags.	0 0.0	1.7/ 2.0		5	
		200 0.0		SLD 80380 1124	4	
4		200 0.0	no recovery		7	
	Some cinders	300 0.0	1.8/ 2.0		3	
5	SM silty fine sand w/ mostly cinders, loose, poorly graded, blk., dry, few brick frags.	200 0.0			6	
		200 0.0		SLD 80381 1139	6	
6		500 0.0	no recovery		5	
7	TD: 6.0' BGS 12-17-03 1140					Background: Nat: 4900 PDP: 0.0 Backfilled boring w/ 30 bags of bastonite chips.
8						
9						
10						

PROJECT FUSRAP/SLDS

SLD 80378

HTRW DRILLING LOG			DISTRICT St. Louis	HOLE NUMBER SLD 80382
1. COMPANY NAME Shaw Environmental		2. DRILLING SUBCONTRACTOR		SHEET 1 OF 2 SHEETS
3. PROJECT FUSRAP / SLDs		4. LOCATION Thomas and Proetz Vicinity Prop.		
5. NAME OF DRILLER Robert Bolin		6. MANUFACTURER'S DESIGNATION OF DRILL CME 75		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT CME 75 using 3/4" HSA and 3" x 2" split spoon		8. HOLE LOCATION See location sketch		
9. SURFACE ELEVATION N/A		10. DATE STARTED 12-17-03		
11. DATE COMPLETED 12-17-03		12. OVERBURDEN THICKNESS N/A		
13. DEPTH DRILLED INTO ROCK N/A		14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A		
15. TOTAL DEPTH OF HOLE 6.0' BGS		16. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A		
17. GEOTECHNICAL SAMPLES DISTURBED ☐ UNDISTURBED ☐		18. TOTAL NUMBER OF CORE BOXES 0		
19. SAMPLES FOR CHEMICAL ANALYSIS VOC ☐ METALS ☐ OTHER (SPECIFY) ☐		20. TOTAL CORE RECOVERY ☐ %		
21. DISPOSITION OF HOLE BACKFILLED ☐ MONITORING WELL ☐		22. SIGNATURE OF INSPECTOR Susan Adams		
LOCATION SKETCH/COMMENTS Witnessed by: Susan Adams Metal Bldg. SLD 80382 Wood Bldg. SCALE: Not to scale Terms used to describe % Trace — 4-5% Few — 5-10% Little — 15-25% Some — 20-35% Mostly — 50-100%				
PROJECT FUSRAP / SLDs				HOLE NO. SLD 80382

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: FURRAP/SLDS SECTION: Phillip Statler

FILE NUMBER: SLD 80382
SHEET: 2 of 2

DEPTH ft	DESCRIPTION OF MATERIALS	FIELD LOG	LABORATORY TESTS	SLURRY COUNT	REMARKS
cover	asphalt cover	-300 0.0		SLD 80382 cover, 12-17-03, 1328	
1	silty fine sand w/some clinders, med. dense, poorly graded dk brn. to blk. dry, few brick frags.	0 0.0 -300 0.0 100 0.0	2.0/ 2.0	SLD 80382 1343	24 27 23
2		100 0.0		SLD 80383 1345	27
3	limestone frag in tip	-500 0.0 -500 0.0	1.0/ 2.6		17 30
4	some silty clay, pp blk. some silty clay, blk.	N/A N/A N/A N/A	no recovery		16 13
5	few broken glass	-200 0.0 -100 0.0 100 0.0	1.3/ 2.0	SLD 80385 1401	5 8 9
6		N/A N/A	no recovery		9
TD: 6.2' BGS 12-17-03 1400					Backgrounds NFI: 4,900 PID: 0.0 Backfilled boring w/ 3.0 bags of benton ite chips.

PROJECT: FURRAP/SLDS

FILE NO: SLD 80382

HTRW DRILLING LOG				DISTRICT <u>St. Louis</u>		HOLE NUMBER <u>SLD 80443</u>	
1. COMPANY NAME <u>Shaw Environmental</u>				2. DRILLING SUBCONTRACTOR		SHEET <u>1</u> OF <u>2</u> SHEETS	
3. PROJECT <u>FUSRAP / SLDs</u>				4. LOCATION <u>Thomas and Proetz Vicinity Prop.</u>			
5. NAME OF DRILLER <u>Robert Bolin</u>				6. MANUFACTURER'S DESIGNATION OF DRILL <u>CME 75</u>			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <u>CME 75 using 3/4" HSA and 3" X 2" split spoon.</u>				8. HOLE LOCATION <u>See location sketch</u>			
9. SURFACE ELEVATION <u>N/A</u>				10. DATE STARTED <u>12-17-03</u>			
11. DATE COMPLETED <u>12-17-03</u>				12. OVERBURDEN THICKNESS <u>N/A</u>			
13. DEPTH DRILLED INTO ROCK <u>N/A</u>				15. DEPTH GROUNDWATER ENCOUNTERED <u>N/A</u>			
14. TOTAL DEPTH OF HOLE <u>6.0' BGS</u>				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <u>N/A</u>			
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <u>N/A</u>				18. GEOTECHNICAL SAMPLES			
DISTURBED		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES		20. SAMPLES FOR CHEMICAL ANALYSIS	
VOC		METALS		OTHER (SPECIFY)		OTHER (SPECIFY)	
RAD		OTHER (SPECIFY)		OTHER (SPECIFY)		21. TOTAL CORE RECOVERY	
22. DISPOSITION OF HOLE		MONITORING WELL		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR	
Yes		N/A		N/A		<u>[Signature]</u>	
LOCATION SKETCH/COMMENTS Witnessed by: <u>Susan Adams</u> SCALE: Not to scale Terms used to describe %							
<u>Metal Bldg.</u> <u>Wood Bldg.</u> <u>R.R. Spur</u> <u>SLD 80443</u> Trace — 4-5% Few — 5-10% Little — 15-25% Some — 20-35% Mostly — 50-100%							
PROJECT <u>FUSRAP / SLDs</u>						HOLE NO. <u>SLD 80443</u>	

HTRW DRILLING LOG				DISTRICT St. Louis		HOLE NUMBER SLD 80447	
1. COMPANY NAME Shaw Environmental				2. DRILLING SUBCONTRACTOR		SHEET 1 OF 2 SHEETS	
3. PROJECT FUSRAP / SLDs				4. LOCATION Thomas and Proetz Vicinity Prop.			
5. NAME OF DRILLER Robert Bolin				6. MANUFACTURER'S DESIGNATION OF DRILL CME 75			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT CME 75 using 3/4" HSA and 3" x 2" split spoons				8. HOLE LOCATION See location sketch			
9. SURFACE ELEVATION N/A				10. DATE STARTED 12-18-03			
11. DATE COMPLETED 12-18-03				12. OVERBURDEN THICKNESS N/A			
13. DEPTH DRILLED INTO ROCK N/A				15. DEPTH GROUNDWATER ENCOUNTERED N/A			
14. TOTAL DEPTH OF HOLE 6.5' BGS				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A			
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A				18. GEOTECHNICAL SAMPLES			
DISTURBED		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES			
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY		0%		RAD		0%	
22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL		OTHER (SPECIFY)	
Yes		N/A		N/A		23. SIGNATURE OF INSPECTOR [Signature]	
LOCATION SKETCH/COMMENTS Witnessed by: Susan Adams [Signature] SCALE: Not to scale Terms used to describe % Trace — 4.5% Few — 5-10% Little — 15-25% Some — 20-35% Mostly — 50-100%							
PROJECT FUSRAP / SLDs						HOLE NO. SLD 80447	

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: FUSRAP / SLAS

INSPECTOR: Phillip Stotler

HOLE NUMBER: 540 80447

SHEET: 2 of 2

DEPTH ft	DESCRIPTION OF MATERIALS	FIELD SAMPLING DEPTH ft	WATER CONTENT %	WATER CONTENT %	WATER CONTENT %	WATER CONTENT %	REMARKS
COVER	Asphalt Cover	200 0.0				SLP 80447 12-18-03 (cover) (1020)	
SM	1 silty fine sand w/ some cinders, dense to med. dense, poorly graded, dk. brn. to blk., dry, few brick frags.	200 0.0 500 0.0 900 0.0 200 0.0	1.8/ 2.0			SLP 80447 12-18-03 7022	44 25 18 14
SM	2	500 0.0	20/ 2.0			SLP 80448 1024	5 4
CL	4 silty clay, soft to med. stiff, med. plant. H. brn., moist, few concrete frags.	800 0.0				SLP 80449 1033 1 PL 80450 1025	3 5
SM	5 silty fine sand w/ some cinders, loose, poorly graded, blk, dry.	0 0.0 200 0.0 1000 0.0 1000 0.0 700 0.0	1.7/ 2.0				6 3 4 4
	6	0.0	Recovery				
	TD: 6.5' BGS 12-18-03 1045						Background Nat: 6500 PID: 0.0 Back-filled boring w/ 3.0 bags of bentonite chips.

FUSRAP / SLAS

HOLE NO. 540 80447

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