Appendix D

Reprint of WMP-29253, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report—Phase III*, Revision 0, Published February 2007

WMP-29253
Revision 0

Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase III

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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Richland, Washington

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WMP-29253
Revision 0

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Title: Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report-Phase III

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EXECUTIVE SUMMARY

This document comprises the ecological data quality objectives (EcoDQO) Phase III summary report for the Hanford Site Central Plateau ecological risk assessment. The Central Plateau EcoDQOs follow EPA/540/R-97/006, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final)*,[1] and address the data quality objectives (DQO) process.

A framework to ensure that environmental impacts associated with past and present activities at the Hanford Site are investigated and that appropriate response actions are taken to protect human health and the environment are established in Ecology et al. 1989, *Hanford Federal Facility Agreement and Consent Order*[2] (commonly referred to as the Tri-Party Agreement). Within the Tri-Party Agreement framework, the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*[3] (CERCLA) remedial investigation/feasibility study process is implemented to gather the information needed to arrive at records of decision that authorize remedial actions. The ecological risk assessment supported by the Central Plateau EcoDQOs is one of several being performed on the Hanford Site to ensure that ecological risks have been properly evaluated in support of remedial-action decision-making. This document only addresses potential terrestrial ecological impacts on the Central Plateau. It does not address Central Plateau human health or groundwater impacts, nor does it consider ecological impacts in other portions of the Hanford Site.

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[1] EPA/540/R-97/006, 1997, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final)*, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

[2] Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington, as amended.

[3] *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 USC 9601, et seq.

The Central Plateau EcoDQOs are being implemented using a phased and tiered approach to characterize ecological risks. Phases are based on spatial domains where investigation areas will be located; tiers are types of data collected within those investigation areas. While there is continuity among the stages of the Central Plateau EcoDQO activities, individual phases also involve unique spatial domains, habitats, and/or operational histories. Consequently, the list of contaminants and the resulting analytical suites differ from one investigation phase to another. Phase I focused on the CERCLA waste sites in the 200 East and 200 West Areas (WMP-20570, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase I*[4]). Phase II evaluated the need for ecological sampling in the US Ecology site, tank farms, and the BC Controlled Area (WMP-25493, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase II*[5]). Phase III addresses the supplemental data needs that resulted from sampling in Phases I and II, evaluates the need for ecological sampling in non-waste-site areas outside of the 200 East and 200 West Areas, and addresses the remaining Central Plateau spatial domains – the dispersed carbon tetrachloride plume in the 200 West Area and West Lake. All three assessments include an evaluation of the need for acquiring soil and biota data in support of remedial-action decision-making and information on the health or condition of the ecosystem across the range of Central Plateau habitats. The culmination of the phased DQOs, sampling and analysis plans, and field characterization activities will be a final Central Plateau ecological risk assessment report, summarizing Phases I, II and III, planned to begin in fiscal year 2007. Figure ES-1 shows the elements of the Central Plateau ecological risk assessment phases.

Supplemental Waste Site Data Collection. Phase I and Phase II data collection was followed by a data assessment, which identified uncertainties in contaminant of potential ecological concern data and resulted in the identification of those requiring further characterization as potential risk drivers. These uncertainties likely would be resolved through supplemental data collection.

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[4] WMP-20570, 2005, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase I*, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

[5] WMP-25493, 2005, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase II*, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

Three specific supplemental data needs were identified: (1) cyanide concentrations in invertebrate tissues; (2) polychlorinated biphenyls (PCB) and Sr-90 analyses for small-mammal and lizard tissues; and (3) vegetative characterization for Phase I waste sites and reference location. The bases for the identification of these data needs are briefly summarized below.

Cyanide in Invertebrates. To better understand the magnitude and general distribution of cyanide detections in tissues, additional invertebrates will be collected and analyzed for cyanide. Fifteen locations will be sampled, including the two Phase I and Phase II reference sites, the six Phase I waste sites, and seven reference sites from the concurrent River Corridor Baseline Risk Assessment effort.

PCBs in Tissues. PCBs were detected inconsistently in co-located soil and tissue samples. To address uncertainties regarding the source of PCBs in biota, lizards, and mice, four Phase I investigation areas will be sampled. Tissue samples also will be collected at four non-waste locations in the vicinity of roads that may have been sprayed with PCB oils as a dust suppression measure to evaluate those areas as potential sources for PCBs. Consensus on these locations was reached in consultation with a representative of the Hanford Natural Resource Trustee Council. For the Phase III PCB analyses, detected results of selected congeners will be quantified and summed.

Strontium-90 in Tissues. Strontium-90 was detected in lizard and mouse tissue at the Phase I reference site and at Phase I and II waste sites. Because the detections at the reference site were unexpected, the remaining mouse sample material that had previously recorded the highest detections was reanalyzed by a second laboratory. However, Sr-90 was not detected in the reanalysis, indicating potential analytical error in the original assay. This reanalysis was limited to mouse material because there was insufficient lizard sample mass to meet the detection limits. Some of the mouse sample material that remains is being submitted to a third laboratory for independent assessment. While it would appear that Sr-90 is not a risk driver, Sr-90 will be analyzed in lizards and mice at select sites targeted for Phase III vertebrate sampling. In addition to collecting data from waste sites, this effort will provide Sr-90 tissue results from reference sites and from non-waste-site areas to address the spatial extent of Sr-90 in the Hanford Site food web.

Vegetation Characterization. Initial surveys of Phase I waste sites occurred early in a dry year (2005) and the vegetation recorded may not be comprehensive of species present in an average-to-above-average rainfall year. The surveys in 2005 were also earlier in the year (late winter, early spring). Therefore, vegetation will be re-surveyed at Phase I waste site investigation areas to supplement existing data. Results of plant surveys conducted during the peak growing season of 2006 will be combined with the species catalogued during 2005 for a more representative indication of the vegetative community's composition. Furthermore, these activities will provide a more complete foundation of the Hanford Site's ecosystem and receptor characteristics to assess relationships between the plant community and other measures of environmental quality (e.g., population/community health attributes of plants, invertebrates, lizards, and small mammals).

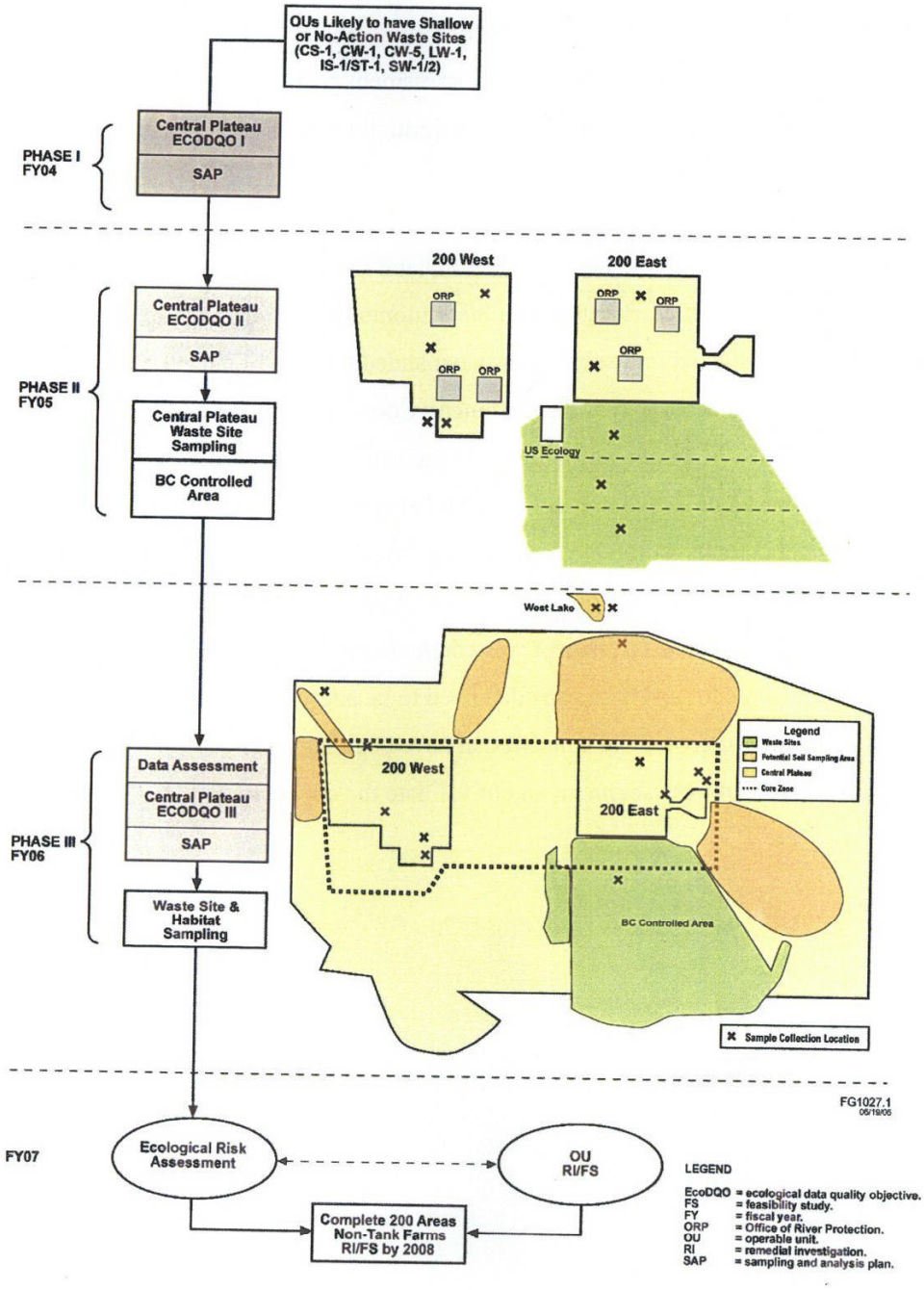
Non-Waste-Site Soil Radiological Sampling. Past Hanford Site operations released radionuclides through air-stack emissions, which represent a potential source of surface-soil contamination. A focus of the Phase III Central Plateau EcoDQO activity is to assess the ecological condition of non-waste-site areas that may have been impacted by air-stack emissions. These data also will supplement existing Near-Facility Monitoring Program and Surface Environmental Surveillance Project radionuclide data. This activity involves surface soil sampling in non-waste-site areas where radionuclide data are limited. Soil transects along presumed deposition pathways will be sampled for Am-241, Cs-137, Sr-90, and isotopic plutonium. Radionuclide contaminants of potential ecological concern detected in surface-soil samples will be assessed relative to mean background values and mean concentrations at reference sites. This activity will provide a measure of radionuclide exposure to ecological receptors in areas outside of waste sites.

Carbon Tetrachloride Inhalation. For most chemicals, evaluation of ecological risk does not typically address inhalation because ingestion dominates as an exposure pathway. For sites with vapor-phase contamination and ecological receptors in the subsurface, however, an increased potential for exposure via inhalation warrants consideration. Evaluation of ecological risk from contaminants like carbon tetrachloride is constrained by limited toxicity and exposure data for ecologically-relevant receptors. To address this need, an ecological screening level for the inhalation pathway was developed for carbon tetrachloride based on a representative fossorial

(burrowing) receptor. The model for calculating ecological screening levels is presented with an emphasis on the process for developing inhalation toxicity reference values. An ecological screening level based on the geometric mean of relevant toxicity reference values was derived following the process employed to derive U.S. Environmental Protection Agency ecological soil screening levels. The resulting screening-level assessment provides a quantitative method for evaluating ecological risk of carbon tetrachloride through comparison to relevant exposure data such as direct burrow-air measurements.

West Lake. West Lake is a unique and dynamic aquatic feature at the Hanford Site that predates Site operations. Wastewater discharges from the Plutonium-Uranium Extraction Plant and the B Plant elevated groundwater and subsequently expanded the size of West Lake, which has decreased in size since discharge was discontinued. Contaminants detected in West Lake media are understood to be the indirect result of these wastewater discharges and from direct dumping of sewage wastes (based on anecdotal reports). Of concern are the possible effects of radionuclides and chemicals on the local ecosystem. Media previously sampled at West Lake include soil, water, sediment, and biological tissues. As part of the Phase I EcoDQO activity, a screening-level ecological risk assessment was conducted that identified contaminants of potential ecological concern and data gaps that need to be addressed. These data gaps and the contaminants of potential ecological concern that have been identified will be addressed in Phase III to complete the screening assessment and to validate the conceptual model for West Lake.

Figure ES-1. Phased Central Plateau Ecological Risk Assessment.



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TERMS

AEA	alpha energy analysis
AVS	acid volatile sulfide
BCG	biota concentration guideline
BIV	bioaccumulation factor
BW	body weight
CAS	Chemical Abstracts Service
CERCLA	*Comprehensive Environmental, Response, Compensation, and Liability Act of 1980*
COPC	contaminant of potential concern
COPEC	contaminant of potential ecological concern
DO	dissolved oxygen
DQO	data quality objective
EcoDQO	ecological data quality objective
EcoSSL	ecological soil screening level
EL	effect level
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ERAGS	*Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final)* (EPA/540/R-97/006)
ESL	ecological screening level
ESR	environmental surveillance report
FE	fundamental error
GC	gas chromatography
GEA	gamma energy analysis
GPC	gas proportional counter
GPS	global positioning system
HEIS	*Hanford Environmental Information System* database
HI	hazard index
HQ	hazard quotient
ICPES	inductively coupled plasma emission spectroscopy
IR	inhalation rate
LD	lethal dose
LOAEL	lowest observed adverse-effect level
MIS	multi-increment sampling
MIS PA	multi-increment sampling performance assessment
MTWS	maximum total weighted score
N/A	not applicable
NOAEL	no observed adverse-effect level
PCB	polychlorinated biphenyl
PNNL	Pacific Northwest National Laboratory
ppm	parts per million
PVC	polyvinyl chloride
QC	quality control

RCBRA	River Corridor Baseline Risk Assessment
SAP	sampling and analysis plan
SESP	Surface Environmental Surveillance Project
SOF	sum-of-fractions
SQuiRT	screening quick reference table
SVOC	semivolatile organic compound
TBD	to be determined
TBP	tributyl phosphate
T_f	fraction
TOC	total organic carbon
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TRV	toxicity reference value
VOC	volatile organic compound
UF	uncertainty factor
WAC	*Washington Administrative Code*
XRD	X-ray diffraction

METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	Millimeters	millimeters	0.039	inches
inches	2.54	Centimeters	centimeters	0.394	inches
feet	0.305	Meters	meters	3.281	feet
yards	0.914	Meters	meters	1.094	yards
miles	1.609	Kilometers	kilometers	0.621	miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	Hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	Grams	grams	0.035	ounces
pounds	0.454	Kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	Milliliters	milliliters	0.033	fluid ounces
tablespoons	15	Milliliters	liters	2.1	pints
fluid ounces	30	Milliliters	liters	1.057	quarts
cups	0.24	Liters	liters	0.264	gallons
pints	0.47	Liters	cubic meters	35.315	cubic feet
quarts	0.95	Liters	cubic meters	1.308	cubic yards
gallons	3.8	Liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	Millibecquerel	millibecquerel	0.027	picocuries

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1.0 OVERVIEW – ECOLOGICAL RISK ASSESSMENT GUIDANCE FOR CERCLA

This document comprises the ecological data quality objectives (EcoDQO) Phase III summary report for the Hanford Site Central Plateau. The Central Plateau EcoDQOs follow EPA/540/R-97/006, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (ERAGS), and address the data quality objectives (DQO) for assessing ecological risks on the Central Plateau. This process evaluates the need for acquisition of environmental data to support remedial-action decision-making and the need for information on the health or condition of the ecosystem across the range of Central Plateau habitats. The culmination of the phased DQO/sampling and analysis plans (SAP) and field characterization activities will be a final Central Plateau ecological risk assessment (ERA), planned for fiscal year 2007. Figure 1-1 shows the elements of the Central Plateau ERA phases.

Primary Objectives for the Central Plateau EcoDQOs

1. Provide information to be used for remedial-action decision making.
2. Provide information to evaluate the health or condition of the ecosystem across habitats.

A framework to ensure that environmental impacts associated with past and present activities at the Hanford Site are investigated and that appropriate response actions are taken to protect human health and the environment was established in Ecology et al. 1989, *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement). Within this framework, the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) remedial investigation/feasibility study process is implemented to gather the information needed to arrive at records of decision that authorize remedial actions. The ERA supported by this EcoDQO is one of several being performed on the Hanford Site to ensure that ecological risks have been properly evaluated in support of remedial-action decision-making. A Hanford Site risk assessment integration document has been issued to detail the relationships between the various risk assessments being performed (DOE/RL-2005-37, *Status of Hanford Site Risk Assessment Integration, FY 2005*).

The Central Plateau EcoDQOs are being implemented using a phased and tiered approach to characterize ecological risks. Phases are based on spatial domains where investigation areas will be located; tiers are types of data collected within those investigation areas.

- Phase I focused on the CERCLA waste sites in the 200 East and 200 West Areas (WMP-20570, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase I*).
- Phase II evaluated the need for ecological sampling in the US Ecology site, tank farms, and the BC Controlled Area (WMP-25493, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase II*).

- Phase III (this document) evaluates the need for ecological sampling in habitat (non-waste site) areas outside of the 200 East and 200 West Areas, and spatial domains associated with the 200 West Area dispersed carbon tetrachloride plume and West Lake.

Phase III includes supplemental waste site sampling to address uncertainties resulting from the data assessment of Phase I and Phase II investigation results. This phased approach supports Tri-Party Agreement Milestone M-015-00 for completion of the remedial investigation/feasibility study process for all operable units.

This document follows the guidance in EPA/540/R-97/006. Figure 1-2 depicts the eight-step process. In addition to following EPA/540/R-97/006 guidelines, relevant aspects of the more general ERA guidelines in EPA/630/R-95/002F, *Guidelines for Ecological Risk Assessment*, are included to support development of the assessment endpoints by considering management goals. EPA/630/R-95/002F also provides additional guidance on ecological measures that are addressed in this document. In proceeding through EPA/540/R-97/006 guidance, there will be scientific-management decision points for agreement on the following items:

- Contaminated media
- Contaminants of potential ecological concern (COPEC)
- Assessment endpoints
- Risk questions
- Establishing measures
- Study design
- DQOs (including statistical considerations)
- SAP (to be provided as a separate document and therefore not included in this document).

This summary report provides the basis for developing an ecological sampling design that will be carried forward into an SAP for field implementation. Ecological sampling data will assist in remedial-action decision-making where the consequences of remediation can be traded off against evidence for adverse ecological effects (Whicker et al. 2004, "Avoiding Destructive Remediation at DOE Sites"). Ultimately, Step 8 (Risk Management) from EPA/540/R-97/006 (Figure 1-2) will be documented in a record of decision.

There are several unique considerations for performing an ERA at the scale of the Central Plateau. For example, ERAs typically are performed for individual waste sites. The risks posed by multiple chemicals and radionuclides associated with more than 700 waste sites grouped into operable units on the Central Plateau will need to be integrated in a comprehensive assessment to determine the potential for adverse effects on terrestrial biota. In contrast to typical ERAs, however, the means of performing this integration are available. While ecological information often is lacking in ERAs, there are decades of environmental monitoring data on the plants and animals of the Central Plateau. Compilations of important ecological information also are available for the Hanford Site (Landeen and Crow 1997, *A Nez Perce Nature Guide: I am of this Land Wetes pe m'e wes*; PNNL-6415, *Hanford Site National Environmental Policy Act (NEPA) Characterization*) and the Columbia Basin (O'Connor and Wieda 2001, *Northwest Arid Lands: an Introduction to the Columbia Basin Shrub-Steppe*). This wealth of ecological knowledge will be used to support remedial decision-making through the Central Plateau ERA.

1.1 PROJECT SCOPE

The Tri-Party Agreement (Ecology et al. 1989) includes a site characterization and remediation strategy for the 200 Areas Central Plateau that addresses inactive waste sites, fuel reprocessing facilities, auxiliary buildings, planned and unplanned waste sites, and groundwater. The strategy is based on implementation of the CERCLA remedial investigation/feasibility study process, leading to records of decision that authorize remedial actions. The ERA supported by this DQO is one of several being performed on the Hanford Site to ensure that both human health and ecological risks have been properly evaluated in support of remedial-action decision-making. This document only addresses potential terrestrial ecological impacts on the Central Plateau. It does not address Central Plateau human health or groundwater impacts, nor does it consider ecological impacts in other portions of the Hanford Site. Figure 1-3 shows the spatial boundaries. The relationship of the ERA supported by this EcoDQO with other ERAs is presented in DOE/RL-2005-37.

The scope of Phase I sampling initially focused on the evaluation of Central Plateau non-tank farm waste sites, to determine ecological impacts from contamination in support of remedial-action decision-making. Through the DQO process, issues and concerns were identified by the Tri-Party Agreement decision makers, National Resource Trustee Council members, Hanford Advisory Board, and Tribal participants that resulted in a significant expansion of the project scope (WMP-20570), including consideration of U.S. Department of Energy, Office of River Protection tank farm property, the US Ecology site, and habitat surrounding the Central Plateau waste sites. As Figure 1-1 shows, Phase I focused on the 200 East and 200 West Areas in the industrialized Core Zone, and Phase II expanded consideration of sampling to US Ecology and U.S. Department of Energy, Office of River Protection sites in the Core Zone and the BC Controlled Area (WMP-25493).

Phase III includes consideration of habitat sampling outside of the 200 East and 200 West Areas (non-waste-site areas), spatial domains associated with the dispersed carbon tetrachloride soil-gas plume of the 200 West Area, West Lake, and fulfillment of data gaps and uncertainties associated with results of the Phase I and II investigations.

1.2 PROJECT OBJECTIVES

The two primary objectives of this Central Plateau terrestrial EcoDQO process are (1) to provide information for remedial-action decision-making and (2) to provide information to evaluate the health or condition of the ecosystem across habitats. The environmental information obtained may assist the trustees in understanding the condition of the Central Plateau ecosystem.

1.3 DATA QUALITY OBJECTIVES INTERVIEW ISSUES

To help focus the scope of this EcoDQO summary, the project team conducted interviews with the Tri-Party Agreement decision makers, Hanford Advisory Board, and Natural Resource Trustees. The interview issues and Tri-Party Agreement decision-maker responses and positions are tabulated in an issues matrix (Appendix A).

1.4 SCOPE OF PHASE III SAMPLING

The scope of Phase III sampling includes both supplemental data collection to fill data gaps and resolve uncertainties associated with Phase I and Phase II data assessment results, and collection of data for specific spatial domains identified for the Phase III investigation.

Supplemental evaluations for Phase I and Phase II analyses include Phase I waste site collection and analysis of terrestrial invertebrates for cyanide in tissues, and the collection of lizards and small mammals for polychlorinated biphenyl (PCB) and Sr-90 analyses in tissue, and Phase I waste site plant characterization. The spatial domains under consideration specifically for Phase III include the following: non-waste-site areas, subsurface soil associated with the 200 West Area dispersed carbon tetrachloride plume, and West Lake. The sections that follow evaluate the need for ecological sampling in the Phase III scope and spatial domains considered.

1.4.1 Supplemental Waste Site Data Collection

Four specific supplemental data needs were identified to address uncertainties resulting from the Phases I and II data assessment: (1) cyanide concentrations in invertebrate tissues; (2) PCB analyses for small-mammal and lizard tissues; (3) Sr-90 analyses for small-mammal and lizard tissues; and (4) characterization of vegetative composition and cover for Phase I waste sites and reference location. The observations and findings of the data assessment that resulted in the identification of these data needs are described thoroughly in Chapter 2.0 and briefly summarized in the following subsections.

1.4.1.1 Cyanide in Invertebrates

Treatment of Uranium Recovery Process aqueous waste streams generated at the T, U, and B Plants employed a "scavenging" process to separate long-lived fission products (including Sr-90 and Cs-137) from the waste solutions. Chemicals used to scavenge fission products included potassium and sodium derivatives of the metal/ferrocyanide complex ion (WMP-20570, Appendix B). Cyanide was detected in invertebrate tissues in Phase I and Phase II waste sites and reference locations. To better understand the magnitude and general distribution of cyanide detections in tissues, additional invertebrates will be collected and analyzed for cyanide. Fifteen locations will be sampled, including the two Phase I and Phase II reference sites, the six Phase I waste sites, and seven reference sites of the 100 Area and 300 Area Component of the River Corridor Baseline Risk Assessment (RCBRA).

1.4.1.2 Polychlorinated Biphenyls in Tissues

PCBs were detected inconsistently in co-located soil and tissue samples. To address the source of PCBs in biota, lizards and mice at four Phase I investigation areas will be sampled. Tissue samples also will be collected at four non-waste locations in the vicinity of roads that may have been sprayed with PCB oils as a dust suppression measure to evaluate those areas as potential sources for PCBs. Consensus on these locations was reached in consultation with a representative of the Hanford Natural Resource Trustee Council (D&D-29483, *Re-Issue Meeting Minutes for the Central Plateau Ecological DQO/SAP – Site Investigation Conducted By Ron Mitchell and Wade Riggsbee*). These minutes document the content of a meeting between a

representative of the Yakama Nation and Duratek Federal Services of Hanford, Inc. (acting on behalf of Fluor Hanford) on February 27, 2006. The meeting was arranged during the February 23, 2006, DQO workshop regarding selection of sampling locations for PCB-laden oils that might have been sprayed on security roads at the Hanford Site. For the Phase III PCB analyses, U.S. Environmental Protection Agency (EPA) Method 8082 (from SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update III-A*) will be used to measure selected congeners and summed to total PCBs.

1.4.1.3 Strontium-90 in Tissues

Strontium-90 was detected in two Phase I reference site mammals and one lizard. The residual mouse tissue with the highest detections was reanalyzed but Sr-90 was not detected, indicating potential analytical error in the original assay. Some of the remaining mouse samples are being submitted to a third laboratory for independent assessment of the material. While it would appear that Sr-90 is not a risk driver, Sr-90 will be analyzed in lizards and mice at select sites targeted for Phase III vertebrate sampling. In addition to collecting data from waste sites, this effort will provide Sr-90 tissue results from reference sites and from non-waste-site areas to address the spatial extent of Sr-90 in the Hanford Site food web in nonoperational areas.

1.4.1.4 Vegetation Characterization

Vegetation is planned to be re-surveyed at Phase I waste site investigation areas as part of the Phase III field activities to supplement data gathered to assess relationships between plant characterization with other measures of environmental quality (e.g., population/community health attributes of plants, invertebrates, lizards, small mammals). Initial surveys of Phase I waste sites occurred early in the growing season in a dry year (2005) and the vegetation recorded may not be comprehensive of species present in an average-to-above-average rainfall year. Results of plant surveys conducted during the peak growing season of 2006 will be combined with the species catalogued during 2005 for a more representative indication of the vegetative community's composition. Furthermore, these activities will provide a more complete foundation of the Hanford Site's ecosystem and receptor characteristics to assess relationships between the plant community and other measures of environmental quality (e.g., population/community health attributes of plants, invertebrates, lizards, and small mammals).

1.4.2 Non-Waste-Site Soils

Past Hanford Site operations released radionuclides through plant stack emissions, which present a potential source for surface soil contamination (DOE/RL-2005-49). A focus of the Phase III Central Plateau EcoDQO is to assess the ecological condition of non-waste-site areas. Fourteen sources for non-waste-site data on radionuclides were compiled and reviewed. There is an abundance of existing radionuclide data, especially for soil and vegetation. However, sampling data near the Phase I and II reference sites and other areas on the Central Plateau are sparse (Chapter 3.0).

Near-facility and Surface Environmental Surveillance Project (SESP) sampling indicates higher concentrations of radionuclides (e.g., maximum 15 pCi/g of Cs-137 during the 2000 to 2005

period) within and near the Central Plateau Core Zone (locations proximal to the facility stacks). Thus, Phase I and II reference sites are complemented by reference sites used by the RCBRA effort, near-facility monitoring program, and SESP sampling. However, additional data are recommended to increase understanding of spatial representation of radionuclides in soils. Sampling will be conducted in non-waste-site areas along transects where data on facility stack emission radionuclides are limited; specifically, soils in four non-waste-site areas along presumed deposition pathways from the 200 Area stacks will be sampled. These areas fill data gaps for radionuclides in recent soil sampling and provide additional information on surface radionuclide concentrations in the area of the Phase I and Phase II reference sites, the area to the north of the 200 East Area, and locations east and west of the Core Zone.

1.4.3 200 West Area Dispersed Carbon Tetrachloride Plume

Carbon tetrachloride was used extensively at the Hanford Site, mainly in the plutonium recovery process. Soil contamination resulted in a groundwater contamination plume in the 200 West Area. Since 1994, the Hanford Site has been pursuing remediation activities using soil-vapor extraction and groundwater pump-and-treat operations. Because carbon tetrachloride can partition into the gas phase, potential inhalation risks from soil-gas are being evaluated. While air inhalation is typically not a risk driver in ERAs (DOE-STD-1153-2002, *A Graded Approach For Evaluating Radiation Doses To Aquatic And Terrestrial Biota*; EPA 2003, *Guidance for Developing Ecological Soil Screening Levels, Attachment 1-3, Evaluation of Dermal Contact and Inhalation Exposure Pathways for the Purposes of Setting EcoSSLs*), air below ground may be an important exposure medium to burrowing receptors for volatile organic chemicals emanating from the subsurface.

Plants, invertebrates, reptiles, birds, and mammals all use below-ground habitat to escape extremes in environmental conditions, procure food, and maintain moisture. Burrowing is a particularly successful life history strategy for organisms inhabiting arid environments like the Hanford Site. Assessment of inhalation risks has been limited by a lack of screening values for ecologically relevant receptors. To address this shortcoming, an ecological screening level (ESL) based on the geometric mean of relevant toxicity reference values (TRV) was derived following the process employed to derive EPA ecological soil screening levels (EPA 2005, *Guidance for Developing Ecological Soil Screening Levels [EcoSSLs]*). To evaluate inhalation exposure of burrowing mammals to carbon tetrachloride, quantification of soil gas concentrations and exposures are proposed as part of the Phase III investigation (Chapter 4.0).

1.4.4 West Lake

West Lake represents a unique and dynamic ecological feature at the Hanford Site. West Lake has been on U.S. Geological Survey maps since the late 1800s, and the lake's expanse has varied greatly over time. During operations, wastewater discharges from the Plutonium-Uranium Extraction Plant and the B Plant elevated groundwater and subsequently expanded the size of West Lake. Contamination at West Lake is understood to be the indirect result of wastewater discharges and from direct dumping of sewage and other Hanford Camp wastes (based on anecdotal reports). The lake has been generally shrinking in size since subsurface discharge has

been discontinued in the 200 Areas. In recent years, the lake has ranged from a water-covered expanse of hundreds of square meters to a few square meters. West Lake is responsive to long-term and short-term climatological and seasonal conditions such as wet years or large precipitation events.

Media historically sampled at West Lake included soil, water, sediment, and biological tissues. The Phase I EcoDQO identified surface water as a medium of concern as well as several data gaps that need to be addressed to evaluate the ecological risk. For example, despite a regular monitoring program and various surveillance efforts over the years, there are limited data on inorganic chemicals in sediment and water. There is also sparse documentation of wildlife use of West Lake. Lacking sufficient biological information from West Lake, reconnaissance surveys will be conducted to better describe biological pathways present today, and to estimate the percent of year these pathways exist.

The general classes of COPECs identified at West Lake (i.e., radionuclides and metals) are similar to the COPECs identified for the Central Plateau (WMP-20570). Because West Lake represents a unique habitat, the specific entities at risk are different from those associated with terrestrial waste sites on the Central Plateau. The current understanding is that the food chain at West Lake is simple and includes halotolerant algae at the food base; an invertebrate, the brine fly (Ephydridae) dominates the lower trophic level; brine flies in turn are preyed upon by aerial insectivores such as birds or one of several bat species that forage primarily on emergent insects. Ecological receptors also may have incidental exposures to surface water, salt, and sediment.

In addition to reconnaissance surveys, sampling is proposed to quantify ecological exposure potential associated with West Lake sediments, water (surface, pore), soils, and salt crust (Chapter 5.0). Organic chemicals were a minor component in the processes associated with the Plutonium-Uranium Extraction Plant and the B Plant, nor have organic chemicals been detected in groundwater wells near West Lake. However, the West Lake investigation will include analysis for semivolatile organic compounds, tributyl phosphate (TBP), and n-paraffin hydrocarbon in sediment to confirm their presence or absence as COPECs.

Figure 1-1. Phased Central Plateau Ecological Risk Assessment.

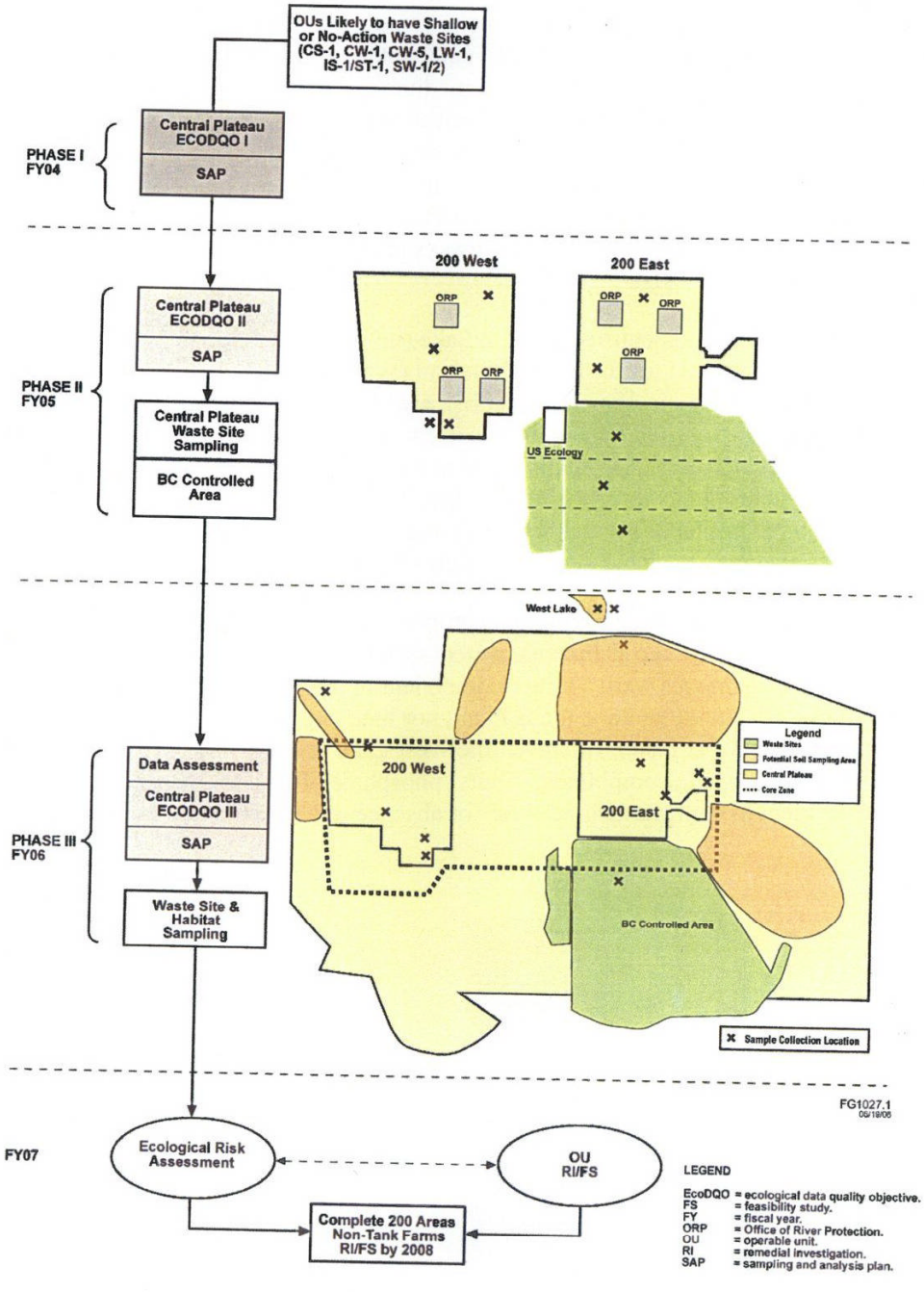
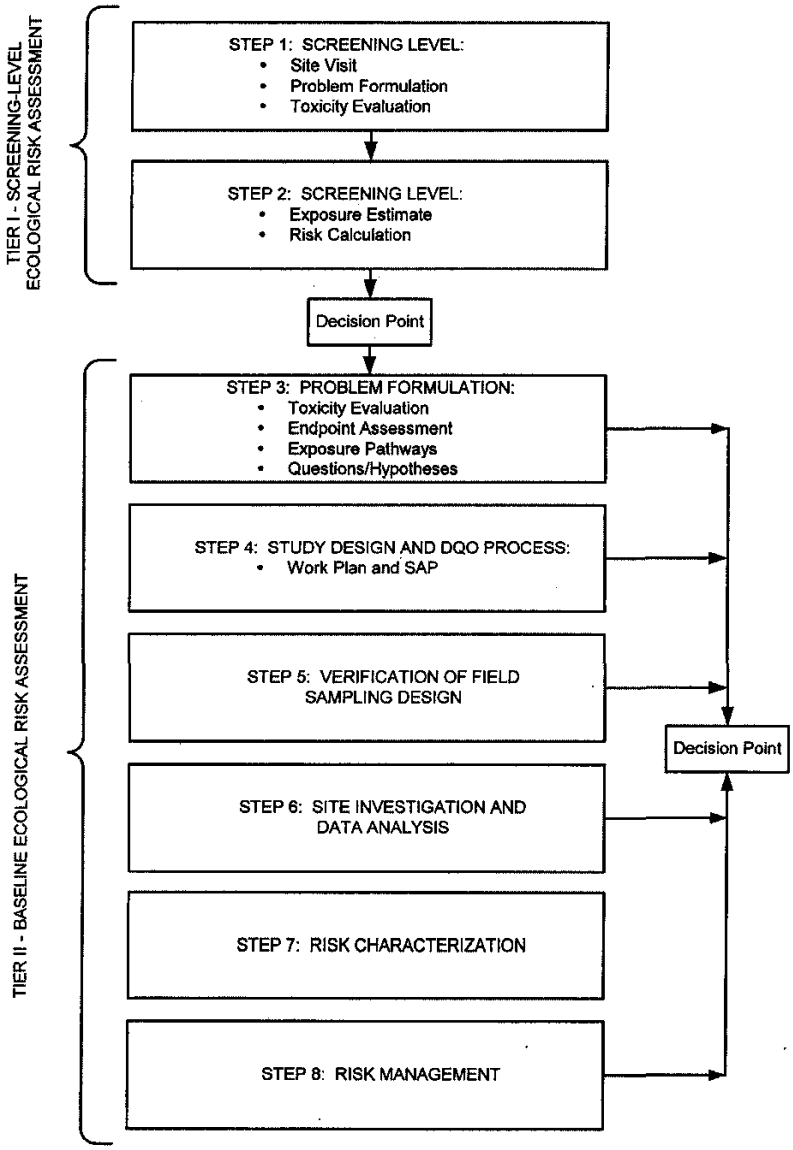


Figure 1-2. U.S. Environmental Protection Agency Two-Tier, Eight-Step Ecological Risk Assessment Process.



Source: Adopted from EPA/540/R-97/006, Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments.

DQO = data quality objective.
SAP = sampling and analysis plan.

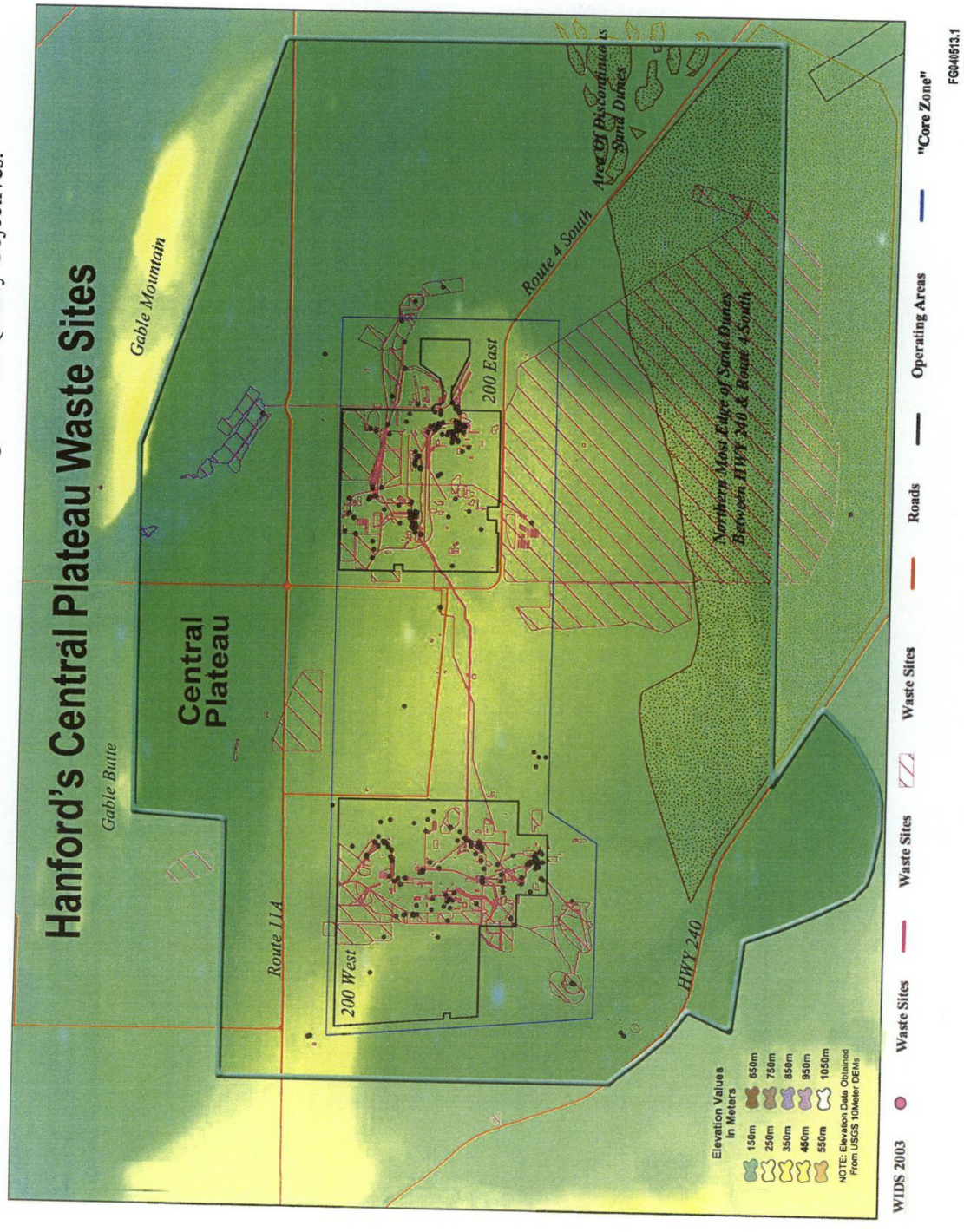


Figure 1-3. Spatial Boundary for the Central Plateau Ecological Data Quality Objectives.

2.0 SUMMARY OF DATA ASSESSMENT FOR PHASE I AND PHASE II INVESTIGATIONS

2.1 DATA SOURCES

A summary of Phase I and Phase II data sources, an assessment of that data, and resultant supplemental waste-site data needs are described in this chapter. Phase I and Phase II data have been collected and analyzed based on the Phase I and II sampling and analysis plans (DOE-RL-2004-42, *Central Plateau Terrestrial Ecological Sampling and Analysis Plan – Phase I*; DOE-RL-2005-30, *Central Plateau Terrestrial Ecological Sampling and Analysis Plan – Phase II*). Field information on the Phase I investigations is summarized in DTS-RPT-077, *Central Plateau Terrestrial Ecological Sampling Report - Phase I*, and field information on the Phase II investigations is summarized in DTS-RPT-078, *Central Plateau Terrestrial Ecological Sampling Report - Phase II*. A summary of the Phase I and II *Hanford Environmental Information System* (HEIS) database samples included in the data assessment is provided in Table 2-1 (the HEIS is documented in DOE/RL-93-24-4). Table 2-1 also lists 10 soil samples from the 100 Area and 300 Area RCBRA, denoted as "MIS PA," that are included in this data assessment. The Phase I and II sample results were validated as documented in their respective data validation reports (VSR07-003, *200 Area Ecological Study - Phase I Soils and Animals*, and VSR07-004, *200 Area Ecological Study - Phase II Soils and Animals*).

The data from the investigation areas were assessed for outliers and for differences in concentration between the potentially impacted areas and the reference areas. Among the relationships explored with these various statistical analyses are differences in the relative density of invertebrates, lizards, and mammals based on variation in plant cover. Data also were evaluated for statistically increased tissue concentrations versus soil concentrations (i.e., transfer factors or more complex bioaccumulation models). Contaminant transfer or bioaccumulation factors are an empirical ratio of contaminants in soil to contaminants in biota, which are used in exposure modeling. Adverse effects are inferred by the ratio of exposure to effects levels (TRVs). It is assumed that the dose received orally for terrestrial wildlife can be described mathematically by the following equation.

$$E_{oral} = I_{food} \cdot [C_{soil} \cdot fs + C_{food}] \cdot AUF$$

where

E_{oral} is the estimated oral daily dose for a COPEC (mg-COPEC/kg-body weight/day)

C_{soil} is the concentration of chemical constituent x in soil (mg/kg dry weight)

I_{food} is the normalized daily dietary ingestion rate (kg-dry weight/kg-body weight/day)

fs is the fraction of soil ingested, expressed as a fraction of the dietary intake

C_{food} is the concentration of COPEC in food (mg/kg-dry weight)

AUF is the area use factor for the receptor (ratio of the investigation area to the home range, but no larger than 1.0).

This equation assumes that a single food type is ingested and that exposure modeling must be specific for herbivores, omnivores, insectivores, and carnivores. This model is the same as the one used in WAC 173-340-900, "Tables," Table 749-4, "Wildlife Exposure Model for

Site-Specific Evaluations," for evaluation of ecological effects of contaminants on terrestrial wildlife (WAC 173-340-7492, "Simple Terrestrial Ecological Evaluation Procedures").

Exposure modeling was based on site-specific soil COPEC data and on COPECs detected in the three taxonomic representatives of middle trophic-level species (invertebrates, lizards, and small mammals) sampled for tissue analyses. Figure 2-1 depicts the decision logic used for the modeling. Food ingestion rates and home ranges for Central Plateau receptors are provided in the Phase I EcoDQO (WMP-20570). Avian and mammalian TRVs for the COPECs being evaluated in this plan also are provided in WMP-20570. Soil ingestion values were obtained from the literature for the receptors considered in the Central Plateau or from appropriate surrogate receptors (EPA 2005). A framework for considering uncertainties in exposure-related (e.g., ingestion rate) and toxicity-related parameters is described in LA-UR-04-8246, *Screening-Level Ecological Risk Assessment Method*, and was adopted for evaluating uncertainty in these data.

Radionuclides were not evaluated using exposure modeling; radionuclides were evaluated using the biota concentration guidelines (BCG), which incorporate soil and food exposure pathways as well as external and internal radiation doses.

The data assessment provided the basis for selecting from among four possible outcomes for each COPEC (Figure 2-1):

1. COPECs are in soil and in biota
2. COPECs are in soil only
3. COPECs are in biota only (potentially triggering deep soil sampling or additional lateral sampling in Phase III and an evaluation of the need for receptor-specific Tier 2 data)
4. COPECs are not in soil or in biota (indicating that no additional data are needed to characterize risk to biota for the geographic areas sampled for Tier 1).

For outcomes 1 through 3, exposure is compared to effect levels to determine if additional data should be collected. A weight-of-evidence approach was used to evaluate the need for additional data collection, either to address Phase I and Phase II uncertainties or for Tier 2 receptor and COPEC investigations.

Figure 2-2 shows the data assessment activities associated with data collected for specific ecological receptors in Phases I and II and how these data assist with the development of DQOs and the Phase III SAP. The five decision logic components in Figure 2-2 represent the receptors considered for Tier 2 characterization.

- **Plants** – The field radiological data and analytical data were used to evaluate the potential for bioaccumulation of COPECs into plants. The results of this evaluation were reviewed to determine whether potential contaminants are present in plant tissues. Additional fieldwork will be undertaken in Phase III, based on the results of the vegetation and radiation-field data assessment.
- **Invertebrates** – Toxicity tests and litterbag assessments are planned if COPECs are measured in soil at greater than invertebrate soil-screening values, and these COPECs also are measured in soil macroinvertebrates. This evaluation includes exploratory data analysis of the macroinvertebrate and soil COPEC concentrations to look for bioaccumulation trends. These results also will be compared to relationships documented

in the literature or from other relevant sites. The data assessment also will evaluate the diversity and relative abundance of invertebrates by measuring the biomass of invertebrates in major taxonomic groups (predominantly beetles and crickets; biomass of lesser fractions will be noted as "other"). A measure of relative abundance is obtained by tabulating the trap days of capture activity at each investigation area. Relative abundance will be based on total biomass of collected invertebrates.

- **Birds** – Further evaluation of the avian receptors was based on measuring COPEC concentrations in soil at levels greater than avian soil-screening values and based on exposure modeling with Hanford Site-specific dietary data (see the detection limit calculations in WMP-20570 for the form and parameters of the exposure model) and also by detecting COPECs in mammals and/or lizards. Mammal and lizard data are relevant in that these species are in the same middle trophic level as the bird species under consideration for Tier 2 data collection.
- **Mammals** – Small-mammal population studies are planned if COPECs are measured in soil at greater than mammalian soil-screening values and based on exposure modeling with Hanford Site-specific dietary data (see the detection limit calculations in WMP-20570 for the form and parameters in the exposure model). These COPECs also are measured in small mammals.

  This evaluation includes exploratory data analysis of the mammal and soil COPEC concentrations to look for bioaccumulation trends. These results also will be compared to relationships documented in the literature or from other relevant sites. The data assessment also evaluated the relative abundance of small mammals by measuring the biomass of each animal captured. A measure of relative abundance is obtained by tabulating the trap days of capture activity at each investigation area. The trapping data will be delineated by small-mammal species per site.
- **Lizards** – Lizard population studies are planned if COPECs in lizards are measured. This evaluation includes exploratory data analysis of the lizard and soil COPEC concentrations to look for bioaccumulation trends. These results also were compared to relationships documented in the literature or from other relevant sites.

The data assessment also evaluated whether an indicator model for ecological risk or ecological effects can be developed. Data analysis determined that exposure levels are comparable between some investigation areas and, therefore, results from sites have comparable exposure levels as something similar to field duplicates of analytical results.

2.1.1 Statistical Methods

The following subsections describe statistical methods used in the assessment.

2.1.1.1 Box Plots and Distribution Shift Tests

Box plots are useful for looking for differences between groups of data. Looking at differences in results between these groups is used to infer changes as a result of waste site operations. The box plots summarize the results for each data group. The ends of a box are the 25th and 75th quantiles, also called the quartiles representing the central 50 percent of the results. The difference between the quartiles is the interquartile range. The line across the middle of a box identifies the median result. Each box has lines, sometimes called whiskers, that extend from

each end. The whiskers extend from the ends of the box to the outermost data point that falls within the distances computed as the upper quartile plus 1.5 times the interquartile range and the lower quartile minus 1.5 times the interquartile range. Results that lie outside of the whiskers are possible outliers. The lines above and below the box are the 10th and 90th percentiles; 80 percent of the results lie between these values. Figure 2-3 is an example box plot.

Instead of simply comparing each datum to a single threshold value representing background (e.g., the 90th percentile of background), distribution shift tests compare the potentially affected site data to the entire distribution of background or reference site concentrations. A distribution shift test is used to determine whether site data are systematically greater than background or reference site data. The result of performing a statistical test on two data sets (one that represents background and one that represents the site) is a test statistic and an associated significance level (also known as a p-value). The significance level is the probability that the test statistic would be as large as or larger than the one produced if the two data sets were from the same distribution (both were from the background distribution). When the significance level is small, this indicates that it is not likely that the two data sets came from the same distribution. It is standard to consider "small" to be less than 0.05 (i.e., such a large test statistic would occur by chance less than 1 out of 20 times when the sampled populations are the same).

To detect an overall distribution shift between potentially affected sites and background or reference site data, the Wilcoxon rank sum test was used. This test can be performed as a two-sided test with the null hypothesis that site concentrations are not greater than background (or reference area concentrations), and the alternative hypothesis that the site is greater than background (or reference area concentrations).

The Wilcoxon rank sum test (or Mann-Whitney U-test) is the nonparametric equivalent to the t-test (Gilbert 1987, *Statistical Methods for Environmental Pollution Monitoring*; Gilbert and Simpson 1992, "Statistical Methods for Evaluating the Attainment Cleanup Standards"). The Wilcoxon test pools site and background or reference site data into one aggregate set and determines whether the average rank of the site data is greater than that of the background data. The Wilcoxon test ranks the results, including detects and nondetects, from lowest to highest rank order. The Wilcoxon rank sum test has about the same or more power than the t-test for most distributions (Gilbert and Simpson 1992).

2.1.1.2 Bivariate Plots, Correlation, and Regression Models

Scatter or bivariate plots are used to look for a mutual relationship or correlation between two variables of interest in the same sample. Data relating to one variable (y-axis) are plotted against data from a second variable (x-axis). Each point represents the values of the two variables from the same sample. Two variables have a positive correlation if they have a tendency to increase together, and a negative correlation if an increase in one tends to produce a decrease in the other. The strength of the correlation between the two variables may be interpreted by the scatter of points around a sloped least squares fit line. The scatter of points typically follows the general pattern and is described as an ellipse. The shape of the ellipse reflects the strength of the correlation (i.e., the magnitude of r, the correlation coefficient). The shape of the ellipse ranges from circular when there is no correlation (r=0) to a thin ellipse that collapses into a straight line (a degenerate ellipse) when the variables are perfectly correlated (r=1, or r=-1). The slope of the line or ellipse of points (positive or negative slope) indicates whether there is a positive or negative correlation. Both parametric and nonparametric methods are available to assess data for

correlations; and a statistical model may be developed using tools like simple linear regression using a pre-determined alpha value; such as 5 percent).

Linear regression is used as one statistical model to relate pairs of variables that conform to a normal statistical distribution. One variable is the independent variable and is plotted on the x-axis, which for this project is mainly the contaminant concentrations in abiotic media. The dependent variable is plotted on the y-axis, and concentrations in tissues or other biological measures are evaluated as the dependent variables. It yields a model with a slope and intercept. The fit of the data to the model is calculated as the coefficient of determination (also known as r^2 or the explained variance of the model). A coefficient of determination of 1 occurs when a perfect fit occurs (the errors are all 0). A coefficient of determination of 0 means that the model predicts the small-mammal concentrations no better than the overall response mean (the regression would have a slope of 0 in this case). As with all other statistical tests, statistical significance is associated with p-values that are less than 0.05. When both detects and nondetects are in a data set, they are denoted graphically with different characters and nondetect values are displayed at half their detection limit or recommended quantitation limit.

2.2 DATA ASSESSMENT RESULTS SUMMARY

Appendix B has a comprehensive collection of plots and tables that summarize data assessment of the radiation surveys, plant species abundance and cover surveys, field observations on biota, and contaminant measurements in soil and tissues. Observations, conclusions, and recommendations of the data assessment for the Phase I and Phase II data are summarized in the following sections.

2.2.1 Radiation Surveys

Gamma and beta radiation surveys of soil, plants, mammal burrow spoils, and ant nests were completed at the nine investigation areas and two reference locations. The results of these surveys are presented in Appendix B, Figures B-1 to B-8. These radiation surveys showed that elevated radionuclide activities were measured primarily at the BC Controlled Area "High" investigation area. Both gamma- and beta-radiation measurements were elevated at this area.

2.2.2 Animal Metrics and Relative Animal Abundance

Invertebrates were collected at all nine investigation areas and both reference sites using pitfall traps. Lizards were collected from eight of the investigation areas and the two reference sites using pitfall traps; an alternate method (hand collection) was employed at the site without lizards, but was not successful. The absence of lizards at the 2607-E6 Septic Tank and Tile Field was thought to be related to the low relative insect density and plant composition at this site. Small mammals were captured at all nine investigation areas and both reference site locations. Animal relative abundance generally was similar among reference sites and waste sites (Table 2-2). Relative abundance was variable, and one site did not have any lizards. Tabulations and plots for metrics and density of the animals captured are provided in Appendix B, Tables B-1 to B-19 and Figures B-9 to B-14. For all sites, five mammal species were caught, and males outnumbered females.

The following notes on animal condition are provided for the benefit of the Natural Resource Trustees:

- Mammals included 66 total captures
  - 58 normal phenotypes
  - 8 observations
    - Ear tear (n=6)
    - Short tail (n=1)
    - Infected uterus (n=1)
  - No observations in reference site mice (n=12)
- Lizards included 48 total captures
  - 46 normal phenotypes
  - 2 observations
    - Double tail (n=1)
    - Dark throat (n=1)
  - No observations for reference site lizards (n=8).

2.2.3 Plant Cover and Diversity Surveys

Field studies assessed cover of dominant plants, bare ground, and cryptogams. The comparability of the investigation areas was evaluated in terms of plant cover; this information can be used to estimate abundance and types of other receptors. Plant surveys included Daubenmire plots at all nine investigation areas and the reference sites and line transects at the Phase II (primarily shrub cover) investigation areas. Cover and diversity information is summarized in Table 2-3; plant measures varied most between Phase I and Phase II sites. The reference sites tended to have greater species diversity, and plant cover was highly variable between the waste sites.

One potential uncertainty regarding the vegetative characterization is the timing of the surveys during a relatively dry year (2005); the surveys occurred early in the growing season. Vegetative characterization conducted in an average-to-wet year could yield more plant species in each plot; therefore, field reconnaissance for plants has been recommended for the Phase I sites surveyed early in 2005.

2.2.4 Relating Relative Animal Abundance to Plant Cover and Diversity Surveys

Figures B-17 to B-20 in Appendix B compare the relative animal abundance at the investigation areas versus measures of plant cover and diversity. There are either weak or no relationships between the relative animal abundance measures and plant cover and diversity.

When reviewing information on relative animal abundance it is important to recognize that relative abundance can only be compared between sites for the same taxon (i.e., invertebrate, lizard, and small mammal). The primary objective of the animal collections was to obtain tissues for contaminant analysis. The small-mammal collections were from baited traps and did not

employ mark-recapture protocols for a quantitative estimate of animal abundance. Given these caveats, the relative abundance information does provide some semi-quantitative information on the potential difference between sites in animal density.

2.2.5 Using Contaminant Concentrations to Identify Soil and Tissue Contaminants of Potential Ecological Concern

Soil contaminant concentration data were obtained from HEIS, and data validation was completed on 5 percent of HEIS data. These analyses are based on validated data; the only data exception was one rejected bismuth soil sample result. Nondetected contaminants in the soil data were eliminated from further analysis, and the detection limits of these analytes were reviewed to see if they met the requirements established in the SAP. Nondetected soil values were greater than the target quantitation limits for three analytes. The detection limits for antimony and thallium meet the WAC 173-340-900, Table 749-3 values but do not meet the calculated target quantitation limit for wildlife. Selenium does not meet the Table 749-3 values. However, the practical quantitation limits were met, but the practical quantitation limits are less than the lowest screening values.

The detected soil contaminant data were evaluated to identify COPECs. The evaluations included statistical comparison of waste site data to reference site data. Contaminants that were greater than reference site concentrations were retained; the reference site data included some initial reference site concentrations from the 100 Area and 300 Area RCBRA project. Waste site concentrations also were compared to Hanford Site background concentrations, and the data were reviewed to identify outliers; all such outliers were retained in the data evaluation. Plots of the soil data are provided in Appendix B, Figures B-21 to B-93. The statistical analyses of the soil contaminant concentration data are summarized in Table 2-4.

Tissue contaminant concentration data were obtained from the HEIS, and data validation was completed on 5 percent of HEIS data. These analyses are based on validated data; no exceptions were noted during data validation. Nondetected contaminants in the tissue data were eliminated from further analysis, and the detection limits of these analytes were reviewed to see if they met the requirements established in the SAP. Nondetect tissue values basically met the target quantitation limits. The only exceptions are that the nondetect value for Aroclor-1254[1] was slightly greater than the target level (0.21 versus 0.2 mg/kg) and that cyanide did not meet all detection limit targets. However, cyanide also was detected and the detected values were evaluated.

The detected tissue contaminant data were evaluated to identify COPECs. The statistical analyses of the tissue contaminant concentration data are summarized in Tables 2-5 through 2-7. The evaluations included a statistical comparison of waste site data to reference site data. Contaminants that were greater than reference site concentrations were retained. The data were reviewed to identify outliers and these also were retained. Tissue COPECs also were identified if there was a significant correlation between the average tissue and soil concentrations (see plots in Appendix B, Figures B-94 to B-124).

[1] Aroclor is an expired trademark.

In summary, soil COPECs were identified by using statistical comparisons to reference site data and by comparisons to Hanford Site background concentrations. Graphical plots were reviewed for outliers as another way to include an analyte as a COPEC. If the waste-site concentration was greater than the reference location or background, and the contaminant was detected in soil, then it was retained as a soil COPEC, unless eliminated by statistical comparisons and plots. This process resulted in 17 soil COPECs: arsenic, barium, boron, cadmium, chromium, copper, lead, molybdenum, nickel, zinc, Aroclor-1254, Aroclor-1260, Cs-137, Ra-226, Ra-228, Pu-239/240, and Sr-90 (see Tables 2-8 and 2-9). Tissue (invertebrate, lizard, and small mammal) COPECs were identified based on statistical comparison of waste sites to reference sites, statistical evaluations to determine if tissue and soil data were correlated, and inspection of results to identify outliers. This process resulted in 17 tissue COPECs: arsenic, boron, cyanide, molybdenum, nickel, silver, thallium, vanadium, zinc, Aroclor-1254, Aroclor-1260, Cs-137, Ra-226, Pu-239/240, Sr-90, U-234, and U-235 (see Tables 2-8 and 2-9).

A concern was raised during the DQO workshop that the uranium results in soil were biased low (see Appendix A, Issue 25). Specifically, the multi-increment sampling (MIS) soil results were about one-third to one-half of the Hanford Site isotopic uranium background mean values. The background study isotopic radionuclide analyses were performed by the IT-Richland Laboratory, now Severn-Trent Richland. The Severn-Trent Laboratory has not dramatically changed its soil preparation methodology since it was IT-Richland Laboratory. The Laboratory performs a size reduction and homogenization using a ball mill and then digests the sample using strong nitric acid (boiling). The other laboratories do similar, but not identical, digestions. For example, the Eberline Laboratory (formerly TMA) does a similar ball milling but uses nitric and hydrofluoric acids (boiling) for the primary digestions, to extract "environmentally accessible" contamination from the samples. The Eberline digestion is probably the most chemically aggressive, with the Severn-Trent the least, but the size reduction/surface preparation may be more critical to consistent and comparable results. Washington Closure Hanford, LLC (and prior organization) has done sample/split evaluations between Eberline and Severn-Trent since 1994. These comparisons have shown no instances where it looked like one laboratory was biased relative to the other. Thus, it does not appear that the current methods for isotopic uranium have changed since analysis of the background samples.

2.2.6 Reference Site Observations

Sample results for the Phase I and Phase II reference sites were reviewed. Data for PCBs and Sr-90 resulted in the following conclusions and recommendations.

Aroclors were not detected in soil at the reference site or in any insect or asphalt samples. Aroclor-1254 was detected in two waste-site lizards, one at the 216-B-63 Ditch and the other at the 216-B-3 B Pond. Aroclor-1260 was detected in soil only at the 2607-E6 Septic Tank and Tile Field and was detected in small mammals at the 216-B-63 Ditch, and PCBs were not detected in other samples collected from that site. The possibility exists that PCB-laden oils could have been used for dust suppression on Hanford Site unpaved roads (DOE-RL, 1984, "EPA PCB Inspection Report and Notice of Compliance"). Thus, there is uncertainty regarding the source of Aroclors, and additional tissue data will be collected in Phase III to address these uncertainties.

Strontium-90 originally was detected in two reference site mammals and one lizard. These results were suspect and mammal tissues were submitted to a different analytical laboratory for

reanalysis. As shown in Table 2-10, the results were not reproducible upon reanalysis (for mammals only; there was not enough material to reanalyze for lizards). Analytical uncertainties surrounding Sr-90 results warrant further data collection to evaluate the distribution of Sr-90 in Central Plateau vertebrates.

2.2.7 Ecological Exposure Analysis and Contaminant of Potential Ecological Concern Evaluations

The ecological exposure analysis was based on the COPECs identified in Section 2.2.5 for soil and tissue. The exposure equation for nonradionuclides is presented in Section 2.1. Intake is modeled from soil and/or tissue (invertebrate, lizard, mouse) exposure pathway. The Hanford Site-specific receptors were developed during the Phase I EcoDQO and include killdeer (*Charadrius vociferus*), Northern grasshopper mouse (*Onychomys leucogaster*), red-tailed hawk (*Buteo jamaicensis*), and badger (*Taxidea taxus*). The exposure parameters for these receptors are provided in Table 2-11. The ecological exposure analysis for the invertivores is summarized in Table 2-12, and includes the maximum detected COPEC soil concentration, the maximum detected COPEC invertebrate concentration, the TRVs, and the hazard quotient (HQ) for each COPEC. The ecological exposure analysis for the carnivores is summarized in Table 2-13, and includes the maximum detected COPEC soil concentration, the maximum detected COPEC lizard or small-mammal concentration, the TRVs, and the HQ for each COPEC. The only COPEC with an HQ between 1 and 5 was cyanide for the killdeer.

The hazard index (HI) is one way to consider the potential for additive effects of contaminants on ecological receptors. The HI for metals is computed by summing the HQs of the individual metal COPECs. The HI for the killdeer is approximately 7 with five metals (arsenic, boron, cyanide, thallium, and vanadium) contributing an HQ >0.1 to the HI. The HI for the northern grasshopper mouse is approximately 1, and two metals (arsenic and thallium) contribute HQ >0.1 to the HI. The HIs for the red-tailed hawk and the badger are much less than 1. The metals that contribute to the HI for the invertivores will be evaluated in the risk assessment, but no further data collection in Phase III is recommended for these metals based on the decision logic described in Figure 2-1.

For radionuclides, toxicity data are not radionuclide-specific when expressed as dose limits (e.g., 0.1 rad/d). These dose limits can, however, be translated into radionuclide-specific concentrations (e.g., picocuries per gram) for a defined exposure scenario, as detailed in DOE/EH-0676, *RESRAD-BIOTA: A Tool for Implementing A Graded Approach to Biota Dose Evaluation* and in DOE-STD-1153-2002. This data assessment uses the BCGs in DOE-STD-1153-2002, which were developed by the U.S. Department of Energy's Biota Dose Assessment Committee to evaluate radiation as a stressor to biota and ecosystems. BCGs are pertinent to the risk assessment in that they provide useful evaluation systems and numerical values. Thus, BCGs are being used within the broader ERAGS (EPA/540/R-97/006) framework because Central Plateau waste sites have both radionuclide and nonradionuclide contaminants of potential concern (COPC).

Because dose from radionuclides is additive, the contribution of radionuclides identified as COPECs in Section 2.2.5 was calculated. This calculation is based on the sum-of-fractions (SOF) method, and the contributions of various radionuclides were reviewed to determine their contribution to dose.

$$SOF = \sum_{j=1}^{n} Exposure_j / BCG_j$$

where

SOF = sum of fractions
$Exposure_j$ = exposure concentration for radionuclides
BCG_j = biota concentration guideline for $radionuclide_j$.

SOF was calculated based on the maximum Phase I and II soil concentrations divided by the BCG for all radionuclide COPECs. If the SOF is not greater than 1, then no radionuclide COPECs are identified. The SOF, based on the maximum soil concentrations, was 0.83, which equals a dose of 0.083 rad/d. Thus, the radiological exposure analysis did not identify any COPECs warranting further data collection. However, comments received during the April 12, 2006 SAP review workshop suggested that additional data collection (soil and biota) would be worthwhile in the BC Controlled Area of highest radioactivity, given that this zone's SOF was relatively close to 0.1 rad/d (Figure 2-4).

The analytical performance requirements for the additional BC Controlled Area characterization in Phase III are discussed in Section 2.3.5.

In summary, the ecological exposure analysis for the soil and tissue COPECs identified one COPEC (cyanide) with an HQ between 1 and 5. The need for additional investigations for cyanide is considered in detail in Section 2.2.7.1. Six COPECs were identified in tissues only (cyanide, thallium, silver, vanadium, U-234, and U-235). Existing remedial-investigation waste-site data were reviewed along with other lines of evidence to determine if deeper soil sampling or additional lateral sampling were needed for these COPECs. The need for additional sampling was evaluated for cyanide, silver, thallium, vanadium, U-234, and U-235. A summary of this review is presented in the following sections.

2.2.7.1 Cyanide

Cyanide has been detected in biota collected at the Phase I investigation areas. Process knowledge (WMP-20570, Appendix B) indicates that cyanide was used for Cs-137 scavenging operations; the ferrocyanide inventory primarily is in tanks. Consistent with this process knowledge, the remedial-investigation data evaluated in Appendix D of WMP-20570 indicated that there are few detects in soil; cyanide was detected in 5 of 297 soil samples and detects at 5 ft and below (Table 2-14).

However, at the Phase I sites, cyanide was found in biota taken from the reference site as well as those from waste sites (see Appendix B, Figure B-70). For lizard samples, the levels at waste sites were statistically higher than at the reference site. For invertebrate samples, the levels at waste sites were statistically higher. For small-mammal samples, the levels were about the same at reference and waste sites. Cyanide was not detected in soil samples for this investigation, but it was detected in biota in both the reference and study sites.

These findings are in general agreement with those found in an earlier study of waste sites in the Hanford Site 200 Area (BHI-00032, *Ecological Sampling at Four Waste Sites in the 200 Areas*). In that study, cyanide was detected only in small-mammal samples, and not in soils or

vegetation. Invertebrates were not sampled in that investigation. Table 2-15 lists the maximum and average cyanide levels found in the study.

Thus, cyanide has been detected previously in small-mammal tissues, but the question remains on the source of the cyanide. Cyanide exists in various forms in the environment. Free cyanide is volatile at circumneutral pH, and it complexes with metals to create a more stable form as primarily iron cyanides (ferricyanide, ferrocyanide).

Although it is odd for a toxic substance to appear in tissue if it is not also in the soil where the animals live, cyanide is a special case. Cyanide is well known to be a product of metabolism in several species of plants (Eisler 1991, "Cyanide Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review," Seigler 1976, "Plants of Oklahoma and Texas Capable of Producing Cyanogenic Compounds"); and animals. Some plants, or parts of plants, have been found to contain parts per thousand levels of cyanide and/or cyanogenic compounds. Two plants, "yarrow" (*Achillea millefolium*) and "lamb's quarters" (*Chenopodium album*), are known to produce cyanide metabolically (Seigler 1976) and are known to be widespread in the Hanford Site area (PNNL-13688, *Vascular Plants of the Hanford Site*).

In this investigation, insect samples produced some of the highest results for cyanide. Eisler (1991), says,

> "The production of hydrogen cyanide by animals is almost exclusively restricted to various arthropods: 7 of about 3,000 species of centipedes; 46 of 2,500 species of polydesmid millipedes; and 10 of 750,000 species of insects, including 3 species of beetles, 4 moths, and 3 butterflies."

This statement implies that the production of cyanide in animals has been studied extensively and has been found to be rare. However, the level of cyanide reported in Phase I invertebrate samples are in the parts per million range and may be considered low relative to the parts per thousand range concentrations reported for cyanogens.

Cyanide is not expected in vertebrate tissue because it is rapidly eliminated; it was not detected one hour after injection in rats (Pettigrew and Fell 1973, "Microdiffusion Method for Estimation of Cyanide in Whole Blood and Its Application to the Study of conversion of cyanide to Thiocyanate"). However, cyanide has been noted to increase in post-mortem tissues (Wiemeyer et al. 1986, "Acute Oral Toxicity of Sodium Cyanide in Birds"). Thiocyanate in human blood comparable to Phase I biota cyanide levels, which may suggest that a nontoxic form of cyanide, thiocyanide, is being measured as total cyanide in tissues. The analytical methods used in the Phase I investigation closely follow Methods 9010 (distillation) and 9012 (automated colorimetry) from SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update III-A*. These methods were designed for water samples and also have been adapted and widely used for soils.

However, it is well known that the use of these methods for biota samples is subject to a number of interfering mechanisms. First, it must be recognized that cyanide is quickly and nearly quantitatively metabolized to thiocyanate in the presence of specific enzymes (thiocyanate:cyanide sulfurtransferase and 3-mercaptopyruvate:cyanide sulfurtransferase) that are found in the alimentary tract, liver, and kidneys (Pettigrew and Fell 1973). This is at least one of the reasons that the thiocyanate concentration in blood and other bodily fluids is normally 100 to 1,000 times that of cyanide in those bodily fluids (Pettigrew and Fell 1973; Tsuge et al. 2000, "Cyanide and Thiocyanate Levels in Blood and Saliva of Health Adult Volunteers").

Because the colorimetric method does not differentiate between thiocyanate and cyanide (Pettigrew and Fell 1973), separation of cyanide from thiocyanate by distillation or microdiffusion is required to avoid a gross positive interference. However, these separation methods are based on the acidification of the sample to release cyanide as hydrocyanic acid gas. This acidification in the presence of oxyhemoglobin converts thiocyanate to cyanide at least partially, resulting in a negative interference.

The extent of conversion of thiocyanate to cyanide is unclear. The effect was dismissed as insignificant in work conducted in the 1970s (Pettigrew and Fell 1973), but in more recent work it was determined that blood cyanide levels being reported were mostly due to the cyanide converted from thiocyanate. It was found that adding ascorbic acid (or other oxygen scavenger) prevented the conversion and permitted cyanide to be determined without interference (Tsuge et al, 2000, "Cyanide and Thiocyanate Levels in Blood and Saliva of Healthy Adult Volunteers").

The foregoing discussion indicates that the cyanide results reported for biota in the Central Plateau (both the current study and the earlier BHI-00032) are likely biased high due to thiocyanate and hemoglobin in the samples (other oxygen transporters may be involved in the invertebrate samples).

Exposure modeling identified cyanide as a COPEC where invertebrate ingestion exceeds avian TRV. The maximum HQ for the killdeer was at U Pond (HQ=5) and the minimum HQ was at the Phase I reference site (HQ=2). Thus, there is potential for ecological effects on avian invertivores at all Phase I sites. Hazard quotients to mammals and to avian carnivores are much less than 1, indicating no further cyanide data are needed for these receptors.

Avian cyanide toxicity information is based on a study where birds were force-fed sodium cyanide, the most toxic form, in gelatin capsules (Wiemeyer et al. 1986). Lethality occurred immediately or else cyanide is rapidly metabolized and excreted without latent toxicity. Lethal dose (LD) to kestrels (LD_{50} = 4 mg/kg/d) and after applying uncertainty factors the chronic no observed adverse-effect level (NOAEL) was set at 0.04 mg/kg/d). The maximum hypothetical dose for the killdeer is 20 times less than LD_{50} assuming invertebrates contain the most toxic form of cyanide. The mammalian no-effect level is 1,700 times greater, which is an atypical difference in sensitivity.

In summary, Phase I nondetects in surface soil are consistent with the overall 2 percent detect rate for the remedial-investigation samples collected at waste sites. Cyanide was detected in waste site and reference site biota tissues. Many invertebrates contain or produce natural cyanide; however, detections in lizards and small-mammal tissues are unexpected. Because a waste site source of cyanide was not identified via soil analyses, confirmation of the analytical validity of cyanide detection in tissues is being addressed by the laboratories responsible for tissue analyses. The data assessment indicated that cyanide in invertebrates posed a potential risk from dietary exposure to birds. To provide additional information on the nature and distribution of cyanide at the Hanford Site, sampling invertebrates at the Phase I and Phase II reference sites and performing total cyanide analyses is planned for Phase III.

2.2.7.2 Silver

The remedial-investigation waste site characterization data include 289 total samples that were analyzed for silver; 231 values were nondetects. Only 27 of 58 detects are greater than the silver background value (1.33 mg/kg), and these results are summarized in Table 2-16.

In summary, silver was undetected in soil, reported nondetect levels were much less than soil background concentrations, and tissue levels were less than the TRV. There was a single outlier in a 2607-E6 Septic Tank and Tile Field mouse at roughly 10 times the next largest detect. In conclusion, deeper soil data for silver are not warranted, based on the single elevated value in tissue and because of the low overall detection frequency in waste-site characterization data.

2.2.7.3 Thallium

The remedial-investigation waste site characterization data include 200 total samples that were analyzed for thallium; 110 values were nondetects and the range was 0.29 to 1.6 mg/kg. There were 90 detects and the range was 0.09 to 1.7 mg/kg. Three analytical methods were used on these samples:

- **Inductively Coupled Plasma Emission Spectroscopy (ICPES)** – 14 detects out of 25 samples; this method has a high detection limit and is prone to interferences
- **ICPES Trace** – 75 detects out of 111 samples; this method has a low detection limit but is prone to interferences
- **Graphite-Furnace Atomic Absorption** – 1 detect out of 64 samples; this method has a low detection limit and is not prone to interferences.

Process knowledge as documented in WMP-20570 suggests that only radioactive thallium was associated with 200 Area operations. Radioactive thallium (Tl-208) has a half-life of 3 minutes, chemical thallium was never introduced, and exposure was less than the TRV. Although there is no Hanford Site background value for thallium, global crustal abundance data suggest about 1 mg/kg thallium should be the typical level for soils. This level is consistent with the remedial-investigation measurements of thallium.

In summary, there were three outlier values in invertebrates (two to four times larger than the next largest detect). Waste-site soil-characterization data for thallium were similar to global crustal abundance estimates. In conclusion, deeper soil data and small-mammal population studies for thallium are not warranted, based on the lack of elemental thallium in Hanford Site processes and the low detection frequency around estimated background in waste-site characterization data.

2.2.7.4 Vanadium

The remedial-investigation waste site characterization data include 277 total samples that were analyzed for vanadium. There was only 1 nondetect and 2 of 276 detects are greater than Hanford Site background value for vanadium. These remedial-investigation vanadium results (97.35 and 101 mg/kg) were only somewhat greater than the vanadium Hanford Site background value of 93.9 mg/kg.

In tissues there was a single outlier in a 216-U-10 U Pond mouse (30 percent larger than the next largest value) and exposure was less than the TRV. A weak statistical trend was observed between soil and lizard-tissue concentrations. In conclusion, deeper soil data for vanadium are not warranted based on the single elevated value in tissues and the low overall frequency of samples above background in waste-site characterization data.

2.2.7.5 Uranium-234

The remedial-investigation waste site characterization data include 55 total samples that were analyzed for U-234. Of those, 6 results were nondetect and 10 of 49 detects are greater than the Hanford Site background value (1.1 pCi/g). These results are summarized in Table 2-17.

In tissues there was a single outlier in a 216-U-10 U Pond lizard (about three times larger than the next largest value) and exposure was less than the BCG (Appendix B). In conclusion, deeper soil data for U-234 are not warranted, based on a single elevated value in tissues and the low overall frequency and magnitude of samples above background in waste-site characterization data.

2.2.7.6 Uranium-235

The RI waste site characterization data include 250 total samples that were analyzed for U-235; 229 results were nondetects and 4 of 21 detects are greater than the Hanford Site background value of 0.109 pCi/g. These results are summarized in Table 2-18.

In tissues, there were four outliers in lizards from the 216-B-63 Ditch and the 216-U-10 U Pond locations (about 50 percent larger than the next largest value) and exposure was less than the BCG (1 rad/d; Figure 2-4. See also Appendix B). There was a weak statistical correlation between mice and soil. In conclusion, deeper soil data for U-235 are not warranted, based on modestly elevated values in tissues and the low overall frequency and magnitude of samples above background in waste-site characterization data.

2.2.8 Recommendations

Based on the data assessment, further characterization of the BC Controlled Area sampled in Phase II is recommended for the zone of highest contamination (Zone A) because the SOF approached the dose limit of 0.1 rad/d to be considered in assessing effects on terrestrial biota. However, additional sampling of Phase I waste sites and the reference sites is needed to address uncertainties identified during data assessment:

- Additional collection of invertebrates at reference sites for cyanide analysis
- Additional collection of lizard and mammal tissues for total PCB analysis
- Additional collection of lizard and mammal tissues for Sr-90 analysis
- Repeat vegetative characterization at Phase I sites during an average-to-above-average spring rainfall
- No Tier 2 measures are planned for any receptors.

2.3 SUPPLEMENTAL WASTE SITE SAMPLING STUDY DESIGN RESULTING FROM DATA ASSESSMENT

Because these Phase III studies are a logical continuation of Phase I and Phase II investigations, the conceptual model, risk questions, assessment endpoints, and measures developed in Phase I (WMP-20570) and Phase II (WMP-25493) are applicable to these supplemental data-collection plans in Phase III.

2.3.1 Cyanide in Invertebrates

Cyanide was identified for further investigation in the assessment of Phase I and Phase II data. Cyanide was not detected in soil data collected for Phase I and Phase II of the Central Plateau EcoDQO activity and has been detected infrequently in remedial-investigation soil samples (WMP-20570, Appendix D; overall detection rate of 2 percent). Additional soil samples for cyanide analysis are not warranted, given the low detection frequency in soils. Cyanide was, however, regularly detected in biotic tissues (invertebrates, mice, and lizards) from waste sites and from the Phase I reference site, and consumption of cyanide-containing invertebrates was shown to pose a potential risk to insectivorous birds (killdeer) through exposure modeling. The data assessment was structured to assess whether a receptor's ingestion of a contaminant exceeded a toxicity threshold; if so, population studies for potentially affected groups (in this case birds and lizards) would be considered.

To better understand the magnitude and general distribution of cyanide detections in tissues, additional invertebrates will be collected and analyzed for cyanide. Fifteen locations will be sampled, including the two Phase I and Phase II reference sites, the six Phase I waste sites, and seven reference sites of the 100 Area and 300 Area component of the RCBRA. Invertebrates from each location will be divided into three subsamples for analysis. Three replicate invertebrate measurements per investigation area provide the minimum number to determine differences in concentrations between investigation areas. The number of biota samples is sufficient for calculating the mean and standard deviation.

The analytical performance requirements for the additional reference sites cyanide characterization in Phase III are discussed in Section 2.3.5.

2.3.2 Polychlorinated Biphenyls in Vertebrate Tissues

Sampling of total PCBs in biota will address uncertainty in the nature and extent of PCBs in animal tissues. Across Phase I investigation areas, PCBs were detected in soil or mice or lizards. PCBs were detected only in soil from the 2607-E6 Septic Tank and Tile Field site, but were not detected in tissues collected from this site. PCBs were detected in two lizard tissue samples from the Phase I reference site; PCBs also were detected in two mammal tissue samples (for three detections total in mammals tissue; one PCB detect was a duplicate sample of the same animal) at another site (Figure 2-5). Thus, PCB detections were not consistent within samples collected from an investigation area.

The Phase I samples were analyzed for PCBs using the Aroclor method, and only two of eight PCB Aroclor mixtures were detected: Aroclor-1254 and Aroclor-1260. This is consistent with the Aroclors routinely observed in waste samples from Hanford Site waste sites (WMP-20570, Appendix D). To address these uncertainties regarding the detection of PCBs, lizards and mice at four Phase I investigation areas will be sampled. Tissue samples also will be collected at four nonwaste locations in the vicinity of roads that may have been sprayed with PCB oils as a dust-suppression measure to evaluate those areas as potential sources for PCBs. Consensus on these locations was reached in consultation with a representative of the Hanford Natural Resource Trustee Council (D&D-29483). Notably, the sampling frequency used in the sampling design is twice what was initially determined in that consultation in order to increase the significance of the sample population.

The number of biota samples is based on the availability of these organisms for sampling and the minimum number of animals or replicates needed for making statistical inferences. Six lizards or mammals are targeted, because it is believed that this is a reasonable number to collect from an investigation area with six values providing enough information to construct a box plot and also provide some statistical power for detecting differences between sites.

An issue raised during the DQO Workshop is that stakeholders are concerned that weathering of the PCBs might change the pattern used for identification of each Aroclor, thus creating false negatives. Additional analysis of the congeners (individual compounds) may prevent this occurrence. To provide additional information for risk assessment, it was agreed that any additional samples would be analyzed for PCB congeners, sometimes called total PCBs.

To determine the appropriate analytical methodology, two analytical methods were reviewed and the full list of 209 congeners were examined. The first step was to determine which of the methods would meet the necessary detection (reporting) limits needed for the risk assessment.

The two methods that are used for analysis of congeners are EPA Methods 8082 (gas chromatography [GC] from SW-846 with electron capture detection) and Method 1668A (high-resolution mass spectrometry). The detection limits needed were calculated to be 0.1 mg/kg in tissue or 100 µg/kg. The 0.1 mg/kg limit was based on back-calculating the concentration in prey necessary to exceed the WAC 173-340-900, Table 749-5 PCB mixtures TRV. Lists of detection limits were obtained from a laboratory performing analysis of tissue by both EPA methods and the GC method will provide sufficiently low detection limits to allow analysis to meet the PCB TRV from Table 749-5.

The next step is to discuss which of the 209 congeners to request for analysis. The EPA web site provides the basis for much of the information (http://www/epa/gov/toxteam/pcbid). In addition, Thal 2006, *Application of Database Technology for the Selection of PCB Congeners for Multipurpose Studies*, compiles the various lists of congeners based on various toxicity studies for ecological and human risk assessment.

Figure 2-6 provides the logic used to select which congeners to analyze and asks four questions:

1. Are the congeners dioxin-like?
   Dioxin-like congeners are thought to be more toxic based on their chemical structure. In order to be considered dioxin-like, the congener must meet the following structural criteria: planar with four or more chlorines positioned at both para positions and at least to meta positions.
2. Are the congeners recommended for analyses by the EPA Region 9 Biological Technical Assistance Group for use in ERAs?
   This includes congeners from the World Health Organizations or from the National Oceanographic and Atmospheric Administration National Status and Trends Program.
3. Are the congeners of the highest or second highest potential toxicity, frequency of occurrence, and relative abundance?
   Congeners recommended by McFarland and Clarke 1989, "Environmental Occurrence, Abundance and Potential Toxicity of PCB Congeners: Consideration for a Congener-Specific Analysis," as having the highest and second highest priority for potential environmental importance based on potential toxicity, frequency of occurrence

in environmental samples, and relative abundance in animal tissues were included for the next step in the evaluation.

4. Are the congeners present in Aroclors-1254 and -1260?
   The congeners that are representative of the highest weight percents and that uniquely identify these Aroclors were added. These Aroclors are detected in Hanford Site samples. Other Aroclors are not commonly found in Hanford Site samples.

After examination these lists add up to 45 congeners. Only two of these (BZ 199 and 209) are not typically analyzed by Method 8082 and these are not part of either the dioxin-like or the World Health Organization lists, thus 43 congeners will be examined in the tissue samples near the former security roads and from the Phase I investigation areas. Table 2-19 provides the list of congeners for analysis in the tissues. The analytical performance requirements for the 43 PCB congeners are discussed in Section 2.3.5.

2.3.3 Strontium-90 in Vertebrate Tissues

A goal of supplemental sampling is to more broadly evaluate the distribution of COPECs detected in biota samples. Results for Sr-90 are not sufficient for making inferences of risk and additional data collection is planned. Consequently, Sr-90 will be analyzed in lizards and mice at select sites targeted for Phase III vertebrate sampling. In addition to collecting data from waste sites, this effort will provide Sr-90 tissue results from reference sites and from non-waste-site areas to address the spatial extent of Sr-90 in the Hanford Site food web in nonoperational areas.

For Sr-90, additional analysis will be performed on mice and/or lizard tissues at the sites targeted for PCB tissue sampling. Lizards from the Phase I reference site, 216-B-63 Ditch, 216-B-3 (B Pond) and a non-waste-site area will be analyzed for Sr-90 in tissues. Mice from the Phase I reference site and from 216-B-63 Ditch also will be analyzed for Sr-90 in tissues. These sites were chosen to address potentially elevated initial Sr-90 results, reference site concerns, and spurious detections in mouse tissue; an assessment of the validity of initial lizard results cannot be made because there is not enough material remaining to reanalyze. The non-waste-site location was selected to address reference site concerns, and because this location is directly in the path of potential stack emissions. The analytical performance requirements for the supplemental Sr-90 analysis of vertebrate tissues are discussed in Section 2.3.5.

2.3.4 Vegetative Composition

Vegetation cover is planned to be resurveyed at Phase I investigation areas as part of the Phase III field activities, to supplement data gathered to assess relationships between plant composition and cover with other measures of environmental quality identified in the SAP (e.g., population/community health attributes of plants, invertebrates, lizards, small mammals, and birds). Surveys of Phase I waste sites occurred early in a dry year (2005), and the vegetation recorded may not be comprehensive of species present in an average-to-above-average rainfall year. Plant-species data gathered in 2007 should be collected during the spring (April-May), when conditions are favorable to visually observe and identify a nearly complete list of plant species there. This period was captured for Phase II sites during 2005, and the sites do not need to be resampled in 2006. In addition, shrub canopy-cover surveys will not be conducted during

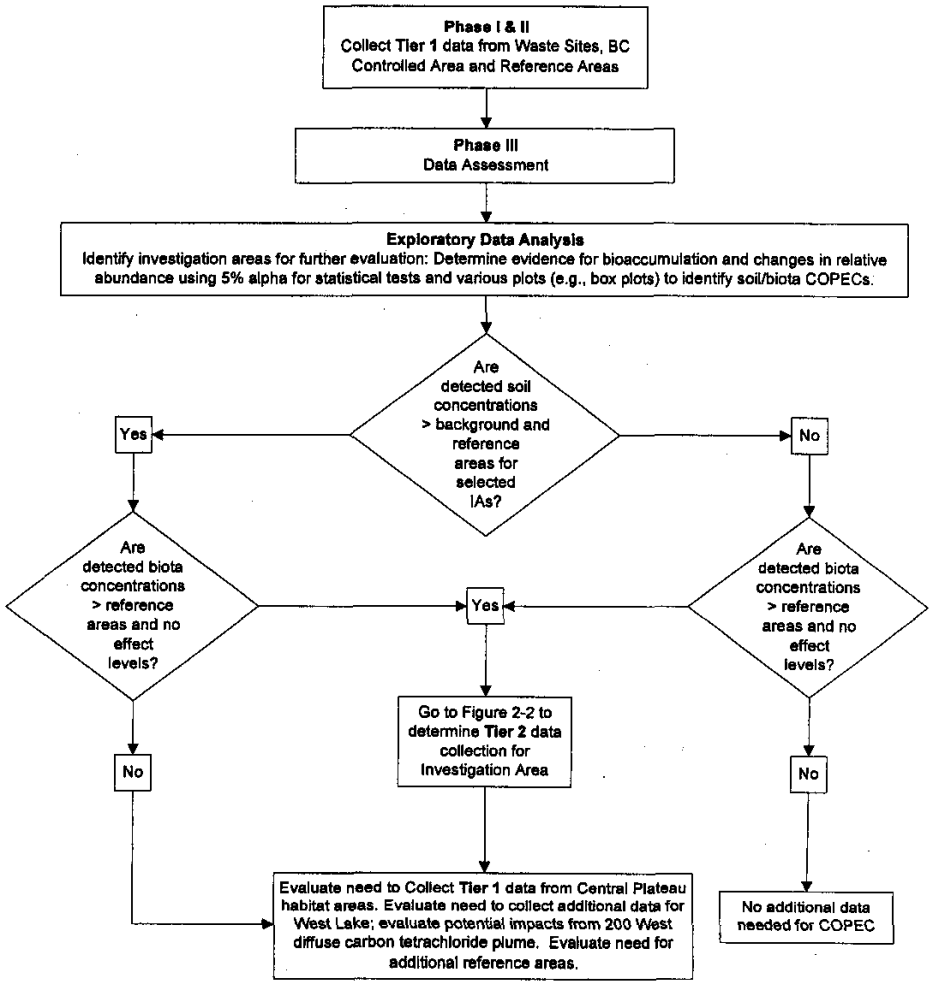
Phase III, because the results generated from 2005 are not expected to change substantially between two consecutive years.

To help address Hanford Natural Resource Trustee Council information needs, any abnormalities on animals handled during data collection will be noted. Phase III data collection will help address gaps in understanding the health status of Central Plateau biota.

2.3.5 Analytical Performance Requirements

The analytical performance requirements for the Phase III ecological characterization discussed in Sections 2.2.6, 2.2.7 and Sections 2.3.1 through 2.3.4 are provided in Tables 2-20 through 2-22.

Figure 2-1. Decision Logic for Phase III Data Quality Assessment to Support the Phased Sampling Approach and Tiered Data Collection for the Ecological Data Quality Objective Sampling and Analysis Plan.

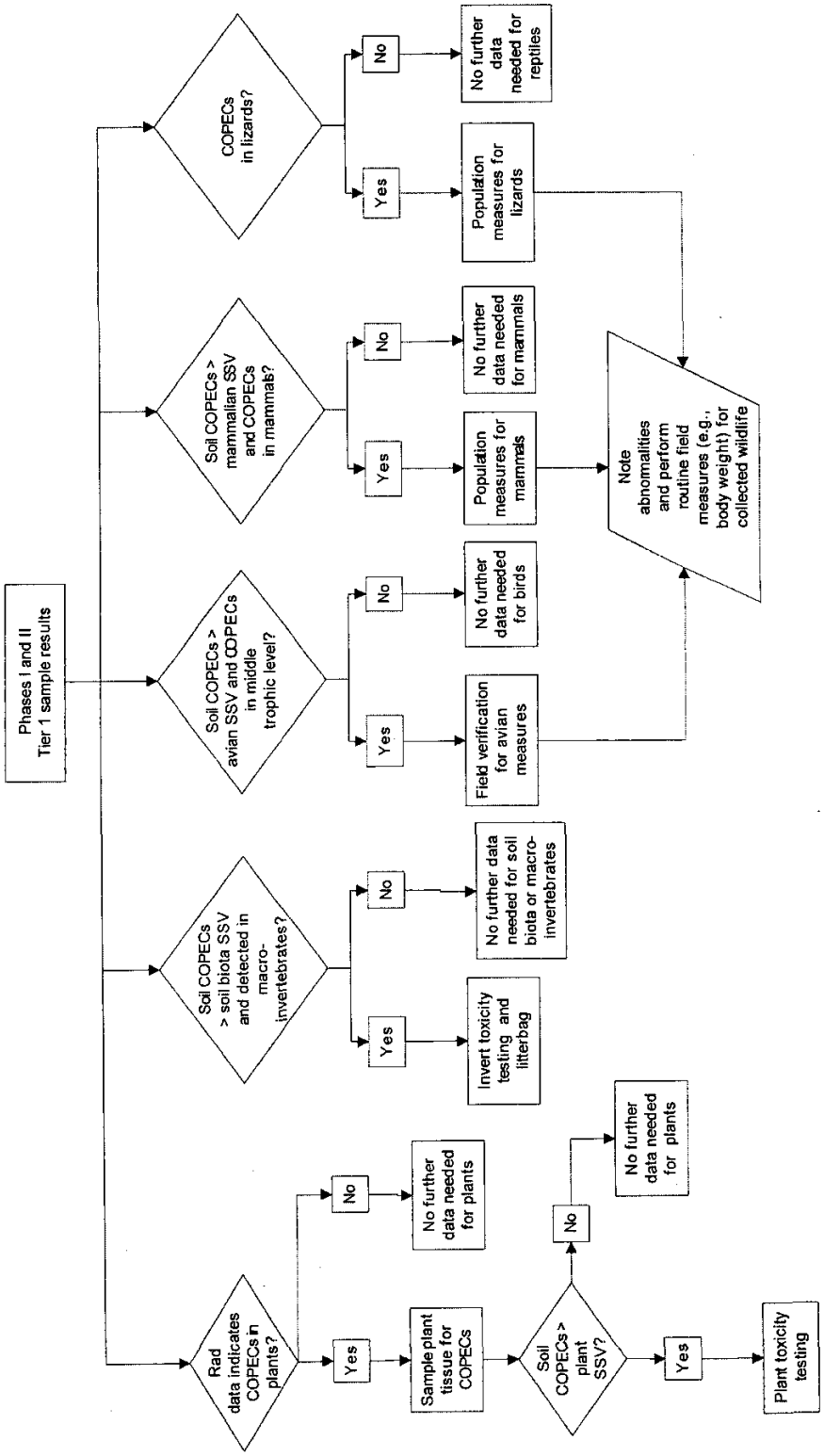


NOTE:
Tier 1 data include:
(A) Field radiological data on soil, ant mounds, burrows
(B) 0-0.5 ft soil samples for metals, rads, and organics
(C) Biota (invert., lizard, mammal) samples
(D) Note abnormalities in collected wildlife

Tier 2 data may include:
(A) Deeper soil sampling (>0.5 ft)
(B) Plant tissue analytical samples
(C) Population measures for mammals and lizards
(D) Field verification for middle trophic-level birds
(E) Litterbag studies and toxicity tests for plants/inverts
(F) Note abnormalities in collected wildlife

COPEC = contaminant of potential ecological concern
CP = Central Plateau
DQA = data quality assessment
IA = investigation area

Figure 2-2. Data Quality Assessment Logic for Determining Data Requirements for Specific Ecological Receptors.



COPEC = contaminant of potential ecological concern.

SSV = soil screening value.

Figure 2-3. Example Box Plot.

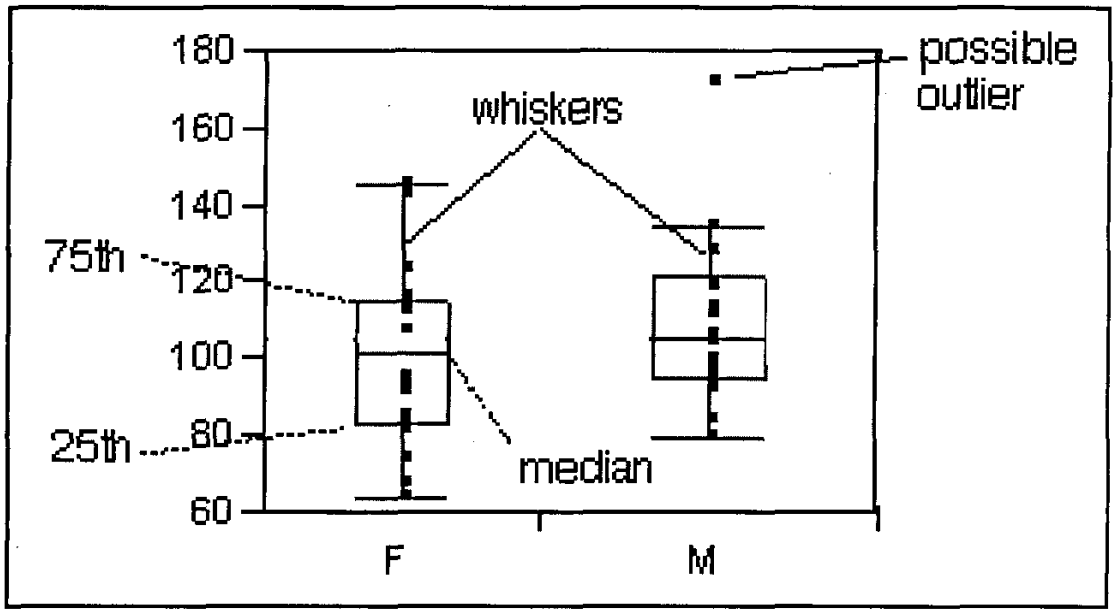
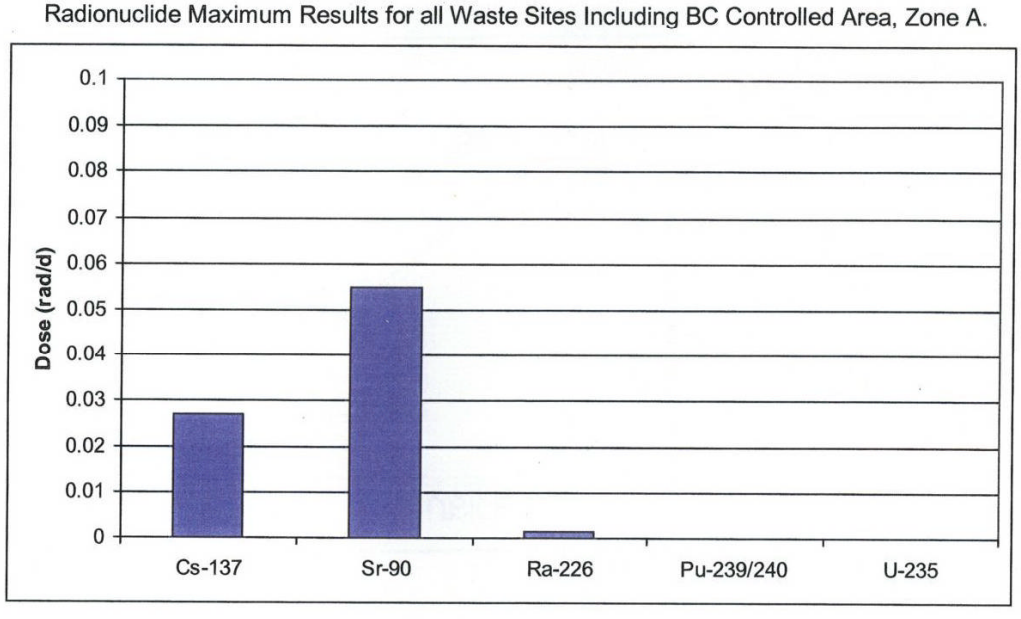


Figure 2-4. Dose from Radionuclide COPECs.



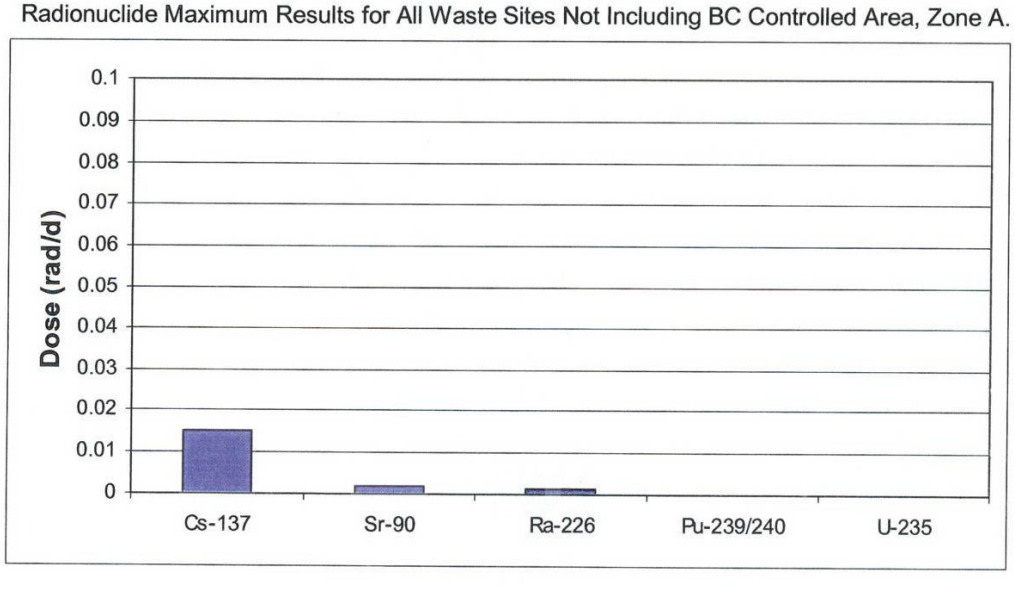


Figure 2-5. Polychlorinated Biphenyls (as Aroclors) Results for Phase I Waste-Site and Reference-Site Sampling.

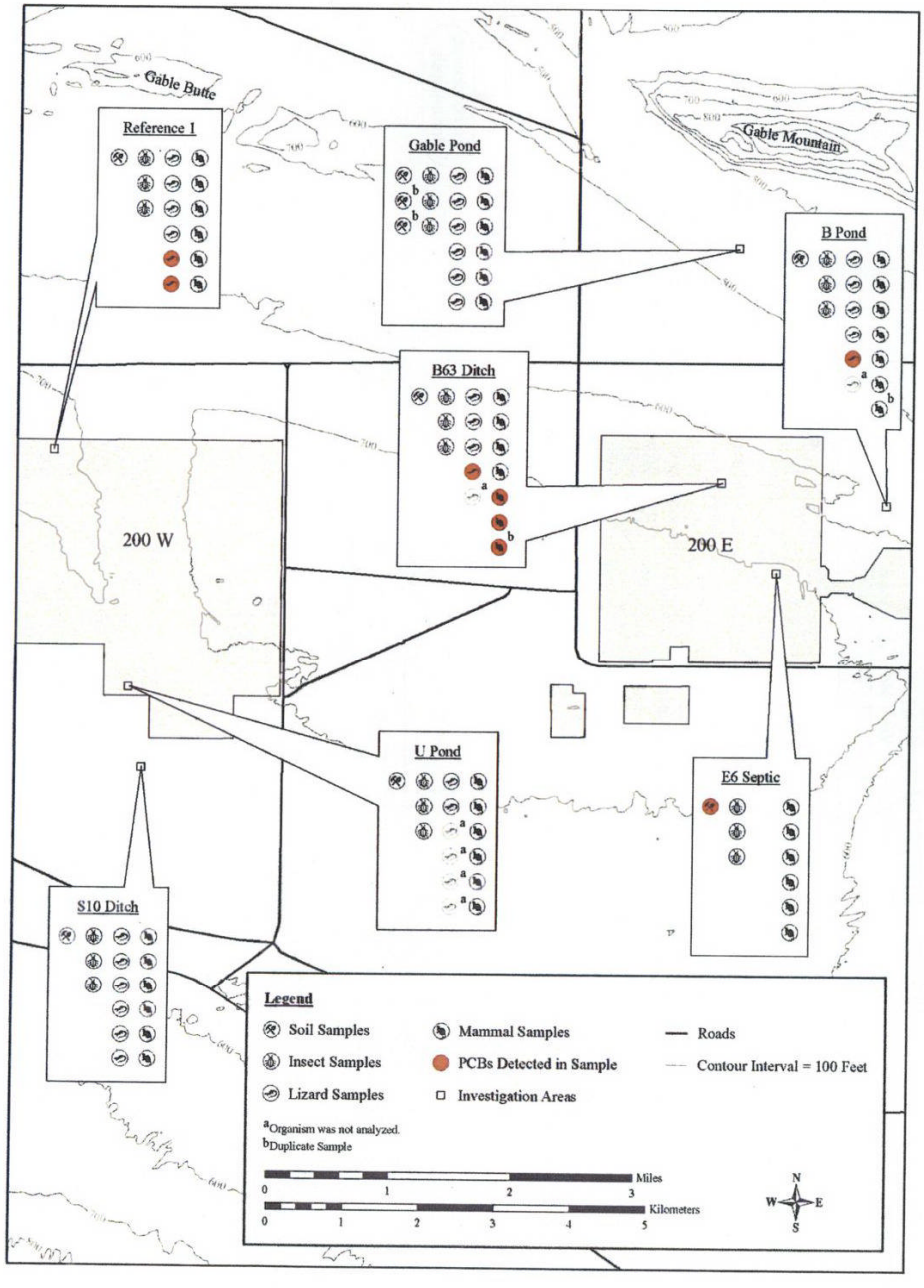


Figure 2-6. Congener Selection Logic Diagram.

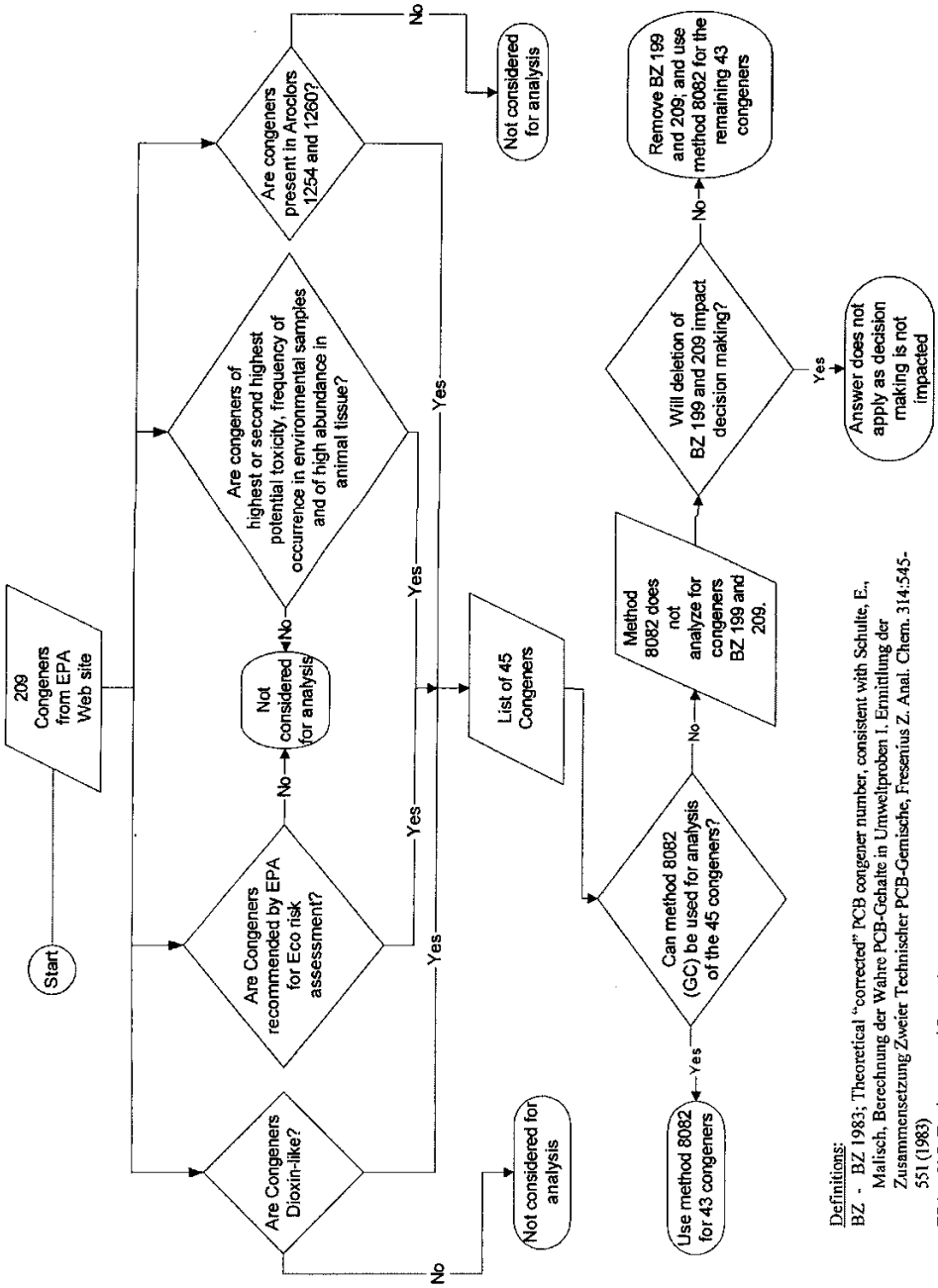


Table 2-1. List of *Hanford Environmental Information System* Database Samples Evaluated in the Data Assessment. (6 Pages)

Phase	Site Type	Site	Sample number	Sample Type	Notes
I	Waste	Road	B1DV27	Asphalt	Aroclors[a] only
I	Waste	Road	B1DV28	Asphalt	Aroclors only
I	Waste	Road	B1DV29	Asphalt	Aroclors only
I	Waste	Road	B1DV30	Asphalt	Aroclors only
I	Waste	Road	B1DV32	Asphalt	Aroclors only
I	Waste	Road	B1DV31	Asphalt	Aroclors only
I	Waste	216-B-63	B1DFR8	Soil	--
I	Waste	216-S-10D	B1DFT2	Soil	--
I	Waste	2607-E6	B1DFT0	Soil	--
I	Waste	B-POND	B1DFR6	Soil	--
I	Waste	GM-POND	B1DFR5	Soil	--
I	Waste	GM-POND	B1DFT3	Soil	--
I	Waste	GM-POND	B1DNP7	Soil	--
I	Reference	REF-1	B1DFT1	Soil	--
I	Waste	U-POND	B1DFR9	Soil	--
I	Waste	216-B-63	B1CV55	Invertebrates	--
I	Waste	216-B-63	B1CV56	Invertebrates	--
I	Waste	216-B-63	B1CV57	Invertebrates	--
I	Waste	216-B-63	B1CV82	Lizards	--
I	Waste	216-B-63	B1CV83	Lizards	--
I	Waste	216-B-63	B1CV85	Lizards	--
I	Waste	216-B-63	B1CV86	Lizards	--
I	Waste	216-B-63	B1CV87	Lizards	--
I	Waste	216-B-63	B1CVD8	Mice	--
I	Waste	216-B-63	B1CVD1	Mice	--
I	Waste	216-B-63	B1CVD2	Mice	--
I	Waste	216-B-63	B1CVD3	Mice	--
I	Waste	216-B-63	B1CVD4	Mice	--
I	Waste	216-B-63	B1CVD7	Mice	--
I	Waste	216-B-63	B1CVH3	Mice	Radium analysis of B1F2V6
I	Waste	216-B-63	B1F2V6	Mice	Duplicate of B1CVD4
I	Waste	216-B-63	B1F2V7	Mice	Pesticide analysis of B1CVD4
I	Waste	216-S-10D	B1CTY2	Invertebrates	--
I	Waste	216-S-10D	B1CTY3	Invertebrates	--
I	Waste	216-S-10D	B1CTY4	Invertebrates	--
I	Waste	216-S-10D	B1CV59	Lizards	--

Table 2-1. List of *Hanford Environmental Information System* Database Samples Evaluated in the Data Assessment. (6 Pages)

Phase	Site Type	Site	Sample number	Sample Type	Notes
I	Waste	216-S-10D	B1CV60	Lizards	--
I	Waste	216-S-10D	B1CV70	Lizards	--
I	Waste	216-S-10D	B1CV71	Lizards	--
I	Waste	216-S-10D	B1CV72	Lizards	--
I	Waste	216-S-10D	B1CV73	Lizards	--
I	Waste	216-S-10D	B1CVF6	Mice	--
I	Waste	216-S-10D	B1CVF7	Mice	--
I	Waste	216-S-10D	B1CVF8	Mice	--
I	Waste	216-S-10D	B1CVF9	Mice	--
I	Waste	216-S-10D	B1CVH0	Mice	--
I	Waste	216-S-10D	B1CVH1	Mice	--
I	Waste	2607-E6	B1CV52	Invertebrates	--
I	Waste	2607-E6	B1CV53	Invertebrates	--
I	Waste	2607-E6	B1CV54	Invertebrates	--
I	Waste	2607-E6	B1CVB2	Mice	--
I	Waste	2607-E6	B1CVB4	Mice	--
I	Waste	2607-E6	B1CVB0	Mice	--
I	Waste	2607-E6	B1CVB1	Mice	--
I	Waste	2607-E6	B1CVB3	Mice	--
I	Waste	2607-E6	B1CVB5	Mice	--
I	Waste	B-POND	B1CV46	Invertebrates	--
I	Waste	B-POND	B1CV47	Invertebrates	--
I	Waste	B-POND	B1CV48	Invertebrates	--
I	Waste	B-POND	B1CV58	Lizards	--
I	Waste	B-POND	B1CV66	Lizards	--
I	Waste	B-POND	B1CV76	Lizards	--
I	Waste	B-POND	B1CV80	Lizards	--
I	Waste	B-POND	B1CV81	Lizards	--
I	Waste	B-POND	B1CV84	Lizards	--
I	Waste	B-POND	B1CVF0	Mice	--
I	Waste	B-POND	B1CVF1	Mice	--
I	Waste	B-POND	B1CVF2	Mice	--
I	Waste	B-POND	B1CVF3	Mice	--
I	Waste	B-POND	B1CVF4	Mice	--
I	Waste	B-POND	B1CVF5	Mice	--
I	Waste	B-POND	B1CVH2	Mice	Radium analysis of B1F2V1

Table 2-1. List of *Hanford Environmental Information System* Database Samples Evaluated in the Data Assessment. (6 Pages)

Phase	Site Type	Site	Sample number	Sample Type	Notes
I	Waste	B-POND	B1F2V1	Mice	Duplicate
I	Waste	B-POND	B1F2V2	Mice	Pesticide analysis of B1CVF0
I	Waste	GM-POND	B1CTY5	Invertebrates	--
I	Waste	GM-POND	B1CTY6	Invertebrates	--
I	Waste	GM-POND	B1CTY7	Invertebrates	--
I	Waste	GM-POND	B1CV61	Lizards	--
I	Waste	GM-POND	B1CV65	Lizards	--
I	Waste	GM-POND	B1CV74	Lizards	--
I	Waste	GM-POND	B1CV75	Lizards	--
I	Waste	GM-POND	B1CV78	Lizards	--
I	Waste	GM-POND	B1CV79	Lizards	--
I	Waste	GM-POND	B1CVC3	Mice	--
I	Waste	GM-POND	B1CVB9	Mice	--
I	Waste	GM-POND	B1CVC0	Mice	--
I	Waste	GM-POND	B1CVC1	Mice	--
I	Waste	GM-POND	B1CVC2	Mice	--
I	Waste	GM-POND	B1CVC4	Mice	--
I	Reference	REF-1	B1CTY8	Invertebrates	--
I	Reference	REF-1	B1CV44	Invertebrates	--
I	Reference	REF-1	B1CV45	Invertebrates	--
I	Reference	REF-1	B1CV62	Lizards	--
I	Reference	REF-1	B1CV63	Lizards	--
I	Reference	REF-1	B1CV64	Lizards	--
I	Reference	REF-1	B1CV67	Lizards	--
I	Reference	REF-1	B1CV68	Lizards	--
I	Reference	REF-1	B1CV77	Lizards	--
I	Reference	REF-1	B1CVC7	Mice	--
I	Reference	REF-1	B1CVC5	Mice	--
I	Reference	REF-1	B1CVC6	Mice	--
I	Reference	REF-1	B1CVC8	Mice	--
I	Reference	REF-1	B1CVC9	Mice	--
I	Reference	REF-1	B1CVD0	Mice	--
I	Waste	U-POND	B1CV69	Lizards	--
I	Waste	U-POND	B1CV88	Lizards	--
I	Waste	U-POND	B1CV89	Lizards	--
I	Waste	U-POND	B1CV90	Lizards	--

Table 2-1. List of *Hanford Environmental Information System* Database Samples Evaluated in the Data Assessment. (6 Pages)

Phase	Site Type	Site	Sample number	Sample Type	Notes
I	Waste	U-POND	B1CV91	Lizards	--
I	Waste	U-POND	B1CV92	Lizards	--
I	Waste	U-POND	B1CVB6	Mice	--
I	Waste	U-POND	B1CVB7	Mice	--
I	Waste	U-POND	B1CVB8	Mice	--
I	Waste	U-POND	B1CVD5	Mice	--
I	Waste	U-POND	B1CVD6	Mice	--
I	Waste	U-POND	B1CVD9	Mice	--
I	Waste	U-POND	B1CV49	Invertebrates	--
I	Waste	U-POND	B1CV50	Invertebrates	--
I	Waste	U-POND	B1CV51	Invertebrates	--
II	Waste	BCC-HIGH	B1DY26	Soil	--
II	Waste	BCC-LOW	B1DY30	Soil	--
II	Waste	BCC-MED	B1DY27	Soil	--
II	Waste	BCC-MED	B1DY28	Soil	--
II	Waste	BCC-MED	B1DY29	Soil	--
II	Reference	REF-2	B1DY24	Soil	--
II	Waste	BCC-HIGH	B1D9J5	Invertebrates	--
II	Waste	BCC-HIGH	B1D9J6	Invertebrates	--
II	Waste	BCC-HIGH	B1D9J7	Invertebrates	--
II	Waste	BCC-HIGH	B1D9F6	Lizards	--
II	Waste	BCC-HIGH	B1D9F7	Lizards	--
II	Waste	BCC-HIGH	B1D9H0	Lizards	--
II	Waste	BCC-HIGH	B1D9H3	Lizards	--
II	Waste	BCC-HIGH	B1D9H4	Lizards	--
II	Waste	BCC-HIGH	B1D9H5	Lizards	--
II	Waste	BCC-HIGH	B1D9H6	Lizards	--
II	Waste	BCC-HIGH	B1D9D2	Mice	--
II	Waste	BCC-HIGH	B1D9D5	Mice	--
II	Waste	BCC-HIGH	B1D9D6	Mice	--
II	Waste	BCC-HIGH	B1D9D8	Mice	--
II	Waste	BCC-HIGH	B1D9D9	Mice	--
II	Waste	BCC-HIGH	B1D9F0	Mice	--
II	Waste	BCC-HIGH	B1F2V3	Mice	Duplicate of B1D9D6
II	Waste	BCC-HIGH	B1F2V4	Mice	Duplicate of B1D9F0
II	Waste	BCC-LOW	B1D9J8	Invertebrates	--

Table 2-1. List of *Hanford Environmental Information System* Database Samples Evaluated in the Data Assessment. (6 Pages)

Phase	Site Type	Site	Sample number	Sample Type	Notes
II	Waste	BCC-LOW	B1D9J9	Invertebrates	--
II	Waste	BCC-LOW	B1DYH7	Invertebrates	--
II	Waste	BCC-LOW	B1D9H1	Lizards	--
II	Waste	BCC-LOW	B1D9H7	Lizards	--
II	Waste	BCC-LOW	B1D9C2	Mice	--
II	Waste	BCC-LOW	B1D9C9	Mice	--
II	Waste	BCC-LOW	B1D9D0	Mice	--
II	Waste	BCC-LOW	B1D9D1	Mice	--
II	Waste	BCC-LOW	B1D9D3	Mice	--
II	Waste	BCC-LOW	B1D9D4	Mice	--
II	Waste	BCC-MED	B1D9H9	Invertebrates	--
II	Waste	BCC-MED	B1D9J0	Invertebrates	--
II	Waste	BCC-MED	B1D9J1	Invertebrates	--
II	Waste	BCC-MED	B1D9J2	Invertebrates	--
II	Waste	BCC-MED	B1D9J3	Invertebrates	--
II	Waste	BCC-MED	B1D9J4	Invertebrates	--
II	Waste	BCC-MED	B1D9H2	Lizards	--
II	Waste	BCC-MED	B1D9H8	Lizards	--
II	Waste	BCC-MED	B1D9C3	Mice	--
II	Waste	BCC-MED	B1D9C4	Mice	--
II	Waste	BCC-MED	B1D9C5	Mice	--
II	Waste	BCC-MED	B1D9C6	Mice	--
II	Waste	BCC-MED	B1D9C7	Mice	--
II	Waste	BCC-MED	B1D9C8	Mice	--
II	Reference	REF-2	B1DYH8	Invertebrates	--
II	Reference	REF-2	B1DYH9	Invertebrates	--
II	Reference	REF-2	B1DYJ0	Invertebrates	--
II	Reference	REF-2	B1D9F8	Lizards	--
II	Reference	REF-2	B1D9F9	Lizards	--
II	Reference	REF-2	B1D9D7	Mice	--
II	Reference	REF-2	B1D9F1	Mice	--
II	Reference	REF-2	B1D9F2	Mice	--
II	Reference	REF-2	B1D9F3	Mice	--
II	Reference	REF-2	B1D9F4	Mice	--
II	Reference	REF-2	B1D9F5	Mice	--
MIS PA	Reference	Pit 23	J10DN0	Soil	--

Table 2-1. List of *Hanford Environmental Information System* Database Samples Evaluated in the Data Assessment. (6 Pages)

Phase	Site Type	Site	Sample number	Sample Type	Notes
MIS PA	Reference	Pit 23	J10DN1	Soil	--
MIS PA	Reference	Pit 23	J10DN2	Soil	--
MIS PA	Reference	Pit 23	J10DN3	Soil	--
MIS PA	Reference	Pit 23	J10DN4	Soil	--
MIS PA	Reference	REF-2	J10DR5	Soil	--
MIS PA	Reference	REF-2	J10DR6	Soil	--
MIS PA	Reference	REF-2	J10DR7	Soil	--
MIS PA	Reference	REF-2	J10DR8	Soil	--
MIS PA	Reference	REF-2	J10DR9	Soil	--

From DOE/RL-93-24-4, *Hanford Environmental Information System (HEIS)*.
[a] Aroclor is an expired trademark.
MIS PA = multi-increment sampling performance-assessment samples from the 100 Area and 300 Area River Corridor Baseline Risk Assessment.

Table 2-2. Summary of Animals Captured and Relative Abundance Information.

Site	Group	Phase	Invertebrates			Lizards			Mammals		
			Trap Nights	Total Mass Inverts (g)	Mass per Trap-Night	Trap Nights	Total Number Captured	Number per Trap-Night	Trap Nights	Total Number Captured	Number per Trap-Night
GMP	Waste	I	63	241	3.83	49	6	0.12	8	6	0.75
B-Pond	Waste	I	70	161	2.3	70	6	0.09	7	6	0.86
B-63	Waste	I	121	181	1.5	121	5	0.04	2	6	3
E-6	Waste	I	140	65	0.46	140	0	0	6	6	1
U-Pond	Waste	I	125	121	0.97	125	6	0.05	16	6	0.38
S-10	Waste	I	61	187	3.07	19	6	0.32	14	6	0.43
Ref. Site #1	Reference	I	61	164	2.69	26	6	0.23	7	6	0.86
BC-Low	Waste	II	90	232	2.58	103	2	0.02	7	6	0.86
BC-Medium	Waste	II	90	577	6.41	103	2	0.02	2	6	3
BC-High	Waste	II	90	219	2.43	94	7	0.07	12	6	0.5
Ref. Site #2	Reference	II	96	164	1.71	103	2	0.02	14	6	0.43

Table 2-3. Summary of Plant Cover and Diversity Information.

Site	Group	Phase	Litter (%)	Bare Ground (%)	Cryptogam (%)	Sum of plant cover (%)	Total plant species	Diversity (H)*
GMP	Waste	I	18.12	69.32	2.64	20.12	5	0.33
B-Pond	Waste	I	18.08	72.08	3.56	13.24	3	0.17
B-63	Waste	I	42.36	39.48	1.8	26	3	0.62
E-6	Waste	I	55.12	18.6	14.6	25.48	6	0.68
U-Pond	Waste	I	14.28	82.48	0	3.56	2	0.18
S-10	Waste	I	19.4	63	0.08	25.6	5	1.33
Ref. Site #1	Reference	I	31.64	46.4	0	36.36	12	1.27
BC-Low	Waste	II	41.52	32.8	18.48	37.08	12	1.3
BC-Medium	Waste	II	40.56	36.8	13.32	33.72	15	1.59
BC-High	Waste	II	28.8	21	16.72	47	9	1.25
Ref. Site #2	Reference	II	43.56	42.24	6.48	43.72	17	1.35

* The Shannon diversity index (H) to characterize species diversity in a community. Shannon's index accounts for both abundance and evenness of the species present. All calculations are based the following equation:

$$H = -\sum_{j=1}^{n} p_i \ln p_i, \text{ where}$$

H = Shannon diversity index.
p_i = percent cover of species i.
$\ln p_i$ = natural logarithm of species i percent cover.

Table 2-4. Statistical Comparison of Reference Site to Waste Site Soil Contaminant Concentrations. (2 Pages)

Contaminant	Reference sites		Waste sites		(Mean-Mean0)/ Std0	Z	Prob>|Z|
	Count	Score Mean	Count	Score Mean			
Antimony	11	6.1	8	15.4	-3.51	3.51	0.00
Arsenic	11	7.5	8	13.5	-2.28	2.28	0.02
Barium	11	6.0	8	15.5	-3.60	3.60	0.00
Boron	11	10.4	8	9.4	0.33	-0.33	0.74
Cadmium	11	6.1	8	15.4	-3.52	3.52	0.00
Chromium	11	6.0	8	15.5	-3.60	3.60	0.00
Hexavalent Chromium	11	11.1	8	8.5	0.95	-0.95	0.34
Copper	11	8.3	8	12.4	-1.53	1.53	0.13
Cyanide	1	5.0	8	5.0	NA	NA	NA
Lead	11	7.6	8	13.3	-2.11	2.11	0.04
Molybdenum	11	6.4	8	15.0	-3.26	3.26	0.00
Nickel	11	6.4	8	15.0	-3.26	3.26	0.00

Table 2-4. Statistical Comparison of Reference Site to Waste Site Soil Contaminant Concentrations. (2 Pages)

Contaminant	Reference sites		Waste sites		(Mean-Mean0)/ Std0	Z	Prob>|Z|
	Count	Score Mean	Count	Score Mean			
Selenium	11	6.2	8	15.2	-3.39	3.39	0.00
Silver	11	8.4	8	12.3	-1.46	1.46	0.14
Thallium	11	13.4	8	5.4	3.02	-3.02	0.00
Tin	11	6.5	8	14.9	-3.18	3.18	0.00
Uranium	11	13.5	8	5.3	3.11	-3.11	0.00
Vanadium	11	10.4	8	9.5	0.29	-0.29	0.77
Zinc	11	6.9	8	14.3	-2.77	2.77	0.01
Aroclor-1254*	1	6.0	8	4.9	0.20	0.20	0.84
Aroclor-1260	1	6.0	8	4.9	0.20	0.20	0.84
Americium-241	1	4.5	8	5.1	0.00	0.00	1.00
Americium-241-GS	2	7.8	13	8.0	0.00	0.00	1.00
Cesium-137	12	11.2	13	14.7	-1.17	-1.17	0.24
Potassium-40	10	5.5	1	11.0	-1.42	1.42	0.15
Radium-226-GS	11	7.3	8	13.8	-2.44	2.44	0.01
Radium-228-GS	11	7.3	8	13.8	-2.44	2.44	0.01
Plutonium-238	11	10.0	8	10.0	0.04	0.04	0.97
Plutonium-239/240	11	8.8	8	11.7	-1.09	1.09	0.28
Total beta radiostrontium	12	10.7	13	15.2	-1.50	-1.50	0.13
Uranium-233/234	11	10.8	8	8.9	0.66	-0.66	0.51
Uranium-235	11	9.4	8	10.9	-0.55	0.55	0.59
Uranium-238	11	8.9	8	11.6	-0.99	0.99	0.32

*Aroclor is an expired trademark.
GS = analyte measured by gamma spectrometry.
NA = not applicable.
Z = z-score, which indicates how far and in what direction, an item deviates from its distribution's mean, expressed in units of its standard deviation.

Table 2-5. Statistical Comparison of Reference Site to Waste Site Invertebrate Contaminant Concentrations. (2 Pages)

Contaminant	Reference Site		Waste Site		(Mean-Mean0)/ Std0	Z	Prob>|Z|
	Count	Score Mean	Count	Score Mean			
Antimony	3	5.3	18	11.9	-1.66	-1.66	0.10
Arsenic	3	7.0	18	11.7	-1.16	-1.16	0.25
Barium	3	19.0	18	9.7	2.36	2.36	0.02
Boron	3	19.0	18	9.7	2.36	2.36	0.02
Cadmium	3	13.0	18	10.7	0.55	0.55	0.58
Chromium	3	12.3	18	10.8	0.35	0.35	0.72

Table 2-5. Statistical Comparison of Reference Site to Waste Site Invertebrate Contaminant Concentrations. (2 Pages)

Contaminant	Reference Site		Waste Site		(Mean-Mean0)/ Std0	Z	Prob>|Z|
	Count	Score Mean	Count	Score Mean			
Copper	3	14.7	18	10.4	1.06	1.06	0.29
Cyanide	3	2.5	18	12.4	-2.52	-2.52	0.01
Lead	3	10.7	18	11.1	-0.05	-0.05	0.96
Molybdenum	3	2.5	18	12.4	-2.51	-2.51	0.01
Nickel	3	16.7	18	10.1	1.66	1.66	0.10
Selenium	3	4.0	18	12.2	-2.06	-2.06	0.04
Silver	3	8.2	18	11.5	-0.81	-0.81	0.42
Thallium	3	4.0	18	12.2	-2.06	-2.06	0.04
Tin	3	20.0	18	9.5	2.66	2.66	0.01
Uranium	3	5.8	18	11.9	-1.51	-1.51	0.13
Vanadium	3	14.7	18	10.4	1.06	1.06	0.29
Zinc	3	19.0	18	9.7	2.36	2.36	0.02
Aroclor-1254*	3	11.5	18	10.9	0.10	0.10	0.92
Aroclor-1260	3	11.5	18	10.9	0.10	0.10	0.92
Actinium-228	3	16.0	18	10.2	1.46	1.46	0.15
Americium-241-GS	6	18.2	30	18.6	-0.06	-0.06	0.95
Bismuth-212	3	16.3	18	10.1	1.56	1.56	0.12
Bismuth-214	3	18.0	18	9.8	2.06	2.06	0.04
Cesium-137	6	13.7	30	19.5	-1.21	-1.21	0.23
Lead-212	3	13.3	18	10.6	0.65	0.65	0.51
Lead-214	3	16.0	18	10.2	1.46	1.46	0.15
Potassium-40	3	16.7	18	10.1	1.66	1.66	0.10
Radium-226-GS	3	18.0	18	9.8	2.06	2.06	0.04
Radium-228-GS	3	17.0	18	10.0	1.76	1.76	0.08
Thallium-208	3	6.7	18	11.7	-1.26	-1.26	0.21
Thorium-234	3	12.7	18	10.7	0.45	0.45	0.65
Plutonium-238	3	16.2	18	10.1	1.52	1.52	0.13
Plutonium-239/240	3	7.2	18	11.6	-1.12	-1.12	0.26
Total beta radiostrontium	6	9.3	30	20.3	-2.31	-2.31	0.02
Uranium-233/234	3	16.2	18	10.1	1.51	1.51	0.13
Uranium-235	3	9.8	18	11.2	-0.30	-0.30	0.76
Uranium-238	3	11.2	18	11.0	0.00	0.00	1.00

*Aroclor is an expired trademark.
GS = analyte measured by gamma spectrometry.
Z = z-score, which indicates how far and in what direction, an item deviates from its distribution's mean, expressed in units of its standard deviation.

Table 2-6. Statistical Comparison of Reference Site to Waste Site Lizard Contaminant Concentrations.

Analyte	Reference sites		Waste sites		(Mean-Mean0)/ Std0	Z	Prob>|Z|
	Count	Score Mean	Count	Score Mean			
Antimony	3	15.3	17	9.6	1.48	1.48	0.14
Arsenic	3	15.7	17	9.6	1.59	1.59	0.11
Barium	3	15.7	17	9.6	1.59	1.59	0.11
Boron	3	12.7	17	10.1	0.64	0.64	0.53
Cadmium	3	16.0	17	9.5	1.70	1.70	0.09
Chromium	3	16.3	17	9.5	1.80	1.80	0.07
Copper	3	10.3	17	10.5	0.00	0.00	1.00
Cyanide	3	2.0	4	5.5	-1.95	-1.94	0.05
Lead	3	7.7	17	11.0	-0.85	-0.85	0.40
Molybdenum	3	14.7	17	9.8	1.27	1.27	0.20
Nickel	3	13.7	17	9.9	0.95	0.95	0.34
Selenium	3	15.7	17	9.6	1.59	1.59	0.11
Silver	3	16.0	17	9.5	1.70	1.70	0.09
Thallium	3	12.3	17	10.2	0.53	0.53	0.60
Tin	3	17.7	17	9.2	2.22	2.22	0.03
Uranium	3	16.0	17	9.5	1.70	1.70	0.09
Vanadium	3	10.0	17	10.6	-0.11	-0.11	0.92
Zinc	3	8.0	17	10.9	-0.74	-0.74	0.46
Aroclor-1254*	6	15.5	23	14.9	0.14	0.14	0.89
Aroclor-1260	6	14.3	23	15.2	-0.19	-0.19	0.85
Americium-241	6	16.7	29	18.3	-0.33	-0.33	0.74
Americium-241-GS	8	23.1	40	24.8	-0.29	-0.29	0.77
Cesium-137	8	28.8	40	23.7	0.93	0.93	0.35
Radium-226-GS	6	16.7	29	18.3	-0.33	-0.33	0.74
Radium-228-GS	6	19.8	29	17.6	0.46	0.46	0.65
Plutonium-238	6	17.0	29	18.2	-0.24	-0.24	0.81
Plutonium-239/240	6	20.9	29	17.4	0.75	0.74	0.46
Total beta radiostrontium	8	28.5	40	23.7	0.87	0.87	0.38
Uranium-233/234	6	24.5	29	16.7	1.69	1.69	0.09
Uranium-235	6	21.7	29	17.2	0.94	0.94	0.35
Uranium-238	6	21.5	29	17.3	0.90	0.90	0.37

*Aroclor is an expired trademark.

GS = analyte measured by gamma spectrometry.
Z = z-score, which indicates how far and in what direction, an item deviates from its distribution's mean, expressed in units of its standard deviation.

Table 2-7. Statistical Comparison of Reference Site to Waste Site Small-Mammal Contaminant Concentrations.

Analyte	Reference Sites		Waste Sites		(Mean-Mean0)/ Std0	Z	Prob>|Z|
	Count	Score Mean	Count	Score Mean			
Antimony	6	19.3	38	23.0	-0.63	-0.63	0.53
Arsenic	6	16.8	38	23.4	-1.16	-1.16	0.24
Barium	6	14.2	38	23.8	-1.69	-1.69	0.09
Boron	6	14.3	38	23.8	-1.68	-1.68	0.09
Cadmium	6	22.5	38	22.5	0.02	0.02	0.99
Chromium	6	15.5	38	23.6	-1.42	-1.42	0.16
Copper	6	17.3	38	23.3	-1.06	-1.06	0.29
Cyanide	6	28.9	37	20.9	1.45	1.45	0.15
Lead	6	21.5	38	22.7	-0.19	-0.19	0.85
Molybdenum	6	22.5	38	22.5	0.02	0.02	0.99
Nickel	6	22.8	38	22.4	0.05	0.05	0.96
Selenium	6	20.1	38	22.9	-0.48	-0.48	0.63
Silver	6	17.6	38	23.3	-0.99	-0.99	0.32
Thallium	6	28.4	38	21.6	1.20	1.20	0.23
Tin	6	18.7	38	23.1	-0.77	-0.77	0.44
Uranium	6	16.1	38	23.5	-1.30	-1.30	0.19
Vanadium	6	18.7	38	23.1	-0.77	-0.77	0.44
Zinc	6	25.0	38	22.1	0.50	0.50	0.62
Aroclor-1254*	6	21.8	38	22.6	-0.12	-0.12	0.90
Aroclor-1260	6	21.4	38	22.7	-0.21	-0.21	0.83
Americium-241	5	23.3	34	19.5	0.67	0.67	0.50
Americium-241-GS	11	23.2	54	35.0	-1.88	-1.88	0.06
Cesium-137	11	29.2	54	33.8	-0.73	-0.73	0.47
Radium-226-GS	5	13.4	34	21.0	-1.37	-1.37	0.17
Radium-228-GS	5	15.4	34	20.7	-0.95	-0.95	0.34
Plutonium-238	6	16.9	38	23.4	-1.13	-1.13	0.26
Plutonium-239/240	6	20.3	38	22.8	-0.43	-0.43	0.67
Total beta radiostrontium	12	26.8	58	37.3	-1.62	-1.62	0.11
Uranium-233/234	6	17.6	38	23.3	-0.99	-0.99	0.32
Uranium-235	6	20.0	38	22.9	-0.50	-0.50	0.62
Uranium-238	6	17.8	38	23.3	-0.96	-0.96	0.34

*Aroclor is an expired trademark.

GS = analyte measured by gamma spectrometry.
Z = z-score, which indicates how far and in what direction, an item deviates from its distribution's mean, expressed in units of its standard deviation.

Table 2-8. Summary of Statistical Comparisons to Reference Site Concentrations. (2 Pages)

Analyte	Mice Significance	Lizards Significance	Insects Significance	Soil Significance	>Background	Notes
Antimony	NS	NS	NS	Waste>Ref	NA	Not detected in soil
Arsenic	NS	NS	NS	Waste>Ref	N	Invert. outlier at E6
Barium	NS	NS	Ref>Waste	Waste>Ref	N	--
Boron	NS	NS	Ref>Waste	NS	NA	Soil outlier E6; lizard & mouse outlier
Cadmium	NS	NS	NS	Waste>Ref	NA	--
Chromium	NS	NS	NS	Waste>Ref	Y	Cr detect in Ref-1
Hexavalent Chromium	NS	NS	NS	NS	NA	--
Copper	NS	NS	NS	NS	N	Outlier in Ref-1 mouse
Cyanide	NS	Waste>Ref	Waste>Ref	NS	NA	Not detected in soil
Lead	NS	NS	NS	Waste>Ref	N	Outliers in lizards/mouse
Molybdenum	NS	NS	Waste>Ref	Waste>Ref	NA	--
Nickel	NS	NS	NS	Waste>Ref	Y	Outlier in B Pond lizard; outlier Ref-1 insect
Selenium	NS	NS	NS	Waste>Ref	NA	--
Silver	NS	NS	NS	NS	N	Not detected; outlier E6 mouse
Thallium	NS	NS	Waste>Ref	Ref>Waste	NA	Waste is not greater than reference for soil
Tin	NS	Ref>Waste	Ref>Waste	Waste>Ref	NA	Not detected in soil; Ref-1 insects are outliers
Uranium	NS	NS	NS	Ref>Waste	NA	--
Vanadium	NS	NS	NS	NS	N	Significant trend between soil and lizards; U Pond mouse outlier
Zinc	NS	NS	Ref>Waste	Waste>Ref	Y	E6 mouse outliers
Aroclor-1254*	NS	NS	NS	NA	NA	1 soil detect at E6; 2 Ref-1 lizards detects
Aroclor-1260	NS	NS	NS	NA	NA	1 soil detect E6; 216-B-63 mice outliers

Table 2-8. Summary of Statistical Comparisons to Reference Site Concentrations. (2 Pages)

Analyte	Mice Significance	Lizards Significance	Insects Significance	Soil Significance	>Background	Notes
Americium-241	NS	NS	NS	NS	NA	--
Americium-241-GS	NS	NS	NS	NS	NA	--
Cesium-137	NS	NS	NS	NS	Y	Significant trend between soil and inverts
Radium-226-GS	NS	NS	Ref>Waste	Waste>Ref	N	Lizard/mouse outliers
Radium-228-GS	NS	NS	NS	Waste>Ref	N	--
Plutonium-238	NS	NS	NS	NS	Y	Not detected in soil
Plutonium-239/240	NS	NS	NS	NS	Y	Insect/mouse outliers
Total beta radiostrontium	NS	NS	NS	NS	Y	Significant trend between soil and inverts
Uranium-233/234	NS	NS	NS	NS	N	Lizard U Pond outlier
Uranium-235	NS	NS	NS	NS	N	Significant trend between soil and mice; lizard U Pond outliers
Uranium-238	NS	NS	NS	NS	N	--

*Aroclor is an expired trademark.

GS = analyte measured by gamma spectroscopy.
N = no.
NA = not applicable.
NS = not significant.
Y = yes.

Table 2-9. Summary of Initial Contaminant of Potential Ecological Concern Analysis. (3 Pages)

Suite	Analyte Name	Notes
Inorganic	Antimony	Eliminated - stat. tests & plots
	Arsenic	Soil & tissue COPEC
	Barium	Soil COPEC
	Bismuth	Eliminated - not detected
	Boron	Soil & tissue COPEC
	Cadmium	Soil COPEC
	Chromium	Soil COPEC
	Hexavalent Chromium	Eliminated - stat. tests & plots
	Copper	Soil COPEC
	Cyanide	Tissue COPEC
	Lead	Soil COPEC
	Mercury	Eliminated - stat. tests & plots
	Molybdenum	Soil & tissue COPEC
	Nickel	Soil & tissue COPEC
	Selenium	Eliminated - stat. tests & plots
	Silver	Tissue COPEC
	Thallium	Tissue COPEC
	Tin	Eliminated - stat. tests & plots
	Uranium	Eliminated - stat. tests & plots
	Vanadium	Tissue COPEC
	Zinc	Soil & tissue COPEC
PCB	Aroclor-1016*	Eliminated - not detected
	Aroclor-1221	Eliminated - not detected
	Aroclor-1232	Eliminated - not detected
	Aroclor-1242	Eliminated - not detected
	Aroclor-1248	Eliminated - not detected
	Aroclor-1262	Eliminated - not detected
	Aroclor-1268	Eliminated - not detected
	Aroclor-1254	Soil & tissue COPEC
	Aroclor-1260	Soil & tissue COPEC

Table 2-9. Summary of Initial Contaminant of Potential Ecological Concern Analysis. (3 Pages)

Suite	Analyte Name	Notes
Pesticide	4,4'-DDD (Dichlorodiphenyldichloroethane)	Eliminated - not detected
	4,4'-DDE (Dichlorodiphenyldichloroethylene)	Eliminated - not detected
	4,4'-DDT (Dichlorodiphenyltrichloroethane)	Eliminated - not detected
	Aldrin	Eliminated - not detected
	Alpha-BHC	Eliminated - not detected
	alpha-Chlordane	Eliminated - not detected
	beta-1,2,3,4,5,6-Hexachlorocyclohexane (beta-BHC)	Eliminated - not detected
	Chlordane	Eliminated - not detected
	Delta-BHC	Eliminated - not detected
	Dieldrin	Eliminated - not detected
	Endosulfan I	Eliminated - not detected
	Endosulfan II	Eliminated - not detected
	Endosulfan sulfate	Eliminated - not detected
	Endrin	Eliminated - not detected
	Endrin aldehyde	Eliminated - not detected
	Endrin ketone	Eliminated - not detected
	Gamma-BHC (Lindane)	Eliminated - not detected
	gamma-Chlordane	Eliminated - not detected
	Heptachlor	Eliminated - not detected
	Heptachlor epoxide	Eliminated - not detected
	Methoxychlor	Eliminated - not detected
	Toxaphene	Eliminated - not detected
Radio-nuclide	Actinium-228	Eliminated - U/Th daughter
	Americium-241-GS	Eliminated - not detected
	Antimony-125	Eliminated - not detected
	Barium-133	Eliminated - not detected
	Bismuth-212	Eliminated - U/Th daughter
	Bismuth-214	Eliminated - U/Th daughter
	Cerium/Praseodymium-144	Eliminated - not detected
	Cerium-144	Eliminated - not detected
	Cesium-134	Eliminated - not detected
	Cesium-137	Soil & tissue COPEC
	Cobalt-60	Eliminated - not detected
	Europium-152	Eliminated - not detected
	Europium-154	Eliminated - not detected
	Europium-155	Eliminated - not detected

Table 2-9. Summary of Initial Contaminant of Potential Ecological Concern Analysis. (3 Pages)

Suite	Analyte Name	Notes
	Lead-212	Eliminated - U/Th daughter
	Lead-214	Eliminated - U/Th daughter
	Niobium-94	Eliminated - not detected
	Potassium-40	Eliminated - U/Th daughter
	Radium-226-GS	Soil & tissue COPEC
	Radium-228-GS	Soil COPEC
	Ruthenium-103	Eliminated - not detected
	Ruthenium-106	Eliminated - not detected
	Thallium-208	Eliminated - U/Th daughter
	Thorium-228	Eliminated - not detected
	Thorium-232	Eliminated - not detected
	Thorium-234	Eliminated - U/Th daughter
	Tin-113	Eliminated - not detected
	Tin-126	Eliminated - not detected
	Uranium-235-GS	Eliminated - not detected
	Uranium-238-GS	Eliminated - not detected
	Zinc-65	Eliminated - not detected
	Americium-241	Eliminated - not detected
	Plutonium-238	Eliminated - not detected
	Plutonium-239/240	Soil & tissue COPEC
	Radium-226	Soil & tissue COPEC
	Radium-228	Eliminated - not detected
	Total beta radiostrontium	Soil & tissue COPEC
	Uranium-233/234	Tissue COPEC
	Uranium-235	Tissue COPEC
	Uranium-238	Eliminated - stat. tests & plots

*Aroclor is an expired trademark.

COPEC = contaminant of potential ecological concern.
PCB = polychlorinated biphenyl.

Table 2-10. Summary of the Reanalysis of Strontium-90 in Small-Mammal Tissues.

Site Name	Original HEIS ID	Original Sr-90 Result (pCi/g)	Reanalysis HEIS ID	Reanalysis Sr-90 Result (pCi/g)
2607-E6	B1CVB3	34	B1CVB3A	-0.082*
REF-1	B1CVC5	160	B1CVC5A	-0.042*
REF-1	B1CVD0	15	B1CVD0A	-0.017*
BCC-LOW	B1D9D3	31	B1D9D3A	1.12
REF-2	B1D9F4	14	B1D9F4A	-0.095*

*nondetect.

HEIS = *Hanford Environmental Information System* database.

Table 2-11. Summary of Wildlife Exposure Parameters. (2 Pages)

Receptor	Parameter	Value	Units	Notes
Killdeer (*Charadrius vociferous*)	Body weight	0.07	kg	Purdue and Haines 1977
	Food intake	0.0147	fresh weight kg/kg/d	Allometric relationship for passerines EPA/600/R-93/187, p. 3-4
	Food moisture content	0.69	fraction	Assumes grasshoppers/crickets EPA/600/R-93/187, p. 4-13
	Food intake	0.00457	dry weight kg/d	Ratio of investigation area (1 ha) to home range area
	Fraction soil in diet	0.164	fraction	EPA, 2005, Table 4-1, page 4-5, used value for woodcock
	Home range	1	ha	Carlsen et al., 2004, Appendix
	Area use factor	1	fraction	Ratio of investigation area (1 ha) to home range area
Northern Grasshopper Mouse (*Onychomys leucogaster*)	Body weight	0.026	kg	D&D-29483
	Food intake	0.00390	fresh weight kg/kg/d	Allometric relationship for rodents EPA/600/R-93/187, p. 3-6
	Food moisture content	0.69	fraction	Assumes grasshoppers/crickets EPA/600/R-93/187, p. 4-13
	Food intake	0.00121	dry weight kg/d	Ratio of investigation area (1 ha) to home range area
	Fraction soil in diet	0.03	fraction	EPA, 2005, Table 4-1, page 4-5, used value for shrew
	Home range	1.725	ha	Average of home ranges for N. grasshopper mice (Carlsen et al., 2004, Appendix)
	Area use factor	0.58	fraction	Ratio of investigation area (1 ha) to home range area

Table 2-11. Summary of Wildlife Exposure Parameters. (2 Pages)

Receptor	Parameter	Value	Units	Notes
Red-Tailed Hawk (*Buteo jamaicensis*)	Body weight	1.2	kg	Average of 1224, 1154, 1235 g from EPA/600/R-93/187, p. 2-82
	Food intake	0.110	fresh weight kg/kg/d	Adult female in winter EPA/600/R-93/187, p. 2-82
	Food moisture content	0.68	fraction	Assumes small mammals EPA/600/R-93/187, p. 4-13
	Food intake	0.0422	dry weight kg/d	Ratio of investigation area (1 ha) to home range area
	Fraction soil in diet	0.057	fraction	EPA, 2005, Table 4-1, page 4-5
	Home range	1770	ha	EPA/600/R-93/187 mean territory size for Colorado prairie, PJ woodlands
	Area use factor	0.00056	fraction	Ratio of investigation area (1 ha) to home range area
Badger (*Taxidea taxus*)	Body weight	8.25	kg	D&D-29483
	Food intake	0.389	fresh weight kg/kg/d	Allometric relationship for all mammals EPA/600/R-93/187, p. 3-6
	Food moisture content	0.68	fraction	Assumes small mammals EPA/600/R-93/187, p. 4-13
	Food intake	0.125	dry weight kg/d	Ratio of investigation area (1 ha) to home range area
	Fraction soil in diet	0.043	fraction	EPA, 2005, Table 4-1, page 4-5, used value for long-tailed weasel
	Home range	200	ha	Carlsen et al., 2004, Appendix
	Area use factor	0.005	fraction	Ratio of investigation area (1 ha) to home range area

PJ= Pinon-Juniper.

Carlsen et al., 2004, "The Spatial Extent of Contaminants and the Landscape Scale: An Analysis of the Wildlife, Conservation Biology, and Population Modeling Literature."

D&D-29483, *Re-Issue Meeting Minutes for the Central Plateau Ecological DQO/SAP – Site Investigation Conducted By Ron Mitchell and Wade Riggsbee.*

EPA, 2005, *Guidance for Developing Ecological Soil Screening Levels.*

EPA-600/R-93/187, *Wildlife Exposure Factors Handbook.*

Purdue and Haines, 1977, "Salt Water Tolerance and Water Turnover in the Snowy Plover."

Table 2-12. Invertivore Exposure Analysis.

COPEC	Max Soil Conc. (µg/kg)	Max Invert. Conc. (µg/kg)	Killdeer					Northern Grasshopper Mouse				
			TRV (mg/kg/d)	TRV Source	HQ Soil	HQ Diet	HQ Total	TRV (mg/kg/d)	TRV Source	HQ Soil	HQ Diet	HQ Total
Arsenic	4400	2220	2.24	EcoSSL[a]	0.021	0.208	0.229	1.04	EcoSSL	0.003	0.186	0.189
Barium	111000	NA	73.5	ECODB V2.2[b]	0.016	NA	0.016	43.5	WAC 749-5	0.002	NA	0.002
Boron	3800	9730	2.92	ECODB V2.2	0.014	0.700	0.714	28	ECODB V2.2	<0.001	0.030	0.030
Cadmium	212	NA	20	WAC 749-5[c]	<0.001	NA	<0.001	15	WAC 749-5	<0.001	NA	<0.001
Chromium	20400	NA	5	WAC 749-5	0.044	NA	0.044	35.2	WAC 749-5	<0.001	NA	<0.001
Hexavalent Chromium	285	NA	11	ECODB V2.2	<0.001	NA	<0.001	5.66	ECODB V2.2	<0.001	NA	<0.001
Copper	20200	NA	61.7	WAC 749-5	0.004	NA	0.004	44	WAC 749-5	<0.001	NA	<0.001
Cyanide	NA	870	0.04	ECODB V2.2	NA	**4.57**	**4.57**	68.7	ECODB V2.2	NA	0.001	0.001
Lead	9640	NA	11.3	WAC 749-5	0.009	NA	0.009	20	WAC 749-5	<0.001	NA	0.000
Molybdenum	870	766	35.3	WAC 749-5	<0.001	0.005	0.005	3.09	WAC 749-5	<0.001	0.022	0.022
Nickel	19400	1810	107	WAC 749-5	0.002	0.004	0.005	175.8	WAC 749-5	<0.001	0.001	0.001
Silver	NA	32	5.44	ECODB V2.2	NA	0.001	0.001	19	ECODB V2.2	NA	0.000	<0.001
Thallium	NA	627	0.35	ECODB V2.2	NA	0.376	0.376	0.071	ECODB V2.2 (LOAEL)	NA	0.768	0.768
Vanadium	NA	1930	0.413	EcoSSL (LOEAL)	NA	0.981	0.981	4.16	EcoSSL	NA	0.040	0.040
Zinc	77200	45900	131	WAC 749-5	0.006	0.074	0.080	703	WAC 749-5	<0.001	0.006	0.006
Aroclor-1254[d]	21	ND	0.1	ECODB V2.2	0.002	ND	0.002	0.611	ECODB V2.2	<0.001	ND	<0.001
Aroclor-1260	13	ND	2.15	ECODB V2.2	<0.001	ND	<0.001	0.031	ECODB V2.2	<0.001	ND	<0.001

[a]EcoSSL is EPA, 2005, *Guidance for Developing Ecological Soil Screening Levels.*
[b]ECODB V2.2 is LA-UR-05-7424, 2005, *ECORISK Database*, Release 2.2.
[c]WAC 749-5 is Table 749-5 from WAC 173-340-900, "Tables."
[d]Aroclor is an expired trademark.

COPEC = contaminant of potential ecological concern.
EcoSSL = ecological soil screening level.
HQ = hazards quotient.
LOEAL = lowest observed adverse-effect level.
NA = not applicable because not a COPEC in that medium.
ND = not detected in this medium.
TRV = toxicity reference value.

Table 2-13. Carnivore Exposure Analysis.

COPEC	Max. Soil Conc. (µg/kg)	Max. Vert. Conc. (µg/kg)	Red-Tailed Hawk					Badger				
			TRV (mg/kg/d)	TRV Source	HQ Soil	HQ Diet	HQ Total	TRV (mg/kg/d)	TRV Source	HQ Soil	HQ Diet	HQ Total
Arsenic	4400	436	2.24	EcoSSL[a]	<0.001	<0.001	<0.001	1.04	EcoSSL	<0.001	<0.001	<0.001
Barium	111000	NA	73.5	ECODB V2.2[b]	<0.001	NA	<0.001	43.5	WAC 749-5	<0.001	NA	<0.001
Boron	3800	20200	2.92	ECODB V2.2	<0.001	<0.001	<0.001	28	ECODB V2.2	<0.001	<0.001	<0.001
Cadmium	212	NA	20	WAC 749-5[c]	<0.001	NA	<0.001	15	WAC 749-5	<0.001	NA	<0.001
Chromium	20400	NA	5	WAC 749-5	<0.001	NA	<0.001	35.2	WAC 749-5	<0.001	NA	<0.001
Hexavalent Chromium	285	NA	11	ECODB V2.2	<0.001	NA	<0.001	5.66	ECODB V2.2	<0.001	NA	<0.001
Copper	20200	NA	61.7	WAC 749-5	<0.001	NA	<0.001	44	WAC 749-5	<0.001	NA	<0.001
Cyanide	NRC	530	0.04	ECODB V2.2	NA	0.001	0.001	68.7	ECODB V2.2	NA	<0.001	<0.001
Lead	9640	NA	11.3	WAC 749-5	<0.001	NA	<0.001	20	WAC 749-5	<0.001	NA	<0.001
Molybdenum	870	494	35.3	WAC 749-5	<0.001	<0.001	<0.001	3.09	WAC 749-5	<0.001	<0.001	<0.001
Nickel	19400	3000	107	WAC 749-5	<0.001	<0.001	<0.001	175.8	WAC 749-5	<0.001	<0.001	<0.001
Silver	NA	1880	5.44	ECODB V2.2	NA	<0.001	<0.001	19	ECODB V2.2	NA	<0.001	<0.001
Thallium	NA	68	0.35	ECODB V2.2	NA	<0.001	<0.001	0.071	ECODB V2.2 (LOEAL)	NA	<0.001	<0.001
Vanadium	NA	1350	0.413	EcoSSL (LOEAL)	NA	<0.001	<0.001	4.16	EcoSSL	NA	<0.001	<0.001
Zinc	77200	839000	131	WAC 749-5	<0.001	<0.001	<0.001	703	WAC 749-5	<0.001	<0.001	<0.001
Aroclor-1254[d]	21	590	0.1	ECODB V2.2	<0.001	<0.001	<0.001	0.611	ECODB V2.2	<0.001	<0.001	<0.001
Aroclor-1260	13	724	2.15	ECODB V2.2	<0.001	<0.001	<0.001	0.031	ECODB V2.2	<0.001	0.006	0.006

[a]EcoSSL is EPA, 2005, *Guidance for Developing Ecological Soil Screening Levels.*
[b]ECODB V2.2 is LA-UR-05-7424, 2005, *ECORISK Database*, Release 2.2.
[c]WAC 749-5 is Table 749-5 from WAC 173-340-900, "Tables."
[d]Aroclor is an expired trademark.

COPEC = contaminant of potential ecological concern.
EcoSSL = ecological soil screening level.
HQ = hazards quotient.
LOEAL = lowest observed adverse-effect level.
NA = not applicable because not a COPEC in that medium.
TRV = toxicity reference value.

Table 2-14. Summary of Remedial-Investigation Cyanide Data.

Phase I Sites	Count	Cyanide Detects	Concentration Range (mg/kg)	Depth (ft)
B Pond	45	3	0.4 - 4	5 - 9
B Ditch	12	0	NA	NA
E6 Septic	NS	--	NA	--
Gable Mtn Pond	42	0	NA	NA
S10 Ditch/Pond	33	1	0.3	7.5-8.5
U Pond	5	0	NA	NA
Phase I site total	137	4	--	--
Other sites	160	1	--	--

NA = not applicable.
NS = not sampled.

Table 2-15. Maximum and Average Cyanide Levels (µg/kg) Found in an Ecological Study of 200 Area Waste Sites.*

Media		Control Site			Study Sites			Overall
		Nondetect	Detect	Overall	Nondetect	Detect	Overall	
Mouse	Number	--	1	1	--	9	9	10
	Maximum	--	690	690	--	7660	7660	7660
	Average	--	690	--	--	1891	--	--
Soil	Number	--	--	--	16	--	16	16
	Maximum	--	--	--	1250	--	1250	1250
	Average	--	--	--	1073	--	1073	--
Vegetation	Number	5	--	5	14	--	14	19
	Maximum	2470	--	2470	4960	--	4960	4960
	Average	1412	--	--	2630	--	--	--
Total number		5	1	6	30	9	39	45
Overall maximum		2470	690	2470	4960	7660	7660	7660
Overall average		1412	690	--	1799	1891	--	--

*BHI-00032, *Ecological Sampling at Four Waste Sites in the 200 Areas.*

Table 2-16. Summary of Remedial-Investigation Silver Data. (2 Pages)

Sample Site Name	Depth (ft)	Results (mg/kg)
216-A-29 (3 detects)	4 – 13	1.4 to 42
216-B-2-2 (2 detects)	8 – 9	4.3 to 8
216-B-43	10.4 - 12.9	2.5
216-B-44	3 – 6	2.4
216-B-45 (2 detects)	3 - 12.5	1.6 to 1.7

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Table 2-16. Summary of Remedial-Investigation Silver Data. (2 Pages)

Sample Site Name	Depth (ft)	Results (mg/kg)
216-B-49 (4 detects)	2 - 12.5	1.5 to 2.04
216-B-57 (2 detects)	2 – 12	2.2 to 2.3
216-B-61	6 – 8	1.4
216-S-10P Pond (3 detects)	0 - 3.5	8.3 to 30.4
216-U-10-TP2 (3 detects)	6.5 – 10	1.7 to 23.9
299-W19-94	4 – 6	1.5
299-W19-98	11 - 13.5	1.6
B Pond (2 detects)	8 – 9	8.85 to 9.4
Well 299-W26-14	4 - 6.5	3

Table 2-17. Summary of Remedial-Investigation Uranium-234 Data.

Sample Site Name	Depth (ft)	Results (pCi/g)
216-A-29 (2 detects)	4 - 8.5	1.19 to 2.05
216-B-3-3 Ditch	5 – 6	1.11
216-U-10-TP2	6.5 - 6.5	85
B Pond (2 detects)	8 – 9	1.665 to 5.17
Gable Mountain Pond	9.5 - 10.5	1.19
299-W19-98	4.4 - 5.4	1.8
299-W23-231	6 – 8	1.57
Well C3104	14.5 - 15.5	5.16

Table 2-18. Summary of Remedial-Investigation Uranium-235 Data.

Sample Site Name	Depth (ft)	Result (pCi/g)
216-A-29	4 – 5	0.439
299-W19-98	4.4 - 5.4	0.12
299-W19-98	11 - 13.5	0.18
B Pond	8 – 9	0.291

Table 2-19. Congeners for Analysis in Tissue. (2 Pages)

CAS Number	BZ 1983	Dioxin Like	BTAG List[a]	MCHP List[a]	MC2P List[b]	Aroclor-1254[c]	Aroclor-1260
34883-43-7	8		X				
37680-65-2	18		X		X		
7012-37-5	28		X				
38444-90-5	37				X		
41464-39-5	44		X		X		
41464-40-8	49				X		
35693-99-3	52		X		X		
32598-10-0	66		X				
32598-11-1	70				X		
32690-93-0	74				X		
32598-13-3	77	X	X	X			
70362-50-4	81	X	X		X		
38380-02-8	87			X			
68194-07-0	90			X			
38380-01-7	99					X	
37680-73-2	101		X	X		X	X
32598-14-4	105	X	X	X			
38380-03-9	110					X	
74472-37-0	114	X	X		X		
31508-00-6	118	X	X	X		X	
56558-17-9	119				X		
65510-44-3	123	X	X		X		
57465-28-8	126	X	X	X			
38380-07-3	128		X	X			
38380-05-1	132			X			
35065-28-2	138		X	X		X	X
38380-04-0	149						X
52663-63-5	151				X		
35065-27-1	153		X	X			X
38380-08-4	156	X	X	X			
69782-90-7	157	X	X		X		
74472-42-7	158				X		
52663-72-6	167	X	X		X		
59291-65-5	168				X		
32774-16-6	169	X	X	X			
35065-30-6	170		X	X			
35065-29-3	180		X	X			X

Table 2-19. Congeners for Analysis in Tissue. (2 Pages)

CAS Number	BZ 1983	Dioxin Like	BTAG List[a]	MCHP List[a]	MC2P List[b]	Aroclor-1254[c]	Aroclor-1260
52663-69-1	183			X			
74472-48-3	184			X			
52663-68-0	187		X		X		
39635-31-9	189	X	X		X		
52663-78-2	195		X	X			
40186-72-9	206		X	X			

[a]Congener 209 is not included as not analyzed by gas chromatography method and is not a major risk contributor.
[b]Congener 199 is not included as not analyzed by gas chromatography method and is not a major risk contributor.
[c]Aroclor is an expired trademark. Aroclor numbers are representative congeners from the most commonly detected Aroclors at the Hanford Site.

CAS = Chemical Abstracts Service.
BTAG = Congeners recommended for analysis by the U.S. Environmental Protection Agency Region 9 Biological Technical Assistance Group.
BZ 1983 = Theoretical "corrected" PCB congener number, consistent with Schulte and Malishe (1983).
MC2P = Congeners recommended for analysis by McFarland and Clarke (1989) as having the second highest priority as described in the text of this report.
MCHP = Congeners recommended for analysis by McFarland and Clarke (1989) as having the highest priority as described in the text of this report.
PCB = polychlorinated biphenyl.

McFarland and Clarke, 1989, "Environmental Occurrence, Abundance and Potential Toxicity of PCB congeners: Consideration for a Congener-Specific Analysis."
Schulte and Malisch, 1983, "Berechnung der Vahren PCB-Gehalte in Umweltproben I. Ermittlung der Zusammensetzung Zweier Technicscher PCB-Gemische."

Table 2-20. Analytical Performance Requirements for BC Controlled Area Soil.

COPEC or Additional Analytes	Chemical Abstracts Service #	Name/ Analytical Technology	Detection Limit Requirement		Matrix Specific Target Required Quantitation Limit[b] Soil (pCi/g)	Precision (%)	Accuracy (%)
			MDL (pCi/g)	PQL[a] (pCi/g)			
Cesium-137	10045-97-3	GEA	0.1	0.1	20.8	±30[c]	70-130[d]
Strontium-90	Rad-Sr	Total radioactive strontium – GPC	1	1	22.5	±30[c]	70-130[d]

[a] The ability to meet PQLs is dependant on the amount of sample obtained and matrix interferences.
[b] Values are Biota Concentration Guidelines (*RESRAD BIOTA*, ANL 2003) except where noted.
[c] Precision criteria for batch laboratory replicate sample analyses.
[d] Accuracy criteria for associated batch laboratory control sample percent recoveries. Except for GEA, additional analysis-specific evaluations also are performed for matrix spikes, tracers, and carriers as appropriate to the method.

COPEC = contaminant of potential ecological concern.
GEA = gamma energy analysis.
GPC = gas-proportional counter.
MDL = minimum detection level.
PQL = practical quantitation limit.

Table 2-21. Analytical Performance Requirements for Vertebrates. (2 Pages)

Contaminant of Potential Ecological Concern or Additional Analytes [a]	Chemical Abstracts Service #	Name/Analytical Technology	Units	Detection Limit Requirement (PQL) [b]	Matrix-Specific Target-, Required Quantitation Limits for Ecological Receptors (fresh weight)	Precision (%)	Accuracy (%)
Radionuclides for Lizards and Mice from BC Controlled Area and Select Phase I Investigation Areas							
Cesium-137	10045-97-3	GEA	pCi/g	0.1	2,290	±30% [c]	70-130%
Strontium-90	Rad-Sr	Total radioactive strontium -- GPC	pCi/g	1	1,710	±30%	70-130% [d]
Total PCBs for Lizards and Mice Collected to Supplement Phase I and II Data [e]							
BZ 8	34883-43-7	Method 8082 [f]	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 18	37680-65-2	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 28	7012-37-5	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 37	38444-90-5	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 44	41464-39-5	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 49	41464-40-8	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 52	35693-99-3	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 66	32598-10-0	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 70	32598-11-1	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 74	32690-93-0	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 77	32598-13-3	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 81	70362-50-4	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 87	38380-02-8	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 90	68194-07-0	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 99	38380-01-7	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 101	37680-73-2	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 105	32598-14-4	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 110	38380-03-9	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 114	74472-37-0	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 118	31508-00-6	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 119	56558-17-9	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 123	65510-44-3	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 126	57465-28-8	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 128	38380-07-3	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 132	38380-05-1	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 138	35065-28-2	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 149	38380-04-0	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 151	52663-63-5	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 153	35065-27-1	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]

Table 2-21. Analytical Performance Requirements for Vertebrates. (2 Pages)

Contaminant of Potential Ecological Concern or Additional Analytes [a]	Chemical Abstracts Service #	Name/Analytical Technology	Units	Detection Limit Requirement (PQL) [b]	Matrix-Specific Target-, Required Quantitation Limits for Ecological Receptors (fresh weight)	Precision (%)	Accuracy (%)
BZ 156	38380-08-4	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 157	69782-90-7	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 158	74472-42-7	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 167	52663-72-6	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 168	59291-65-5	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 169	32774-16-6	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 170	35065-30-6	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 180	35065-29-3	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 183	52663-69-1	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 184	74472-48-3	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 187	52663-68-0	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 189	39635-31-9	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 195	52663-78-2	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]
BZ 206	40186-72-9	Method 8082	mg/kg	0.05	0.1	±30 [c]	70-130 [g]

[a] BZ represents a system of sequential numbers for the 209 PCB congeners (Ballschmiter and Zell, 1980, "Analysis of Polychlorinated Biphenyls (PCB) by Glass Capillary Gas Chromatography." These numbers are consistent with the International Union of Pure and Applied Chemistry numbers from http://www.epa.gov/toxteam/pcdid/Bzviupac.htm.

[b] The ability to meet PQLs is dependant on the amount of sample obtained (e.g., especially biota) and matrix interferences. The PQL was obtained by back-calculating the concentration in prey necessary to exceed the WAC 173-340-900, "Tables," Table 749-5 toxicity reference values for PCB mixtures.

[c] Precision criteria for batch laboratory replicate sample analyses.

[d] Accuracy criteria for associated batch laboratory control sample percent recoveries. Except for GEA, additional analysis-specific evaluations also are performed for matrix spikes, tracers, and carriers as appropriate to the method.

[e] Total PCBs will be addressed through analysis of PCB congeners.

[f] Method 8082 is found in SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update III-A*. Alternately, EPA Method 1668 will be considered instead of Method 8082 for the vertebrate analyses.

[g] Accuracy criteria for associated batch laboratory control sample percent recoveries.

GEA = gamma energy analysis.
GPC = gas proportional counter.
PCB = polychlorinated biphenyl.
PQL = practical quantitation limit.

Table 2-22. Analytical Performance Requirements for Terrestrial Invertebrates.

Contaminant of Potential Ecological Concern or Additional Analytes	Chemical Abstracts Service #	Name/ Analytical Technology [a]	Units	Detection Limit Requirement (PQL) [b]	Matrix Specific Target Required Quantitation Limits, Invertebrates (fresh weight)	Precision (%)	Accuracy (%)
Radionuclides for Invertebrates from BC Controlled Area							
Cesium-137	10045-97-3	GEA	pCi/g	0.1	2,290	±30%	70-130% [c]
Strontium-90	Rad-Sr	Total radioactive strontium – GPC	pCi/g	1	1,710	±30%	70-130% [d]
Cyanide for Invertebrates Collected to Supplement Phase I and II Data							
Cyanide	57-12-5	Method 9010B, 9012A, 9013, or 9014	mg/kg	1	0.19 [e]	±30 [f]	70-130 [c]

[a] Methods are found in SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update III-A.*
[b] The ability to meet PQLs is dependant on the amount of sample obtained (e.g., especially biota) and matrix interferences.
[c] Accuracy criteria for associated batch matrix spike percent recoveries. Evaluation criteria based on laboratory statistical limits or fixed limits as defined in the referenced methods.
[d] Accuracy criteria for associated batch laboratory control sample percent recoveries.
[e] WAC 173-340-707, "Analytical Considerations," allows use of the detection limit as the target quantitation limit where technology does not allow PQLs below the target limit.
[f] Precision criteria for batch laboratory replicate matrix spike analyses or replicate sample analysis.

GEA = gamma energy analysis.
GPC = gas-proportional counter.
PQL = practical quantitation limit.

3.0 NON-WASTE-SITE DATA EVALUATION AND DATA QUALITY OBJECTIVES

The Phase I and II Central Plateau ERA SAPs and DQOs indicated that one element in Phase III would be to evaluate the need for sampling the non-operational habitat surrounding 200 East and 200 West Areas. Therefore, a focus of Phase III of the Central Plateau EcoDQO is to assess habitats in non-waste-site areas to better understand the status and health of the Central Plateau ecosystem. The Phase III DQO process also will be used to evaluate the adequacy of Phase I and Phase II reference sites. The sources of contamination in non-waste-site areas is world-wide radionuclide fallout as well as past Hanford Site operations, which released radionuclides and metals through air stack emissions.

3.1 AIR DEPOSITION OF CONTAMINANTS ON SURFACE SOIL

Air deposition of contaminants on surface soils was considered for the EcoDQO to provide a comprehensive analysis of contaminant distribution and exposure. Both world-wide fallout and Hanford plant stack emissions are historical airborne contaminant sources. World-wide fallout is related to nuclear weapons testing and accidents (i.e., Chernobyl). Hanford plant stack releases discontinued with the cessation of fuel extraction and production. The contaminated media and exposure resulting from these historic air emissions are limited to surface soils in their deposition path and the terrestrial receptors potentially exposed to them.

Hanford stack releases have deposited contaminants on Hanford Site surface soils that potentially represent ongoing exposure media. Nonradionuclide contaminant stack emissions from Hanford Site operations were relatively minor and primarily consisted of volatile organic compounds (VOC) associated with the solvents used in the 200 Area separation processes (DOE/RL-2005-49). Volatile organic stack emissions would have been in a gaseous state and would not have deposited in surface soil. Inorganic stack emissions from the separation plants were minor and primarily consisted of nitrate compound particulates from the inorganic acids used in the separation process. These nitrate compounds generally formed a scale within the stacks that would periodically flake off and fall to the ground in the immediate vicinity of the 200 Area separation plants (Hodges 1989, *Radiological History of the PUREX Facility 1955 to 1989*). Other inorganic compounds (e.g., metals) were an insignificant component of stack emissions. Short- and long-lived radionuclides also were released intermittently from process facilities in the 200 Areas, and are the focus of this evaluation.

Short-lived radionuclides include I-131, which was the focus of the Hanford Environmental Dose Reconstruction Project and Co-60. These short-lived radionuclides are no longer germane to current surface soil concentrations because radioactive decay has removed them from the environment.

Longer half-life radionuclides include Am-241, Cs-137, I-129, Pu-239/240, and Sr-90. Iodine-129 is not found in surface soils except in small concentrations near the stacks of the separation plants in the 200 Areas. Iodine is very mobile in water and tends to migrate into the

vadose zone with the moisture front. Therefore, I-129 was not typically measured in background or non-waste-site soil samples and will not be considered further in this evaluation. Radionuclides considered as contaminants of interest include Am-241, Cs-137, Pu-239/240, and Sr-90. Plutonium-238 also will be evaluated given its long half-life and its association with Hanford Site operations. Cobalt-60 has a 5-year half-life and is no longer routinely detected in Hanford Site soil and vegetation and is therefore not considered in this evaluation.

3.2 DATA EVALUATION

Relevant data sources for this evaluation are summarized in Table 3-1; these data sources have some samples of environmental media for radionuclides or other analytes in non-waste-site locations. Data included in these references span about the last 20 years of environmental characterization efforts at the Hanford Site. Other data sources also were reviewed as they were made available and were included as appropriate. The data for Cs-137, Pu-238, Pu-239/240, and Sr-90 from the data sources listed in Table 3-1 are provided in Appendix C. It is important to note that the existing Hanford Site studies greatly help to extend the inferences regarding ecological exposure and risk from the Phase I and Phase II investigation areas. This is particularly true for radionuclides and, to a lesser extent, metals. However, radionuclides and metals are the most important COPECs as evidenced by the Phase I and II EcoDQOs (WMP-20570 and WMP-25493) and this document.

Figure 3-1 displays the cumulative locations sampled in the compiled non-waste-site data; media sampled (e.g., soil, vegetation) and the data source codes are shown. Most of the locations were sampled for radionuclides in soil and vegetation. Relatively few locations were sampled for invertebrates or small mammals. Figures 3-2 through 3-5 show the maximum soil concentrations of Cs-137, Pu-238, Pu-239/240, and Sr-90 from 2000 to 2005. Figures 3-6 and 3-7 show the maximum small-mammal concentrations of Cs-137 and Sr-90 from 2000 to 2005.

In summary, there are a wealth of existing radionuclide data, especially for soil and vegetation. However, sampling near the reference sites is sparse. These non-waste-site sample data do show that there are higher concentrations (e.g., 15 pCi/g maximum for Cs-137) within and near the Central Plateau.

Phase I and II reference sites will be complemented by the 100 Area and 300 Area RCBRA reference sites (scheduled for data collection in fiscal year 2006) and the non-waste-site data summarized in this section. However, additional data are recommended to enhance spatial coverage of radionuclides and to better understand spatial distribution of world-wide fallout and Hanford stack emissions radionuclides in surface soil.

3.3 NON-WASTE-SITE DATA QUALITY OBJECTIVES AND STATISTICAL CONSIDERATIONS

The concentrations of and subsequent exposure from radionuclides deposited on surface soil will be considered in this assessment. Soil transects along presumed deposition pathways will be sampled to determine whether mean concentrations of COPECs detected in surface soil samples

are greater than mean background values (DOE/RL-96-12, *Hanford Site Background: Part 2, Soil Background for Radionuclides*) or mean concentrations at reference sites. As discussed above, radionuclides released as a result of world-wide fallout and Hanford plant stack deposition represent potential sources of surface soil contamination (DOE/RL-2005-49).

A focus of the Phase III Central Plateau EcoDQO is to assess the ecological condition of non-waste-site areas. Fourteen sources for non-waste-site data on radionuclides were compiled and reviewed. There are a wealth of existing radionuclide data, especially for soil and vegetation. However, sampling data near the Phase I and II reference sites and other non-operational areas on the Central Plateau are sparse, as is illustrated in Figures 3-1 through 3-7. The data gaps depicted in these figures are shown graphically in the 5 shaded areas in Figure 3-8.

Additional data are recommended to increase understanding of spatial representation of radionuclides in soils in these five shaded areas. Sampling will therefore be conducted in non-waste-site areas along transects where data on plant stack emission radionuclides are limited; specifically, soils in five non-waste-site areas along presumed deposition pathways from the 200 Area stacks will be sampled for Am-241, Cs-137, Sr-90, and isotopic plutonium analyses. Sampling data from these areas will be used to fill spatial data gaps and provide information on surface radionuclide concentrations in the vicinity of the Phase I and II reference sites, the area to the northeast of the 200 West Area (to address potential releases from T Plant), the area north of the 200 East Area, and areas east and west of the Core Zone.

3.3.1 Boundaries

The Phase I and II soil samples were collected over a 1 hectare (ha) spatial area, because this area was representative of the spatial scale appropriate for populations of middle trophic-level species. A 1 ha area would ensure that exposure to multiple animals from soil could be evaluated. Because Phase III is not coupled with tissue sampling at the same locations, a smaller spatial unit is possible. A benefit of a smaller unit is that it will better correspond to the 1 m^2 spatial area sampled by the near-facility monitoring program and SESP. An area of 0.0625 ha or 625 m^2 is selected because this area corresponds to the size of the pocket mouse and deer mouse home ranges (0.05 and 0.077 ha). This area also is approximately equal to the typical size of a residential lot (500 m^2), and 625 m^2 also is logistically simple to implement in the field (25 m by 25 m).

3.3.2 Decision Rules/Risk Questions

Decision rules or risk questions/hypotheses used for ecological risk characterization support a weight-of-evidence evaluation of the potential for ecological risk. The following risk questions were identified for non-waste-site area surface soil sampling.

- Are radionuclide concentrations greater than Hanford Site background concentrations?
- What is the spatial distribution of radionuclides associated with air-stack emissions along potential emissions paths in data-limited, non-waste-site areas?

3.3.3 Study Design

The study design optimizes sample collection to characterize surface soil concentrations of radionuclides in areas with very little data and to evaluate radionuclide concentrations in surface soils relative to Hanford Site background and world-wide fallout values.

The DQOs for the MIS identify sample depth, the particle size of interest for ecological exposure considerations, the spatial scale over which the MIS should be collected, and the number of increments needed to adequately characterize the area. The depth should be 0 to 1 in. to be consistent with near-facility and SESP samples; a shallow 1-in. depth also is consistent with characterizing air deposition. The particle size should be the less-than-2-mm size fraction that was also used for other MIS collected for the Central Plateau project. The 2 mm fraction is consistent with the definition of soil and is representative of the incidental ingestion and soil to food exposure pathways.

The number of increments needed to characterize this area can be based on several factors:

- Historical information on the between-year variation in radionuclide concentrations from near-facility and SESP monitoring data
- Physical factors leading to variable deposition and contaminant redistribution
- Logistical considerations in sample collection and processing.

Analysis of the variations in Cs-137 concentrations shows that between-year variation is small (9 percent of the total) compared to between-location variation (accounts for 80 percent of the variation in Cs-137 concentrations). One simple approach is to consider a grid composed of 25 cells to characterize the 0.0625 ha area. Systematic samples with a random start would characterize soil concentrations across the area with an equal chance of collecting samples from different microsite types (e.g., cryptogam, under shrubs, between plants, burrow spoils). To obtain sufficient mass for laboratory analyses, it is necessary to collect two co-located increments from each cell. Note that 50 increments would be equal to the cumulative number of composite samples collected from each location over a 10-year sampling period, thus making the MIS more comparable to the average radionuclide concentrations from the last 10 years.

Transects will be set up in each non-waste-site area targeted for sampling. Three to four soil multi-increment samples will be collected along transect as shown in Figure 3-9. The North Area transect also will be characterized with a field-duplicate MIS for quality assurance purposes.

Based on feedback from Hanford Natural Resource Trustees at the Phase III DQO workshop, it was decided that MIS was the preferred method to obtain surface soil radionuclide concentration data. While MIS soil samples were different from the local composite samples used by the near-facility and SESP programs to characterize soil concentrations, MIS data are comparable to the mean values obtained by these programs.

The MIS will be collected from a grid composed of 25 cells to characterize the 0.0625 ha area. Surface soils (the top 1 in.) will be characterized by collecting multi-increment samples that are

representative of the entire 0.0625 ha location. The multi-increment samples will be a mixture of 50 samples taken at a depth of 0 to 2.5 cm (0 to 1 in.). The samples will be selected using systematic sampling with a random start.

The target quantitation limits for soil are summarized for the study design in Table 3-2.

3.3.4 Multi-Increment Soil Sampling and Analysis Process

The soil sampling plan is based on MIS procedures that are designed to control the fundamental error (FE) for an average, based on collecting an adequate sample mass (Pitard 1993, *Pierre Gy's Sampling Theory and Sampling Practice: Heterogeneity, Sampling Correctness, and Statistical Process Control*; Ramsey 2004, *Sampling for Environmental Activities*). The following steps are involved in determining an adequate sample mass to collect in the field and the proper particle size for the analytical laboratory to measure for chemical and radiological analysis.

1. The sampling investigation unit size is 0.0625 ha. The sample location will be divided into a grid of 5 rows by 5 columns, yielding 25 grid cells, with a grid size of 5 by 5 m. Each of the 25 grid cells will be sampled, but with a random offset in each cell.

2. Select or measure a reasonable maximum sample particle size in the field. Because soils typically are defined as consisting of particles $\leq$2 mm, it will be assumed that the maximum particle size is 2 mm or 0.2 cm. This will be achieved by sieving the soil samples to exclude the > 2 mm size particles.

3. Select the desired FE, which has been specified as 10 percent. This corresponds to a standard error of 10 percent on the mean concentration. This value was selected to be low relative to other sources of error (i.e., analytical measurement error is typically 30 percent).

4. Calculate the mass of sample (M) needed based on the FE and particle size (diameter [d] in cm) as

$$M = 22.5\frac{d^3}{FE^2}$$

   If d=0.2 cm and FE=0.1 (10%), then M=18 g.

5. Using a scoop large enough to capture the maximum particle size, collect enough sample increments (k=50) to at least equal the mass calculated in Step 4 and place in a container, combining increments into one "sample" (M). Care will be taken to obtain consistent and representative samples for the desired sample depth, and the multi-increment sample will be formed such that the material is representative of the particle size fractions that are less than 2 mm. Sufficient sample mass will be collected for all laboratory analyses.

6. Repeat step 5 within the investigation area to obtain two field replicate samples by sampling from two additional sets of 50 systematic samples with a different random start for each replicate.

7. Deliver the soil samples and quality control (QC) samples to the laboratory.

8. Because sufficient sample mass of <2 mm screened soil will be collected for all laboratory analyses, the laboratory is expected to analyze the entire mass for each test method. According to item #4, this is a minimum of 18 g per analysis.

9. Calculate the concentration from the sample.

10. Concentration represents average concentration or activity in the investigation area.

Each multi-increment sample will be submitted to the analytical laboratory for analysis of radionuclides (Am-241, Cs-137, Sr-90, and isotopic plutonium).

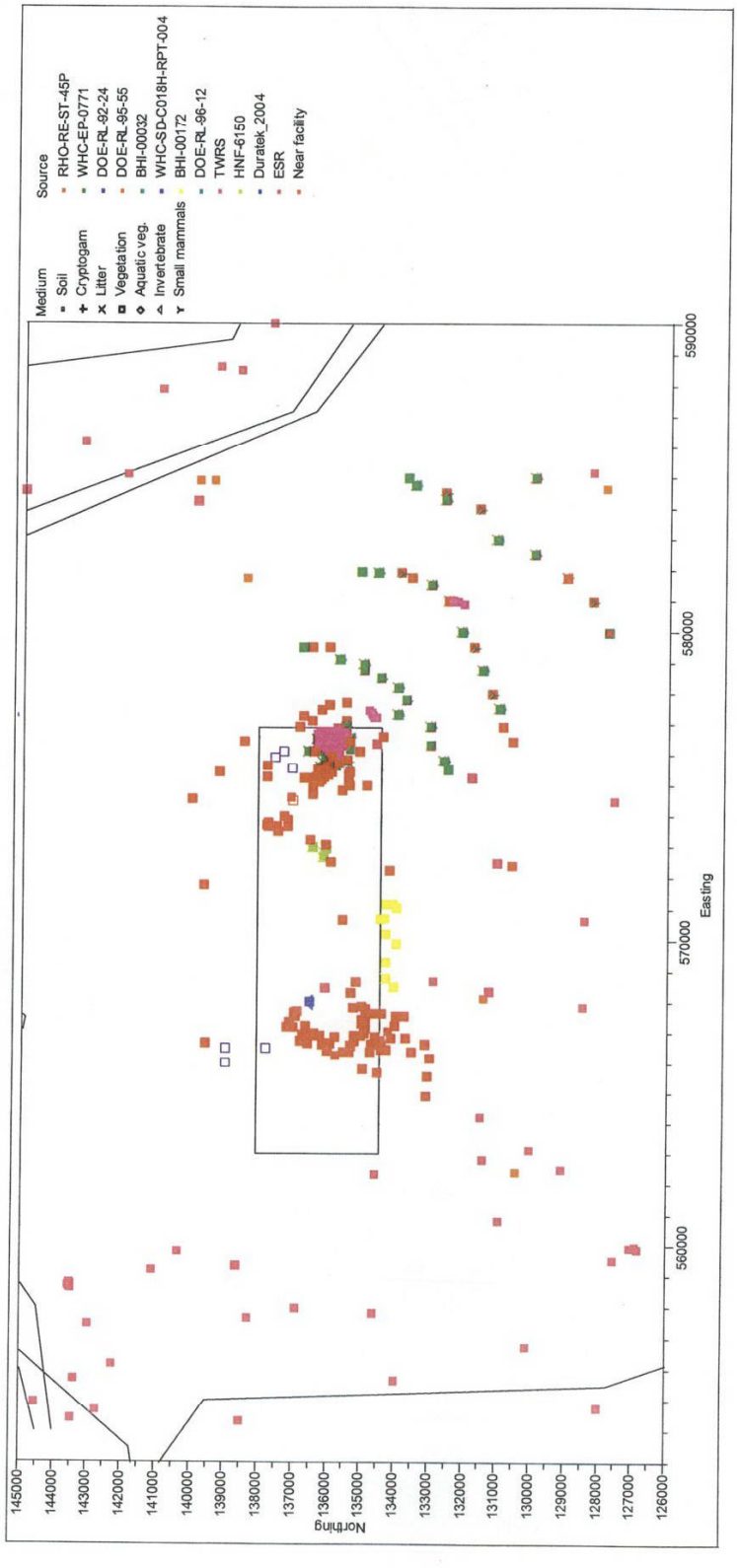

Figure 3-1. Locations of the Non-Waste-Site Data.

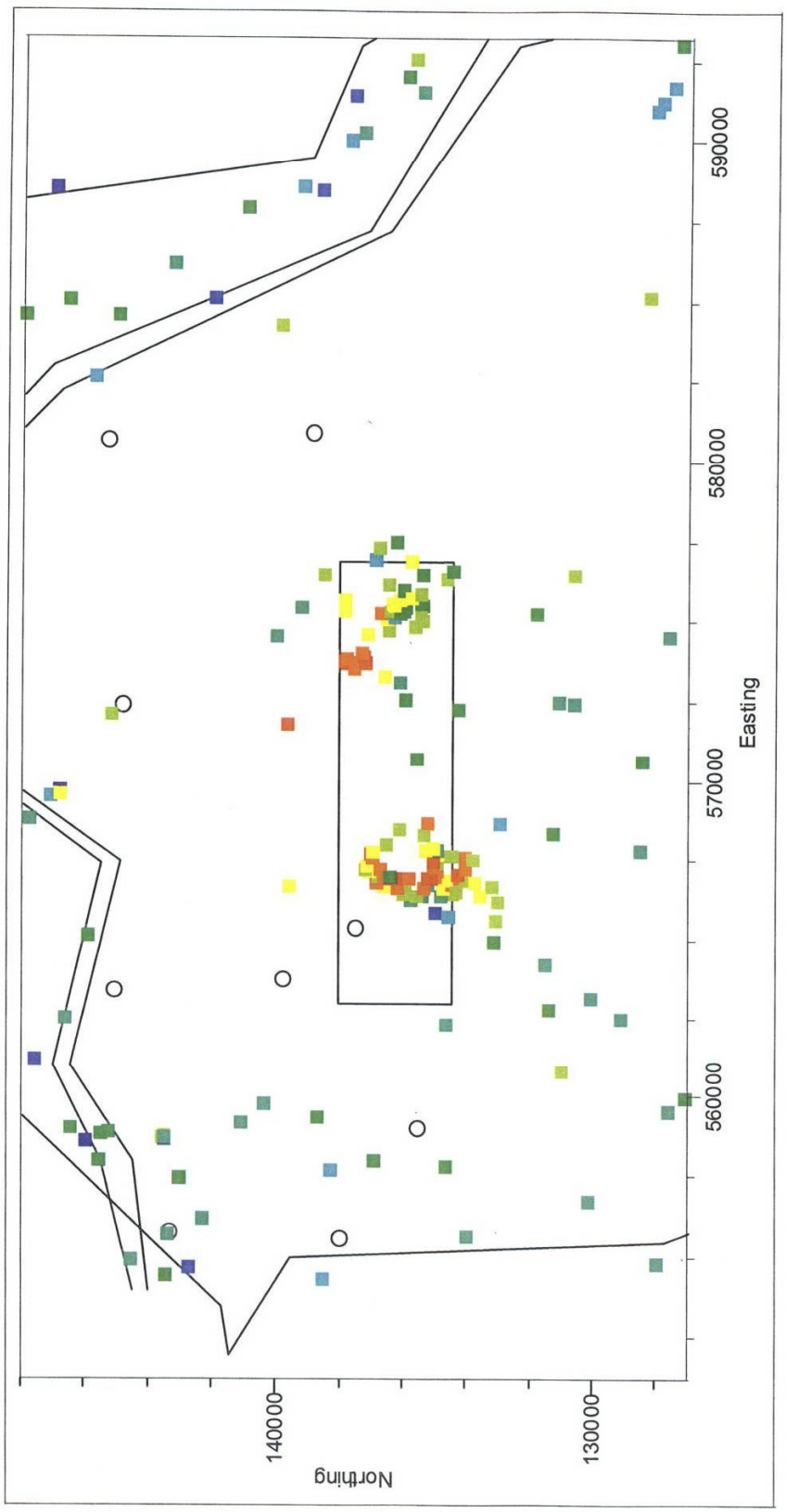

Figure 3-2. Maximum Cesium-137 Soil Concentrations from Each Sampled Location during 2000 to 2005.

Circles display the locations of the Phase I and II and 100 Area and 300 Area RCBRA reference sites.

RCBRA = River Corridor Baseline Risk Assessment.

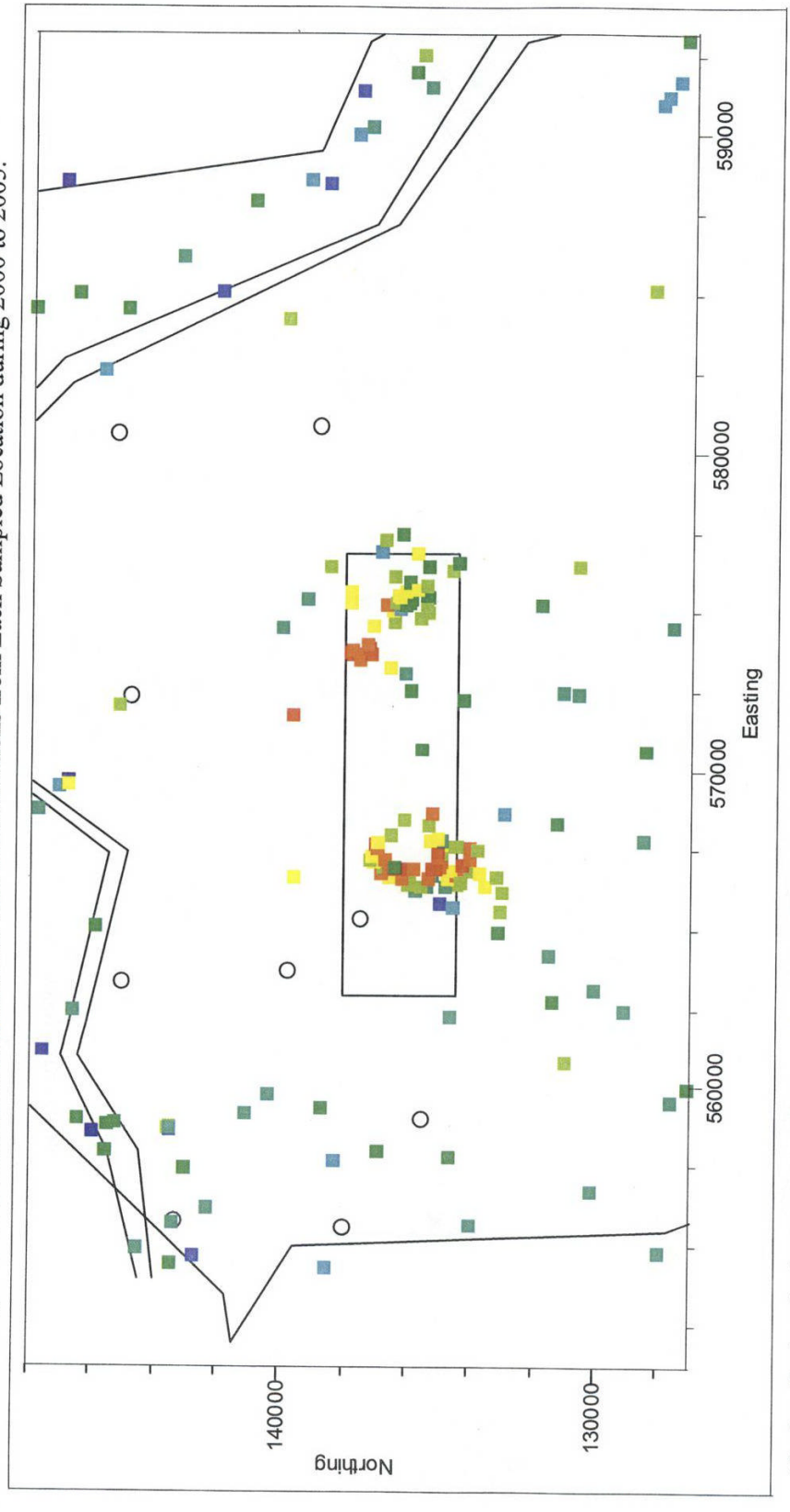

Figure 3-3. Maximum Plutonium-238 Soil Concentrations from Each Sampled Location during 2000 to 2005.

Circles display the locations of the Phase I and II and 100 Area and 300 Area RCBRA reference sites.
RCBRA = River Corridor Baseline Risk Assessment.

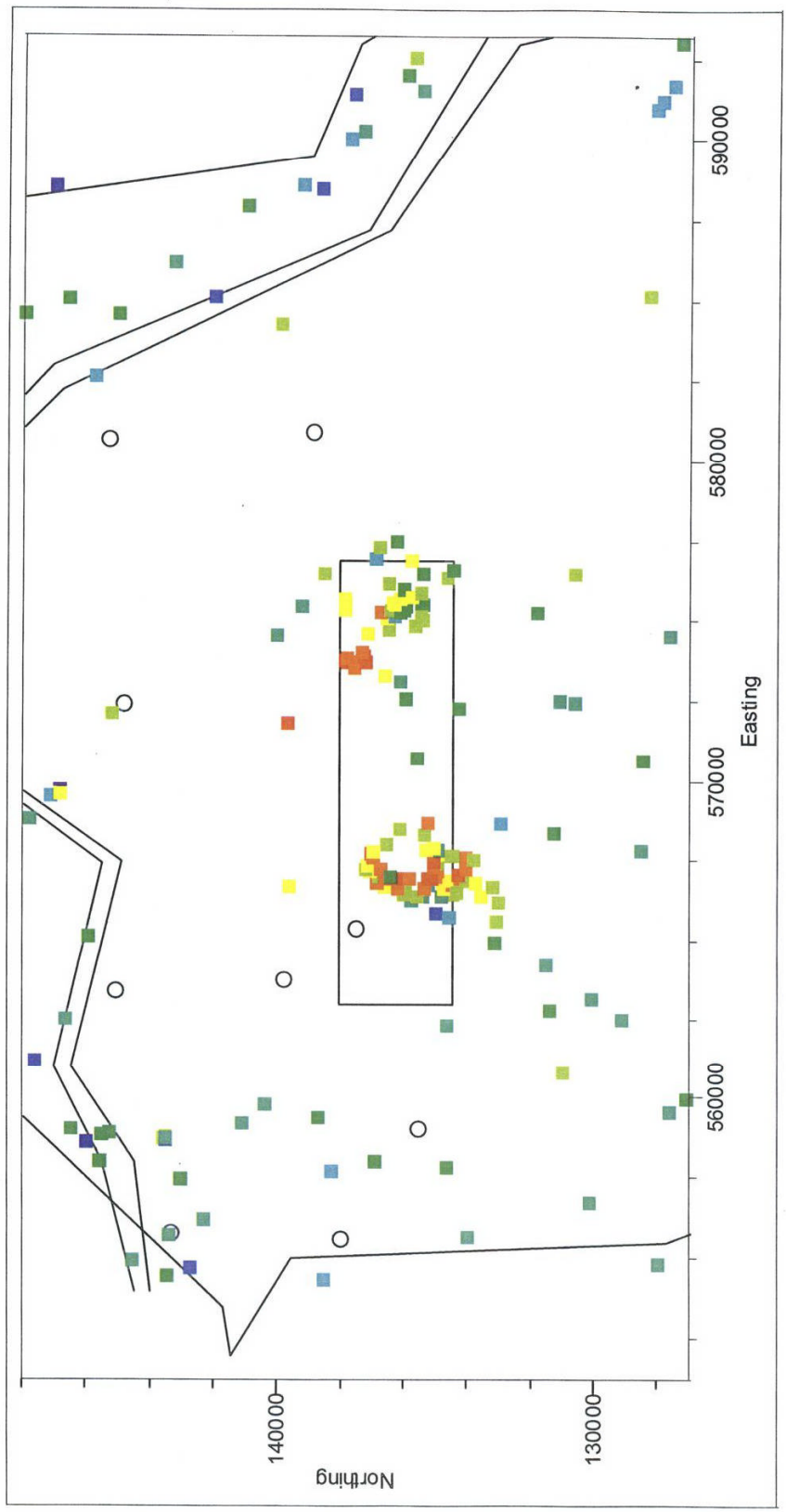

Figure 3-4. Maximum Plutonium-239/240 Soil Concentrations from Each Sampled Location during 2000 to 2005.

Circles display the locations of the Phase I and II and 100 Area and 300 Area RCBRA reference sites.

RCBRA = River Corridor Baseline Risk Assessment.

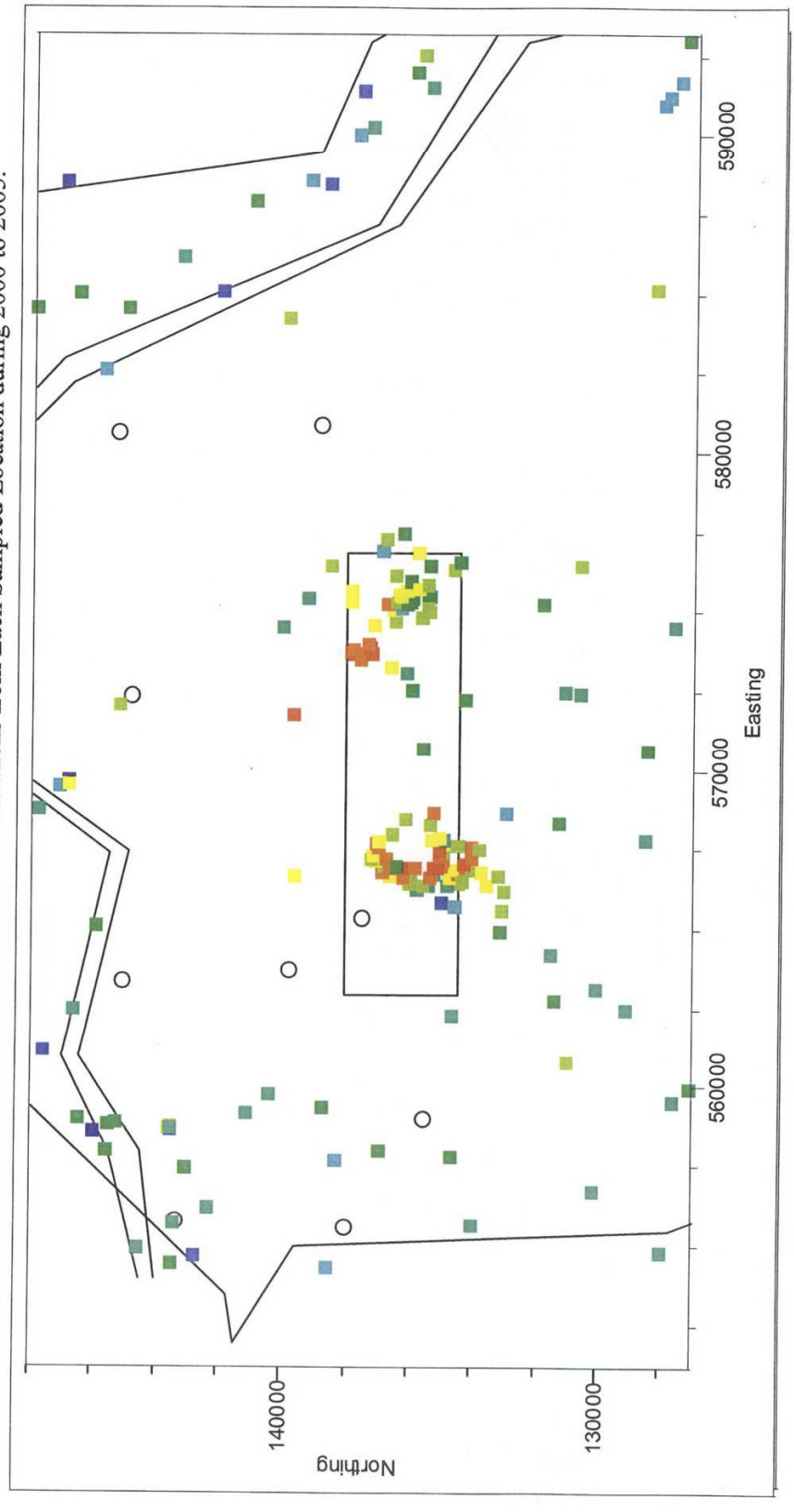

Figure 3-5. Maximum Strontium-90 Soil Concentrations from Each Sampled Location during 2000 to 2005.

Circles display the locations of the Phase I and II and 100 Area and 300 Area RCBRA reference sites.
RCBRA = River Corridor Baseline Risk Assessment.

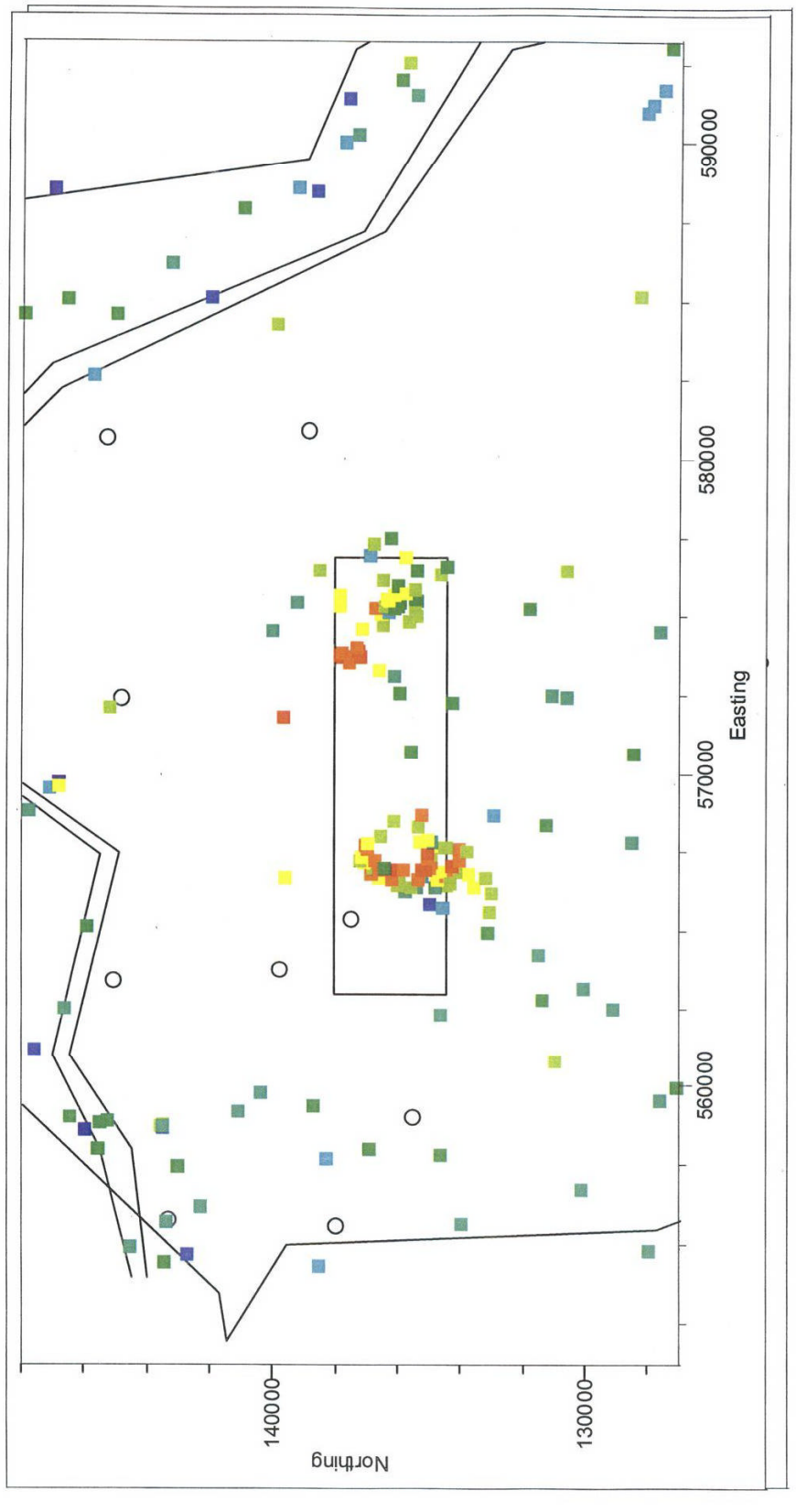

Figure 3-6. Maximum Cesium-137 Small-Mammal Concentrations from Each Sampled Location during 2000 to 2005.

Circles display the locations of the Phase I and II and 100 Area and 300 Area RCBRA reference sites.
RCBRA = River Corridor Baseline Risk Assessment.

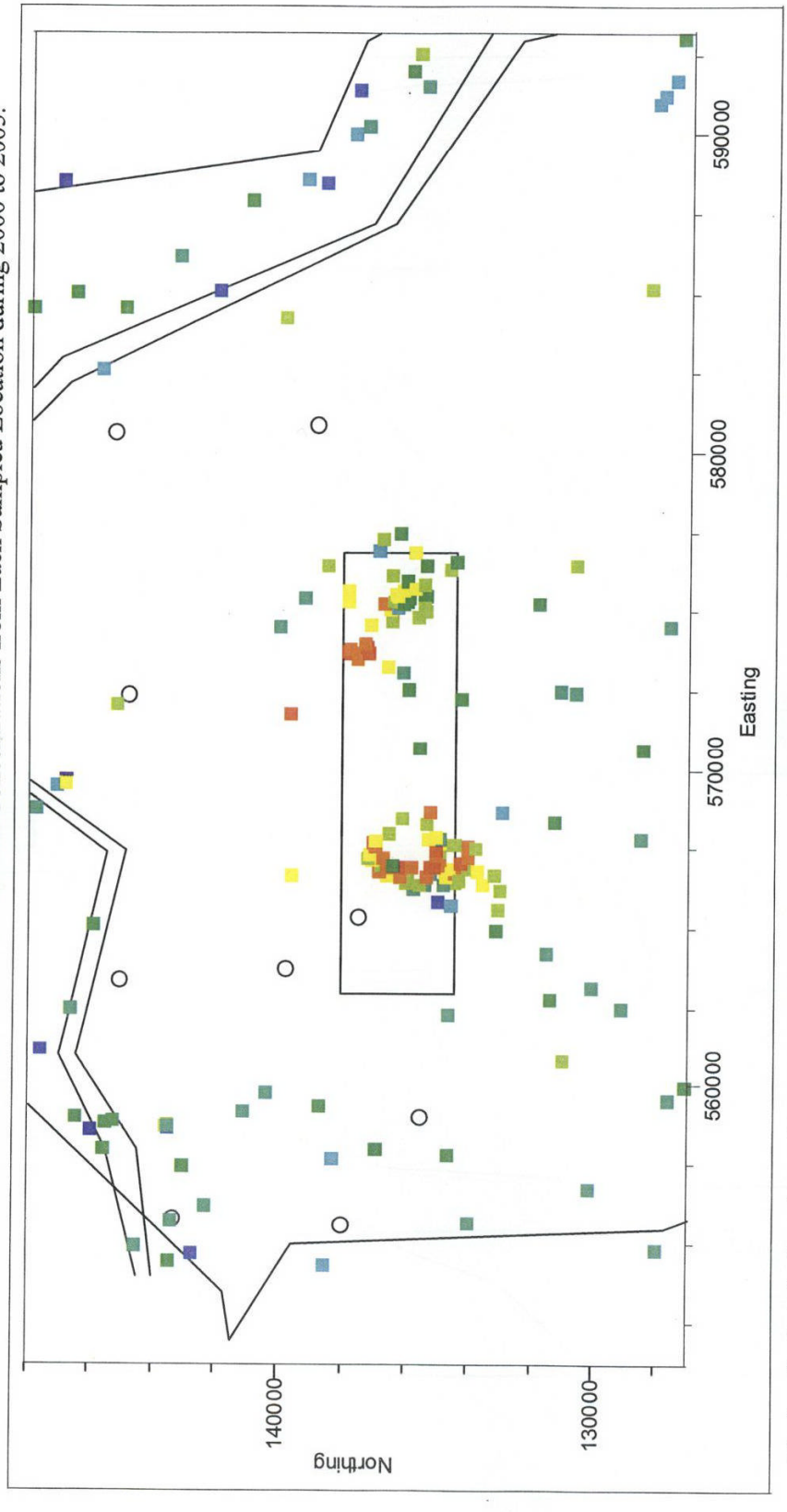

Figure 3-7. Maximum Strontium-90 Small-Mammal Concentrations from Each Sampled Location during 2000 to 2005.

Circles display the locations of the Phase I and II and 100 Area and 300 Area RCBRA reference sites.
RCBRA = River Corridor Baseline Risk Assessment.

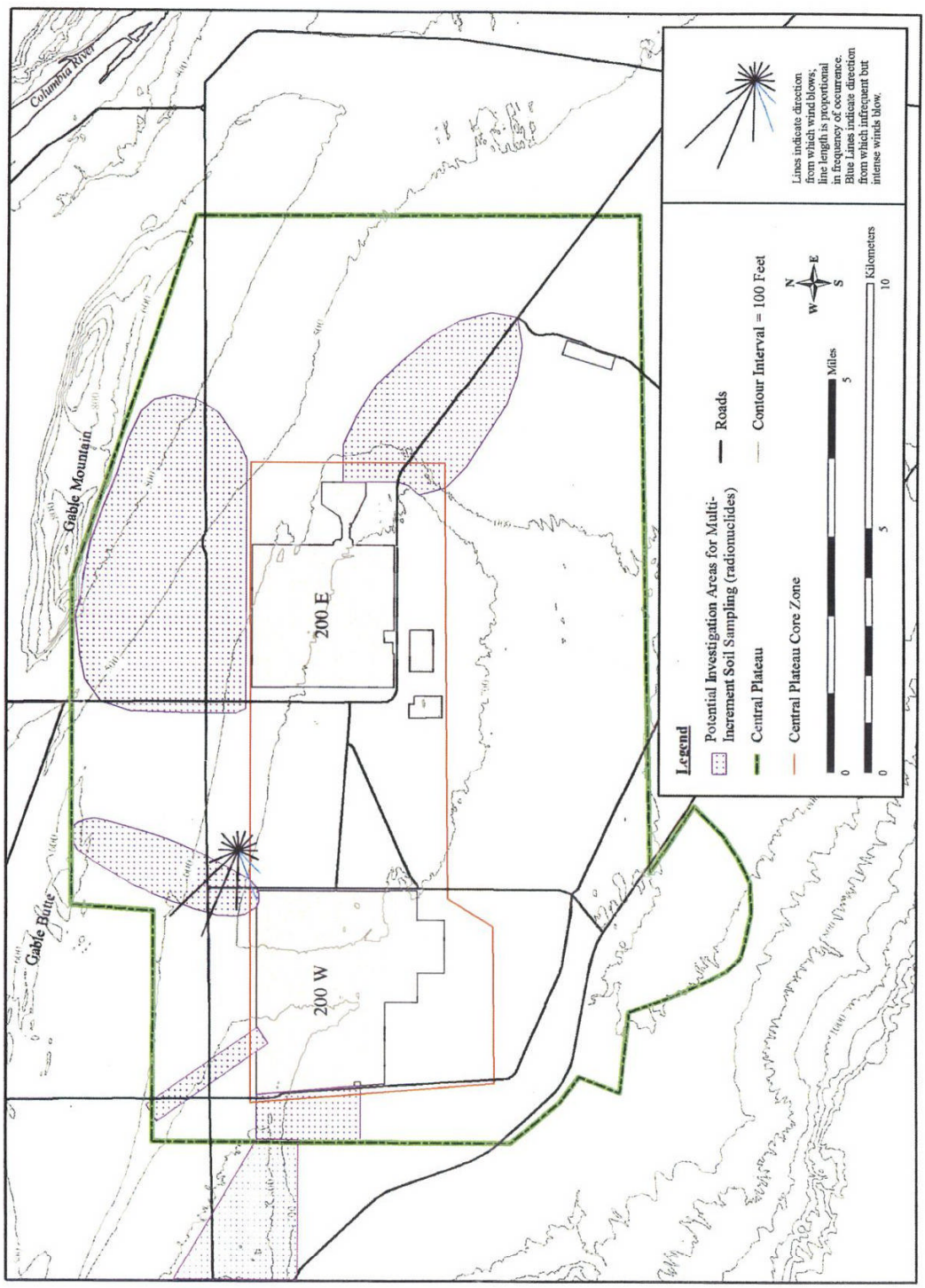

Figure 3-8. Map Displaying Radionuclide Data Gaps in Non-Waste-Site Areas.

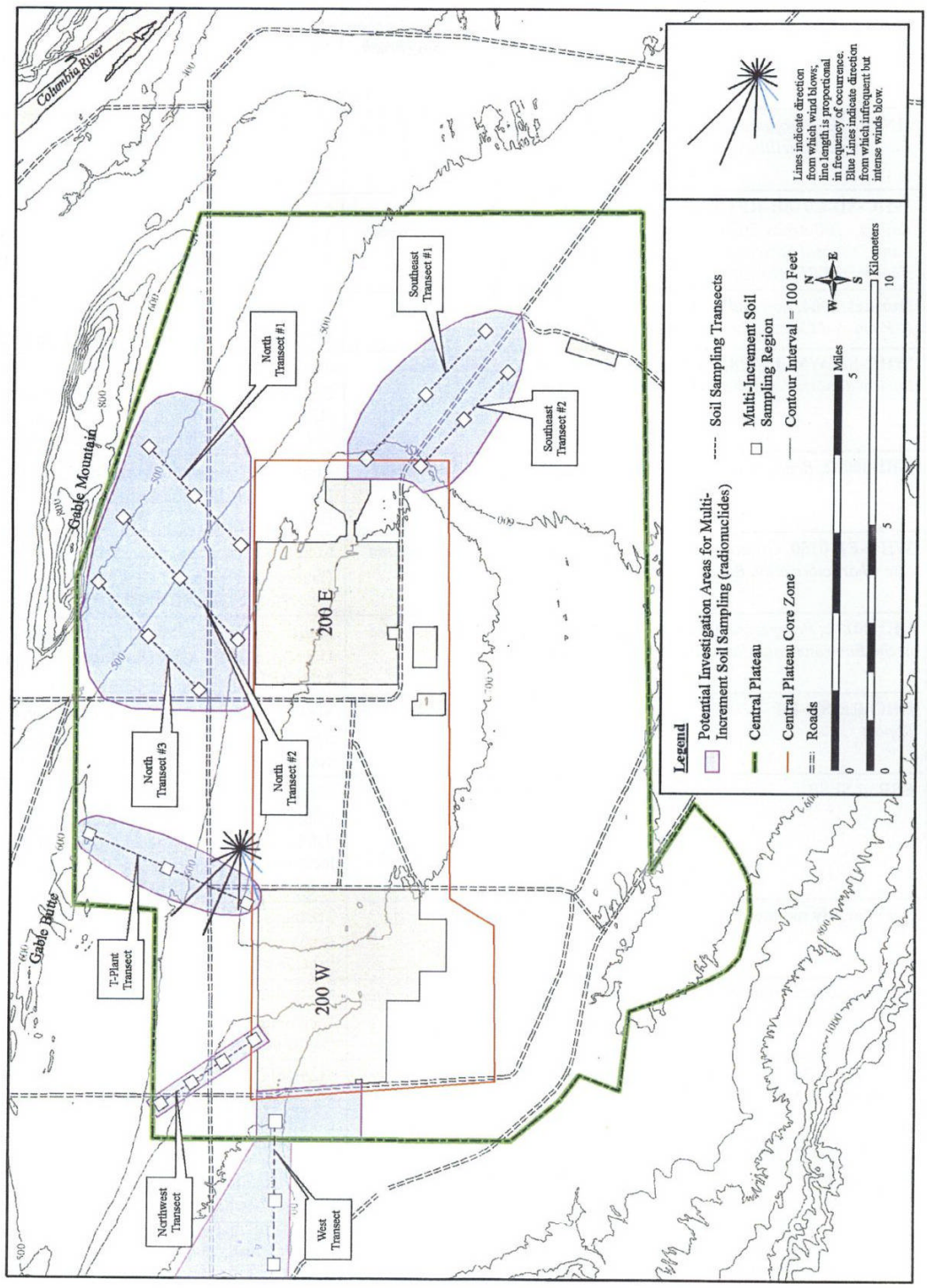

Figure 3-9. Map Displaying Transect Locations for Surface Soil Sampling in Non-Waste-Site Areas.

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Table 3-1. Summary of Data Resources.

Resource (Source Code is Bolded)	Description of Data Extracted
WHC-EP-0771, *Comparison of Radionuclide Levels in Soil, Sagebrush, Plant Litter, Cryptogams, and Small Mammals*	Media: soil, vegetation, litter, cryptogams, mice. Data and locations entered by hand. GPS coordinates extrapolated from BHI-011119.
HNF-6150, *Preoperational Environmental Survey for the Spent Nuclear Fuel Project Facilities*	Media: soil, vegetation, litter, cryptogams, mice. Data and locations entered by hand. GPS coordinates extrapolated from BHI-01119.
WHC-SD-C018H-RPT-004, *Preoperational Environmental Survey Report: 200 Areas Effluent Treatment Facility (ETF), State Approved Land Disposal Structure (SALDS), and Liquid Effluent Retention Facility (LERF) (C018H)*	Media: vegetation. Vegetation data entered by hand. Soil data have HEIS numbers but were not located in HEIS.
Duratek 2004, *Soil and Biota Collections at Gable Mountain Pond, B-Pond and Control Site*	Media: soil, vegetation, insects. Data from HEIS. GPS coordinates reported.
WHC-SD-WM-TI-778, *Preoperational/Operational Environmental Survey Report: Solid Waste Operations Complex*	Medium: soil. Soil data entered by hand (tab labeled "1987 data"), HEIS numbers (for soil, cryptogam, mammal, litter, veg.) present in file, but no results found in HEIS.
BHI-00032, *Ecological Sampling at Four Waste Sites in the 200 Areas*	Media: soil, vegetation, mice insects. Data from HEIS. Locations approximated using BHI-01119.
WHC-EP-0150, *Grout Treatment Facility Environmental Baseline and Site Characterization Report*	Media: Cryptogram, litter, soil, vegetation. Data entered by hand. GPS coordinates approximated from BHI-01119.
BHI-00172, *Preoperational Environmental Baseline Survey Conducted at the Environmental Restoration Disposal Facility (ERDF)*	Media: soil, vegetation, litter, cryptogams, mice. Data from HEIS. GPS coordinates extrapolated from BHI-01119.
RHO-RE-ST-45P, *PUREX Preoperational Environmental Survey Report*	Media: soil, vegetation, litter, cryptogams, mice. Radionuclides only. Data entered by hand. GPS coordinates extrapolated from BHI-01119.
ESR or SESP	Media: soil, vegetation (1990 to 2005). Data provided by PNNL personnel from their database. Coordinates were provided for some locations and converted to a common coordinate system.
Near-facility monitoring program	Media: soil, vegetation (1993 to 2003). Data provided by Duratek. Coordinates were provided for most locations.
DOE/RL-92-24, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*	Medium: soil. Data obtained from HEIS. Nonradionuclides only. Coordinates were not provided.
DOE/RL-95-55, *Hanford Site Background: Evaluation of Existing Soil Radionuclide Data*	Medium: soil. Data entered by hand. Radionuclides only. Coordinates provided.
DOE/RL-96-12, *Hanford Site Background: Part 2, Soil Background for Radionuclides*	Medium: soil. Some data obtained from HEIS, some data entered by hand. Radionuclides only.

ESR = environmental surveillance report.
GPS = global positioning system.
HEIS = *Hanford Environmental Information System* database.
PNNL= Pacific Northwest National Laboratory.
SESP = Surface Environmental Surveillance Project.

BHI-01119, *Hanford Site Atlas.*

Table 3-2. Analytical Performance Requirements for Soil.

COPEC or Additional Analytes	Chemical Abstracts Service #	Name/ Analytical Technology	Detection Limit Requirement		Matrix Specific Target Required Quantitation Limit [b] Soil (pCi/g)	Precision (%)	Accuracy (%)
			MDL (pCi/g)	PQL [a] (pCi/g)			
Americium-241	14596-10-2	AEA	1	1	3890	±30 [c]	70-130 [d]
Cesium-137	10045-97-3	GEA	0.1	0.1	20.8	±30 [c]	70-130 [d]
Plutonium-238 [e]	13981-16-3	Plutonium isotopic – AEA	1	1	54 [e]	±30 [c]	70-130 [d]
Plutonium-239/240	Pu-239/240	Plutonium isotopic – AEA	1	1	6,110	±30 [c]	70-130 [d]
Strontium-90	Rad-Sr	Total radioactive strontium – GPC	1	1	22.5	±30 [c]	70-130 [d]

[a] The ability to meet PQLs is dependant on the amount of sample obtained (e.g., especially biota) and matrix interferences.
[b] Values are Biota Concentration Guidelines (*RESRAD BIOTA*, ANL 2003) except where noted.
[c] Precision criteria for batch laboratory replicate sample analyses.
[d] Accuracy criteria for associated batch laboratory control sample percent recoveries. Except for GEA, additional analysis-specific evaluations also are performed for matrix spikes, tracers, and carriers as appropriate to the method.
[e] Value for plutonium-238 from DOE/RL-2005-40, *100-B/C Pilot Project Risk Assessment Report*.

AEA = alpha energy analysis.
COPEC = contaminant of potential ecological concern.
GEA = gamma energy analysis.
GPC = gas proportional counter.
MDL = minimum detection level.
N/A = not applicable.
PQL = practical quantitation limit.

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4.0 200 WEST AREA DISPERSED CARBON TETRACHLORIDE PLUME

Carbon tetrachloride was used extensively at the Hanford Site, mainly in the plutonium-recovery process. Discharges to the soil column resulted in a dispersed groundwater carbon tetrachloride plume in the 200 West Area. Since 1994, the Hanford Site has been pursuing carbon tetrachloride remediation activities such as soil-vapor extraction. With a few exceptions (Carlsen 1999, "Ecological Risks to Fossorial Vertebrates from Volatile Organic Compounds in Soil"; Spring et. al. 2004, "Effects of Trichloroethylene and Perchloroethylene on Wild Rodents at Edwards Air Force Base"), ERAs typically do not quantitatively address inhalation hazards posed by VOCs such as carbon tetrachloride. Characteristics of VOCs indicate that vapor-phase contaminants disperse rapidly in air following volatilization from soil or groundwater, resulting in negligible concentrations in surface air (DOE-STD-1153-2002; EPA 2005; Markwiese et al. 2003, "Abstract, Wildlife Screening Thresholds for Volatile Organic Chemicals"). However, the inhalation pathway is relevant at sites where VOCs are detected at soil depths occupied by biota because the potential for atmospheric dilution is limited (EPA 2005). This situation exists at the Hanford Site where carbon tetrachloride is a VOC present in subsurface soils. Because carbon tetrachloride can partition into a gas phase, the focus of the Phase III carbon tetrachloride investigation is on the soil-gas exposure pathway to burrowing mammals.

4.1 CARBON TETRACHLORIDE CONCEPTUAL EXPOSURE MODEL

Numerous ecological receptors exploit the subsurface to procure food, to escape predation, and to create a refuge from wide variations in climate. This life-history strategy is especially important for arid-adapted biota of the Hanford Site where organisms must deal with a water-limited environment. Use of below-ground habitat by plants, invertebrates, reptiles, birds, and mammals around the dispersed carbon tetrachloride plume may result in exposure in subsurface soil (Figure 4-1). While plant roots may be exposed to carbon tetrachloride, vapor-phase phytotoxicity testing has only recently received attention (Kapustka et. al. 2003, "Challenges in Organic Vapor-Phase Phytotoxicity Testing") and uncertainties between laboratory test results and field exposures, as well as basic data gaps, presently preclude assessing ecological effects that might result from this exposure pathway. Of soil fauna, toxicological information on the inhalation exposure pathway is limited to mammals. Phase III of the Central Plateau EcoDQO focuses on developing an inhalation ESL for assessing potential adverse effects from carbon tetrachloride on mammals in general and on fossorial mammals in particular.

Burrowing mammals have a greater exposure potential to subsurface carbon tetrachloride relative to other mammalian receptors and they are a key component of the Hanford Site's terrestrial environment. Fossorial organisms affect surface soils in many ways, and no other group influences near-surface (ca. the top 30 to 50 cm) soil mixing more profoundly than mammals (Nevo 2000, *Mosaic Evolution of Subterranean Mammals: Regression, Progression and Global Convergence*; Smallwood et. al. 1998, "Animal Burrowing Attributes Affecting Hazardous Waste Management"). Burrowing mammals rework the soil surface over most of the North American continent, resulting in the deposition of fecal material, the intermixing of

vegetation, and the significant aeration of upper soil layers. These actions dramatically affect soil fertility, permeability by air and water, and can greatly affect soil colonization by other soil fauna and plants (Dindal 1990, *Soil Biology Guide*; Hole 1981, "Effects of Animals on Soil"; Laundré 1993, "Effects of Small Mammal Burrows on Water Infiltration in a Cool Desert Environment"). Burrowing mammals also are important to surface deposition and general redistribution of buried hazardous wastes (Smallwood et. al. 1998) and represent a link between buried waste and ecological exposure to organisms predating on contaminated fossorial mammals. To facilitate the assessment of carbon tetrachloride inhalation risks to burrowing mammals, a carbon tetrachloride ESL was calculated for this functional ecological group.

4.2 SUBTERRANEAN ECOLOGICAL RECEPTORS AT HANFORD

The most prevalent burrowing small mammals present on the Hanford Site include pocket mice (*Perognathus parvus*) and the Northern pocket gopher (*Thomomys talpoides*). Inhalation exposure calculations for fossorial mammals developed by the Los Alamos National Laboratory using parameters for the Botta's pocket gopher (*Thomomys bottae)* are applicable to burrowing receptors at the Hanford Site. Botta's pocket gopher is a suitable surrogate screening receptor for inhalation exposure because it represents several fossorial and semi-fossorial species (e.g., Northern pocket gopher, pocket mice, rabbits) that may occupy burrows at sites with subsurface vapor-phase contamination. Botta's pocket gopher shares the same family and genus as the Northern pocket gopher, which is present on the Hanford Site in areas where fine-grained soils are at least 30 cm (12 in.) deep (PNL-4140, *Habitat Requirements and Burrowing Depths of Rodents in Relation to Shallow Waste Burial Sites*). Gophers are obligately fossorial and their primary habitat is below ground (Chase et. al. 1982, "Pocket Gophers: Geomyidae"). The weight of the Botta's pocket gopher used in the inhalation ESL is slightly higher than the range of body weights of the Northern pocket gopher in Washington State (ESL body weight parameter = 140 g, Northern pocket gopher weight range =75-130g [University of Washington, 2006, *Burke Museum of Natural History and Culture*, Online reference: *Mammals of Washington*. Entry: Northern Pocket Gopher, *Thomomys talpoides*]). Relative to *T. talpoides*, use of *T. bottae* body weight is a protective approach, because the larger body weight results in a greater volume of air taken in and consequently greater exposure potential. Other burrowing ecological receptors at the Hanford Site, such as the Great Basin pocket mouse, are more abundant and have lower body weights and higher weight-normalized air inhalation rates, which increase their potential for carbon tetrachloride exposure. Relative to a pocket gopher, however, these other receptors spend much less time underground and typically experience less cumulative exposure to subsurface burrow air. Therefore, the inhalation ESLs calculated for the gopher are protective of other mammals potentially exposed to subsurface carbon tetrachloride. The protective ESL developed for carbon tetrachloride can be compared to direct measurements of carbon tetrachloride in burrow air.

4.3 DERIVATION OF THE CARBON TETRACHLORIDE TOXICITY REFERENCE VALUE

The general inhalation ESL model for burrowing mammals is:

$$ESL = (BW * TRV/IR) * Occupancy\ Factor$$

where

ESL is the CCl_4 ecological screening level (mg/m^3)
BW is the ecological receptor body weight (kg)
TRV is the CCl_4 toxicity reference value (mg/kg/d)
IR is the ecological receptor inhalation rate (m^3/d)
Occupancy Factor is the fraction of time the ecological receptor spends in the burrow.

Several protective exposure assumptions were used in calculating the ESL, such as the use of the smallest body weight (BW) (LA-13719-MS, 2000, *The Relationship between Pocket Gophers (*Thomomys bottae*) and the Distribution of Buried Radioactive Waste at the Los Alamos National Laboratory, Los Alamos, New Mexico*) for the ecological receptor to result in a maximum weight-adjusted inhalation rate as well as use of the maximum BW in TRV derivation to yield the lowest TRV. In addition, an occupancy factor of 1 for the ecological receptor is used to represent 100 percent occupancy for maximum exposure time.

A comprehensive review of the scientific literature was performed to collect inhalation toxicity data for mammals (LA-UR-05-7424, 2005, *ECORISK Database*). The measured endpoints were evaluated against an exclusion criterion for ecological relevance (e.g., uncertainty with respect to extrapolating the endpoint to the capacity of a wildlife population to reproduce successfully). These endpoints included reproduction, development, and adult survival and growth. Endpoints such as histopathology or biochemistry were excluded because these types of sub-organismal changes were considered to have an unacceptable level of uncertainty for extrapolating effects on wildlife populations.

To gauge the level of uncertainty associated with the scientific literature, confidence criteria and scores typically are developed to rate the degree of relevance and quality of the data (Markwiese 2004, "Collection and Evaluation of Existing Data: An Ecological Risk Assessment Perspective"). For this project, a confidence score was developed for interpreting uncertainties in data applicability based on 20 criteria in the following categories:

- Study design
- Test organism relationship to screening receptor
- Exposure conditions
- Measurements and results.

The Los Alamos National Laboratory *ECORISK Database*, (LA-UR-05-7424, 2005) was used to develop these criteria. To assess the data quality of the toxicity information used to calculate inhalation screening values, confidence scores were applied to the toxicity values (Table 4-1).

The toxicity value scores were associated with confidences of high, medium, low, or unacceptable, corresponding to specific percentage ranges of the maximum possible score (Table 4-1).

The toxicity values with high or medium confidences were used to develop the carbon tetrachloride TRV. The basis for the TRV is an effect level equivalent to a chronic NOAEL. The toxicity values represent effect levels including the following:

- NOAELs
- Lowest observed adverse-effect levels (LOAEL)
- NOAELs bound by a LOAEL
- Other effect levels such as lethal dose or concentration for 50 percent of the test population ($LD_{50\ or}\ LC_{50}$, respectively).

The exposure durations associated with these effect levels included chronic, chronic-critical life stage, subchronic, and acute. If a chronic NOAEL was not available, other effect levels were extrapolated to represent chronic NOAEL-based effect levels by applying one or more uncertainty factors (UF) (i.e., fractional multipliers between 0.01 and 0.1 that were applied to the effect level to ensure protectiveness of the TRV [LA-UR-05-7424, 2005]). The UF is 1 (chronic – critical life stage or chronic NOAEL), 0.1 (subchronic NOAEL or chronic – critical life stage or chronic LOAEL), or 0.01 for all other toxicity values (e.g., LD_{50}). To minimize compounded conservatism, the product of UFs applied to an effect level did not exceed a 100-fold reduction. Once UFs were applied, the chronic NOAEL-based effect levels were developed into the carbon tetrachloride TRV using

$$TRV = \frac{C * IR}{BW} * T_f$$

where

TRV = toxicity reference value (mg/kg/d) for CCl_4
C = effect level; the concentration (mg/m^3) of CCl_4 in air
IR_j = inhalation rate (m^3/day)
BW_j = body weight (kg)
T_f = fraction of time exposed.

The effect levels (C) were converted from original exposure units (typically parts per million by volume) to a mass per reference volume (mg/m^3) using the ideal gas law and assuming standard temperature and pressure conditions.

$$\text{Concentration } (mg/m^3) = [\text{Concentration (ppmv)} * MW]/24.45$$

where

MW = molecular weight (g/mol)
24.45 = ideal gas law constant at standard temperature and pressure.

If not provided in the study, the test organism's inhalation rate (IR) is based on its BW in kilograms according to the following equation (Stahl 1967, "Scaling of Respiratory Variables in Mammals"):

$$IR = 0.5458*BW^{0.80}.$$

The maximum body weight reported in the literature was selected to obtain the minimum TRV to ensure protectiveness.

The type of inhalation exposure test organisms received was categorized as continuous or intermittent. In continuous exposure studies, test organisms were exposed for 24 hours/day, 7 days/week and the fraction of time the organisms were exposed was equal to 1. In intermittent exposures, test organisms inhaled chemical vapors for a certain number of hours per day and number of days per week for a certain study length (e.g., 4 hours/day, 5 days/week, for 10 weeks). In this example, the actual amount of time the organisms were exposed to the chemical is determined as a fraction (T_f) of the chemical administration period and used as the fraction of time the test organisms are exposed to vapors (i.e., actual chemical exposure time/total chemical administration period) (LA-UR-05-7424, 2005; Johnson and Jay 1999, "Development and Derivation of Inhalation Benchmark Values for Wildlife: An Application to Identify Ecological Risk for the Anniston Chemical Disposal Facility Incinerator, Anniston, AL"). For example, an intermittent exposure design consisting of exposure for 4 hours/day, 5 days/week, for 10 weeks is equal to 200 hours of actual chemical exposure time during a 1,680-hour (10-week) chemical administration period. This example has a T_f of 0.12.

Carbon tetrachloride toxicity data were sufficient to calculate a geometric mean TRV. Use of the geometric mean was desirable in summarizing TRVs because, relative to the arithmetic mean, it is less sensitive to the influence of outliers and the geometric mean is used by EPA to derive soil screening values (EPA 2005). The geometric mean also is desirable because it incorporates toxicity data from multiple studies resulting in a more robust estimate of the adverse effect threshold. The geometric mean TRV is the n^{th} root of $(TRV_1)(TRV_2)...(TRV_n)$ where n is greater than 3 and each TRV represents chronic NOAEL-based effect levels. As with the effect levels underlying individual carbon tetrachloride TRVs, the geometric mean carbon tetrachloride TRV was assigned a confidence rating.

The confidence score for the geometric mean TRV was based on 11 criteria (LA-UR-05-7424, 2005) including the following:

- Number of experiments
- Type of exposure medium
- Number of test organism orders
- Number of unique measurements (endpoints)
- Type of endpoint category
- Number and type of the TRVs
- Confidence rating of TRVs in a data set
- Outlier(s) in data set distribution
- Assessment of bimodality of data set
- Relationship of geometric mean TRV to chronic LOAEL-based TRVs
- Relationship of geometric mean TRV to other published TRVs.

Based on this evaluation the geometric mean TRV could be rated with a low, medium, or high confidence; which corresponds to specific percentage ranges of the maximum total score possible for the evaluation. Table 4-2 lists the results of this scoring. This process is similar to ecological soil screening level TRV ranking (EPA 2005) for assessing data quality in the input to TRV calculations.

4.4 DERIVATION OF THE CARBON TETRACHLORIDE ECOLOGICAL SCREENING LEVEL

The calculation of the inhalation carbon tetrachloride ESL is completed using the carbon tetrachloride toxicity study NOAELs that exist for this VOC (Figure 4-2).

The ESL was calculated as

$$ESL = (BW * TRV/IR) * Occupancy\ Factor$$

$$ESL = 5.7\ mg/m^3$$

where

BW = 0.104 kg; a site-specific minimum measured field value for *T. bottae*
TRV = 4.88 mg/kg/d based on the geometric mean of chronic NOAEL-based effect levels (Figure 4-2)
IR = 0.089 mg/m^3 based on the equation $0.5458*BW^{0.8}$ (kg)
Occupancy Factor = 1.

The TRV is a geometric mean derived from a data set (Figure 4-2) of 15 NOAEL-based effect levels representing 9 experiments from 3 studies (Alexeeff and Kilgore 1983, *Learning Impairment in Mice Following Acute Exposure to Dichloromethane and Carbon Tetrachloride*; Prendergast et al. 1967, "Effects on Experimental Animals of Long-Term Inhalation of Trichloroethylene, Carbon Tetrachloride, 1,1,1-Trichloroethane, Dichlorodifluoromethane, and 1,1-Dichloroethylene"; Schwetz et al. 1974, "Embryo- and Fetotoxicity of Inhaled Carbon Tetrachloride, 1,1-Dichloroethane, and Methyl Ethyl Ketone in Rats"). The data set represents five unique measurements (fetal body weight, pre-adolescent body weight change, maternal body weight, adult body weight gain, and adult mortality) corresponding to the general endpoint categories of development, adult body weight change, and adult survival. The data set included six test organisms (beagle, rabbit, monkey, mouse, rat, and guinea pig) that span four phylogenetic test organism orders (*Carnivora, Lagomorpha,* Primates, and *Rodentia*).

All of the NOAEL-based effect levels used to calculate the geometric mean TRV had medium confidence. Table 4-1 provides the confidence scoring for a toxicity value (chronic - critical life stage LOAEL of 1100 mg/kg/d) from Alexeeff and Kilgore (1983), to which a UF of 0.1 was applied to derive the chronic NOAEL-based effect level (110 mg/kg/d) included in the carbon tetrachloride TRV data set. This toxicity value represents a developmental endpoint, pre-adolescent body weight change in mice. The TRV for carbon tetrachloride also had a medium confidence because the weighted score was 69, which is 65 percent of the maximum total weighted score (109) for an inhalation geometric mean TRV. Table 4-2 provides the

confidence scoring and confidence brackets, respectively, for the geometric mean TRV for carbon tetrachloride.

The inhalation ESL for carbon tetrachloride is listed in Table 4-3 and presented in units of ppmv and mg/m^3 for flexibility in comparing the ESL to soil gas data. Associated TRVs and the number of chronic NOAEL-based effect levels that comprise the TRV also are presented. The TRVs used to calculate the ESL were geometric means of 15 chronic NOAEL-based effect levels and associated with medium confidence.

4.5 SCREENING HANFORD SITE CARBON TETRACHLORIDE SOIL GAS DATA

The ESL for carbon tetrachloride can be used to quantitatively evaluate potential hazards posed by carbon tetrachloride inhalation to burrowing mammals. Furthermore, confidence ratings associated with the ESL can be used to interpret conclusions about potential risks to such receptors. Protective assumptions in the exposure model are employed to ensure that carbon tetrachloride concentrations measured below the ESL are unlikely to be hazardous. For example, the geometric mean is more robust than the arithmetic mean against the influence from extreme values. Furthermore, use of a geometric mean TRV is protective of wildlife populations because it incorporates multiple ecologically relevant TRVs for a broad range of ecological receptors.

Estimates of burrow air were obtained by using soil pore-gas data collected from depths occupied by fossorial animals; these data would have the least amount of uncertainty associated with exposure. Specifically, soil-gas data were limited to those collected at depths between 0 and 4.6 m (0 and 15 ft) below ground surface (Appendix D). Depths beyond 4.6 m (15 ft) are not representative of likely exposures to burrowing mammals, as the biologically active zone is typically shallower than 4.6 m (Section 2.1, WMP-20570). Soil pore-gas carbon tetrachloride concentrations are assumed to be equivalent to burrow air concentrations and are compared directly to the ESL. This is a conservative approach, which is less representative of actual exposure because burrow air is assumed to equal the soil gas concentration; the exposure concentration does not account for burrow air exchange. Ecological realism can be increased by modifying the model to account for the fact that animals construct burrows to optimize ventilation (Vogel et al. 1973, "Wind-Induced Ventilation of the Burrow of the Prairie-Dog, *Cynomys ludovicianus*"), thereby facilitating exchange with surface air, minimizing VOC concentrations in burrows.

The Phase III assessment of the dispersed carbon tetrachloride plume includes an exposure assessment for burrowing animals residing in potentially affected locations. Available soil-gas data from the Hanford Site soil-gas monitoring program indicate that the carbon tetrachloride-inhalation ESL was exceeded in many areas associated with the dispersed carbon tetrachloride plume in the 200 West Area. This information will be used in field reconnaissance activities to identify candidate burrows for in situ burrow-air measurements (Figure 4-3).

Because soil-gas concentrations of carbon tetrachloride exceeded the inhalation ESL for fossorial mammals in some locations, additional characterization is proposed to help interpret potential risks to these receptors. A tiered investigation approach has been developed that will evaluate habitat suitability and presence/absence of receptors at locations where soil-gas concentrations of

carbon tetrachloride indicate potential risks (Figure 4-4). In the event that empirical burrow-air data exceed the carbon tetrachloride ESL, subsequent investigation, including potential health effects studies, may occur where suitable habitat and receptors are present in locations with elevated soil-gas concentrations of carbon tetrachloride.

4.6 STUDY DESIGN FOR CARBON TETRACHLORIDE

Areas for investigation of inhalation risks to burrowing mammals will be identified based on the results of preliminary soil-gas data analysis and field reconnaissance activities to scope potential habitat. Initial selection of investigation areas is based on analytical data, including the magnitude and frequency of ESL exceedances (as represented by hazard quotients), and the presence of near-surface carbon tetrachloride reported by recent (2003 and 2004) passive soil-gas survey results (Appendix D). The passive gas samples (EMFLUX[1]) show where carbon tetrachloride was detected in the 0 to 1.5 m samples. Reconnaissance of habitat suitability and receptor presence/absence will be performed to determine the likelihood of exposure to burrowing small mammals in locations where carbon tetrachloride has been documented in soils. This information also may be used to select areas for burrow-gas sampling.

4.6.1 Carbon Tetrachloride Risk Questions

Habitat suitability for burrowing small mammals is a function of vegetation and level of disturbance. Observations will be conducted to answer the following questions.

- Are areas of relatively elevated carbon tetrachloride concentrations encompassed or bordered by suitable habitat (i.e., vegetation, soil type)?
- Are areas of relatively elevated carbon tetrachloride concentrations situated in areas of low-to-moderate industrial development or human disturbance?

4.6.2 Carbon Tetrachloride Field Reconnaissance

The presence of fossorial small mammals will be assessed visually, noting observations of burrow holes and mounds, runways, and small-mammal droppings if present. Because small-mammal populations fluctuate seasonally, reconnaissance surveys will be conducted during periods of optimal small-mammal activity. Reconnaissance activities will result in the identification of candidate burrows for burrow-air sampling.

Before the active burrow-gas measurements are collected, EMFLUX tube measurements will be collected at animal burrows targeted for gas sampling to verify that carbon tetrachloride is present in subsurface. The screening step will employ EMFLUX tubes placed in association with candidate burrows; burrows with higher readings will be targeted for active-gas

[1] EMFLUX is a registered trademark of Beacon Environmental Services, Inc., Bel Air, Maryland.

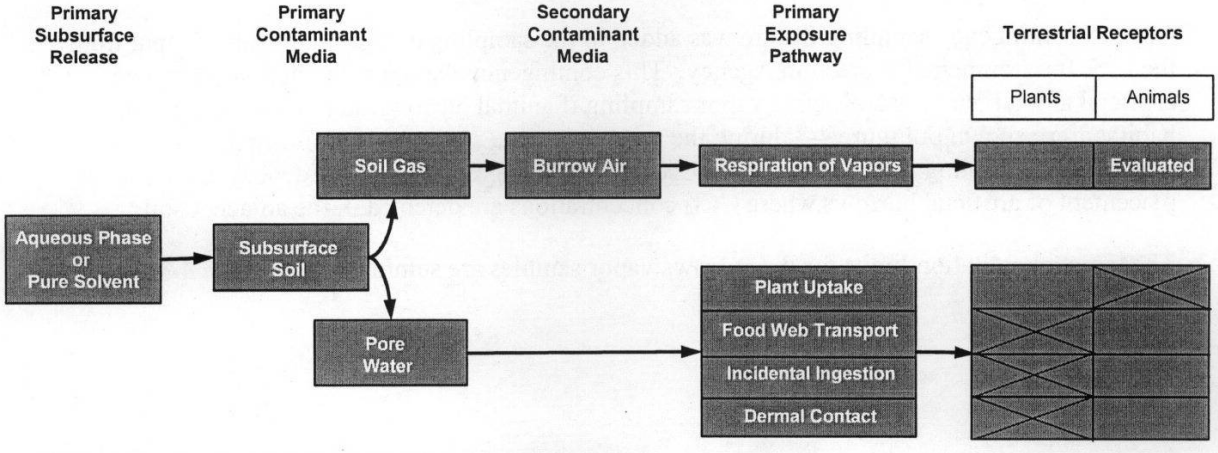
measurements. Burrow air will be measured by actively collecting gases (Summa[2] canister) from within burrows to empirically determine the carbon tetrachloride gas concentrations to which fossorial animals are exposed.

Note: A contingency sampling feature was added to the sampling design as a result of input from the U.S. Environmental Protection Agency. This contingency feature calls for installation of artificial animal burrows and active vapor sampling if animal burrows do not exist within the habitat areas shown in Figure 4-3 during the reconnaissance surveys. If performed, this contingency sampling will include EMFLUX tube passive gas sampling to identify locations for placement of artificial burrows where CCl_4 concentrations are detected in the adjacent soils.

The target quantitation limits for the burrows vapor samples are summarized in Table 4-4.

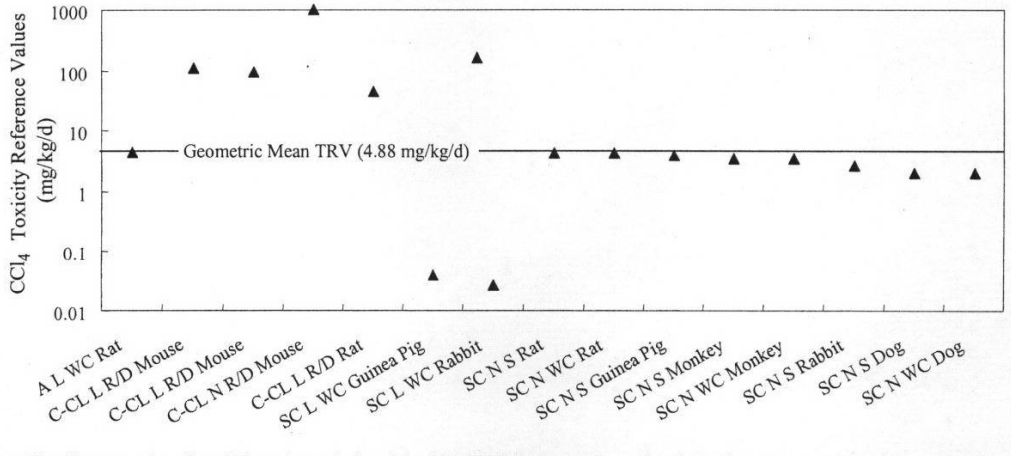
[2] SUMMA is a trademark of Moletrics, Inc., Cleveland, Ohio.

Figure 4-1. Potential Ecological Exposure Pathways for Carbon Tetrachloride in Subsurface Soils.



NOTE: Blank cells are not evaluated; cross-hatched cells are not applicable.

Figure 4-2. Chronic NOAEL-Based Toxicity Reference Values and their Geometric Mean for Carbon Tetrachloride Inhalation in Mammals.



Notes: On the x-axis, the 15 carbon tetrachloride TRVs used to calculate the geometric mean are listed by exposure duration (A, SC, C-CL); original effect category (N, L); effect type (WC, S, R/D); and test organism. Each TRV was scored as having medium confidence.

▲ = reference value.
A = acute.
C-CL = chronic/critical life stage.
L = lowest observed adverse-effect level.
N = no observed adverse-effect level.
NOAEL = no observed adverse-effect level.
– = geometric mean.
R/D = reproduction/development.
S = survival.
SC = subchronic.
WC = weight change.

Figure 4-3. Exceedances of Inhalation Ecological Screening Level for Carbon Tetrachloride and Habitat Characteristics of the 200 West Area.

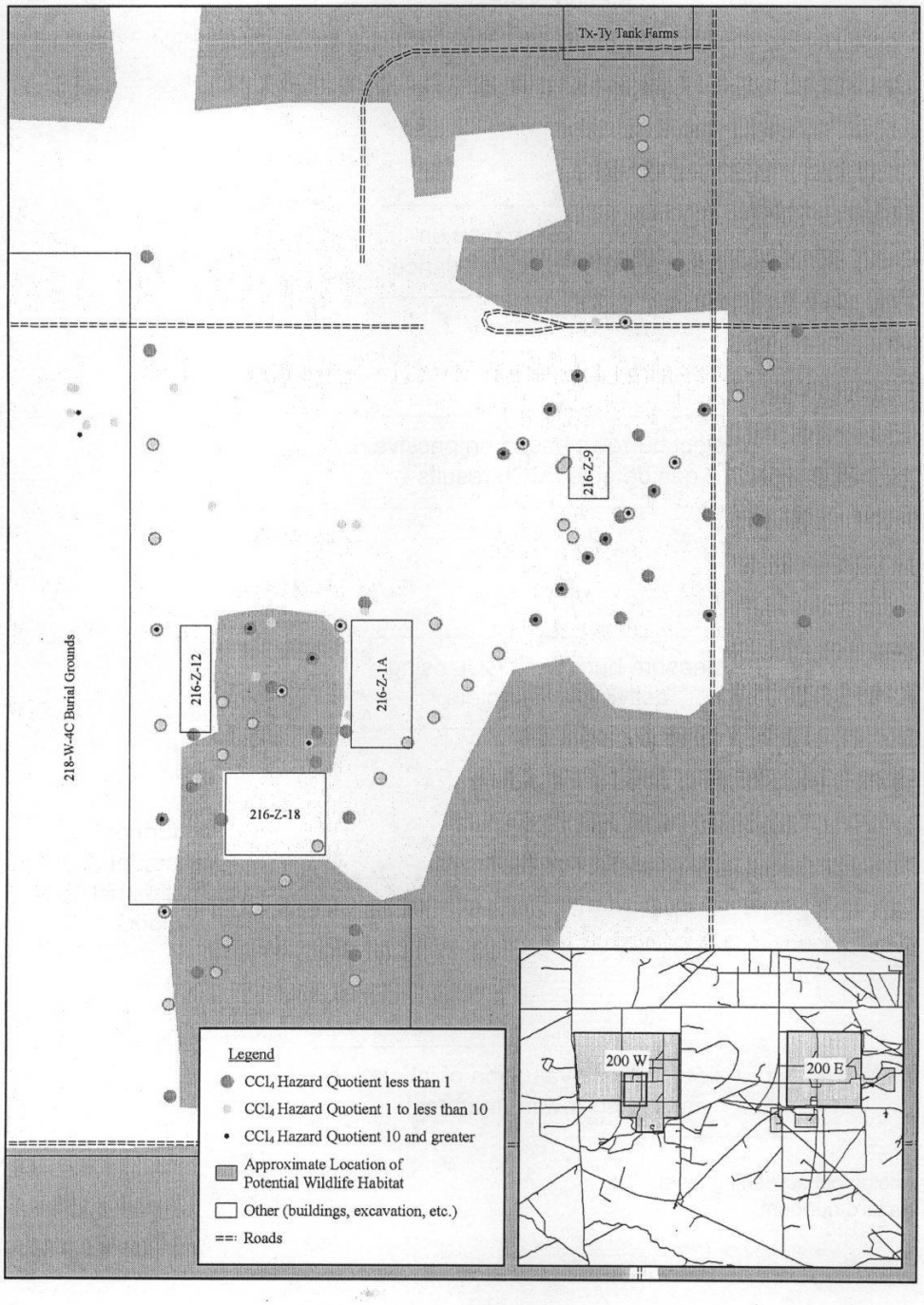
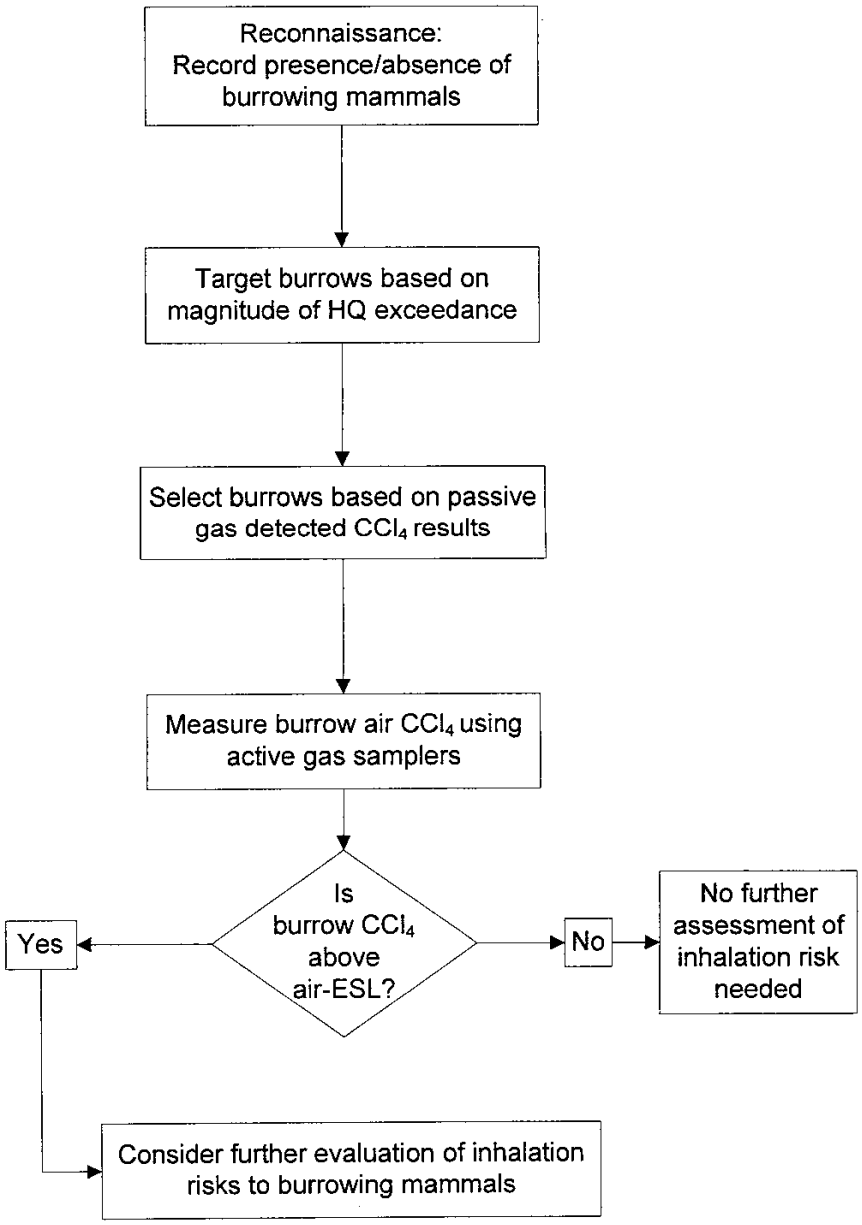


Figure 4-4. Logic Diagram for the Assessment of Potential Carbon Tetrachloride Inhalation Risks to Burrowing Receptors.



ESL = ecological screening level.
HQ = hazard quotient.

Table 4-1. Confidence Criteria and Scoring for Evaluating Toxicity Data for the Development of Carbon Tetrachloride Toxicity Reference Value. (4 pages)

Evaluation Group	Evaluation Criterion	Score[a]	Weighting Factor[b]	Carbon Tetrachloride Weighted Score[c]
Study Design and Documentation				
Taxonomic relationship	A control group was included, or a control group was not included or reported but was not needed to verify or assign effect levels.	1	3	3
	A control group was not included, and effect levels provided by the authors could not be verified.	0		
Exposure group(s)	More than one exposure group was used.	1	3	0
	Only one exposure group was used.	0		
Test organism details: name (common and/or scientific), age, sex, and source/origin	All information was provided.	4	1	4
	Three items were provided.	3		
	Two items were provided.	2		
	One item was provided.	1		
	No information was available.	0		
Dose rate parameters: dose rates can be calculated using two dose rate parameters: body weight and an inhalation rate	Either both of the dose rate parameters were provided, the inhalation rate was already normalized to body weight, or the dose rate parameters are not applicable because the authors reported the daily dose rate.	2	4	4
	One dose rate parameter was provided.	1		
	No dose rate parameters were provided.	0		
Exposure dose concentration: dose concentration basis	Measured.	2	3	6
	Nominal.	1.5		
	Unknown.	0		
Statistics	Both the statistical test and confidence level were reported.	1	3	3
	The statistical test or the confidence level is missing or if neither was reported, data is available for reviewer to run analysis.	0.5		
	Neither the statistical test or confidence level were reported, and data is not adequate for reviewer to run analysis.	0		

Table 4-1. Confidence Criteria and Scoring for Evaluating Toxicity Data for the Development of Carbon Tetrachloride Toxicity Reference Value. (4 pages)

Evaluation Group	Evaluation Criterion	Score[a]	Weighting Factor[b]	Carbon Tetrachloride Weighted Score[c]
Test Organism				
Taxonomic relationship to test organism	The test organism is related to at least one screening receptor at the Order, Family, Genus, or Species level. (Not applicable to plant or invertebrate test organisms.)	2	2	4
	The test organism is related to at least one screening receptor at the Class level. (Not applicable to plant or invertebrate test organisms.)	1		
	The test organism is not related to a screening receptor at the Class or more specific level or is a plant or invertebrate.	0		
Basis for use of test organism	The researchers indicated, or it can be reasonably assumed, why the particular test organism was chosen.	1	1	1
	It is not known why the test organism was chosen.	0		
Exposure Conditions				
Test environment	The study is based on a field or laboratory study from which a single chemical exposure can be discerned.	1	1	1
	The study is NOT based on a field or laboratory study from which a single chemical exposure can be discerned.	0		
Test exposure medium	The test exposure medium is assumed to be equivalent or similar to air.	N/A	N/A	N/A
Test exposure chemical interactions	Chemicals and properties that could potentially affect the toxicological impact of the test exposure chemical on the test organism are NOT present in the test exposure medium.	1	2	2
	Chemicals and properties are present and could potentially affect the toxicological impact of the test exposure chemical on the test organism.	0		
Test exposure route	The test exposure route is equivalent to the ESL exposure route of concern (inhalation).	1	3	3
	The test exposure route is NOT equivalent or similar to the ESL exposure route of concern.	0		

Table 4-1. Confidence Criteria and Scoring for Evaluating Toxicity Data for the Development of Carbon Tetrachloride Toxicity Reference Value. (4 pages)

Evaluation Group	Evaluation Criterion	Score[a]	Weighting Factor[b]	Carbon Tetrachloride Weighted Score[c]
Test period	Chronic (>90 days).	3	5	5
	Subchronic (14 to 90 days).	2		
	Acute (<14 days).	1		
	Not reported.	0		
Critical life stage	Chemical administration occurs during a critical life stage.	1	4	4
	Chemical administration does not occur during a critical life stage.	0		
Test exposure frequency	The test exposure frequency is continuous or frequent enough to represent the chemical administration period.	1	2	2
	The test exposure frequency is not continuous or frequent enough to represent the chemical administration period.	0		
Measurements and Results				
Focus measurement effect category	Reproduction or development.	4	4	16
	Survival.	3		
	Adult weight or size change.	2		
	Other.	1		
Measurement of focus measurement	The focus measurement was measured so that it reflects the entire chemical administration period.	1	1	1
	The focus measurement did not reflect the entire chemical administration period.	0		
Focus measurement effect level	NOAEL and LOAEL values are within a factor of 3. (NOEC and LOEC are not of concern in inhalation studies.)	6	5	10
	NOAEL and LOAEL values are within a factor of 10.	5		
	NOAEL and LOAEL are not within a factor of 10.	4		
	NOAEL only.	3		
	LOAEL only.	2		
	Other effect level (e.g., LD_{50}, LC_{50}, or EC_{50}) only.	1		
Total Weighted Score[d]				**69**
Maximum Total Weighted Score[d]				106
Confidence Rating[d]				Medium

Table 4-1. Confidence Criteria and Scoring for Evaluating Toxicity Data for the Development of Carbon Tetrachloride Toxicity Reference Value. (4 pages)

Evaluation Group	Evaluation Criterion	Score[a]	Weighting Factor[b]	Carbon Tetrachloride Weighted Score[c]

Based on example study Alexeeff and Kilgore, 1983, "Learning Impairment in Mice Following Acute Exposure to Dichloromethane and Carbon Tetrachloride."

[a]Scores range from 0 to 6 based on contribution to the confidence in the resultant TRV.

[b]Criterion scores are weighted according to the degree of influence the criterion group has on the magnitude and uncertainty of the TRV. Scale for weighting factor ranges from 0 to 5, with 5 having the greatest influence on weight.

[c]The toxicity value evaluated is a chronic - critical life stage LOAEL of 1100 mg/kg/d for a developmental endpoint, body weight gain of juvenile from [19].

[d]The overall total weighted score for the CCl_4 toxicity value is 69. The MTWS for an inhalation toxicity value is 106. The CCl_4 toxicity value score is equal to 65% of the MTWS, which corresponds to a medium confidence rating. For confidence ratings, high = %MTWS ≥76%, medium = 51% ≤%MTWS < 76%, low = 26% ≤%MTWS < 51%, and unacceptable = %MTWS < 26%.

ESL = ecological screening level.
LOAEL = lowest observed adverse-effect level.
MTWS = maximum total weighted score.
N/A = not applicable.
NOAEL = no observed adverse-effect level.
TRV = toxicity reference value.

Table 4-2. Confidence Criteria and Scoring for Evaluating the Geometric Mean Toxicity Reference Value – Carbon Tetrachloride Results. (4 Pages)

Evaluation Category	Evaluation Criterion	Score	Weighting Factor [a]	Carbon Tetrachloride Weighted Score [b]
Number of experiments	Equal to 10 or more.	1.5	1	1
	Between 4 and 9.	1	1	
	Less than or equal to 3.	0.5	1	
Type of exposure medium	Test exposure medium matches that of concern.	1	1	1
	Test exposure medium partially matches that of concern.	0.5	1	
Number of test organism orders	Equal to 3 or more.	1.5	1	1.5
	Equal to 2.	1	1	
	Equal to 1.	0.5	1	
Number of unique measurements (endpoints)	More than 3.	1.5	1	1.5
	Equal to 3.	1	1	
	Less than 3.	0.5	1	

Table 4-2. Confidence Criteria and Scoring for Evaluating the Geometric Mean Toxicity Reference Value – Carbon Tetrachloride Results. (4 Pages)

Evaluation Category	Evaluation Criterion	Score	Weighting Factor [a]	Carbon Tetrachloride Weighted Score [b]
Type of endpoint category	Reproduction/development.	3.5	1	2.5
	Combination of reproduction/development and survival.	3	1	
	Combination of reproduction/development, survival, and weight or size change.	2.5	1	
	Combination of reproduction/development and weight or size change.	2	1	
	Survival.	1.5	1	
	Combination of survival and weight or size change.	1	1	
	Weight or size change.	0.5	1	
Number and type of effect levels of toxicity values associated with the individual NOAEL-based effect levels In geometric mean TRV data set	2 or more chronic or chronic-critical life stage NOAELs with LOAELs.	3.5	1	2.5
	1 chronic or chronic-critical life stage NOAEL with LOAEL.	3	1	
	1 or more chronic or chronic - critical life stage NOAELs without LOAELs	2.5	1	
	1 or more chronic or chronic - critical life stage LOAELs.	2	1	
	1 or more subchronic NOAEL with LOAEL.	1.5	1	
	1 or more subchronic NOAEL without LOAEL.	1	1	
	1 or more subchronic LOAEL or other EL or acute NOAEL, LOAEL, or other EL.	0.5	1	
Confidence rating of toxicity values associated with the individual NOAEL-based effect levels In geometric mean TRV data set	100% of the toxicity values have High confidence ratings.	2	1	1
	Toxicity values have a mixture of High and Medium confidence ratings.	1.5	1	
	100% of the toxicity values have Medium confidence ratings.	1	1	
	Toxicity values have a mixture of High, Medium, and Low confidence ratings.	0.5	1	
Outlier(s) in chronic NOAEL-based effect level distribution	100% of data are within a GSD less than or equal to 2	4	2	4
	75 to 99% of data are within a GSD less than or equal to 2.	3	2	
	75% or more of data are within a GSD of 6.	2	2	
	75% or more of data are within a GSD of 10.	1	2	
	None of the above.	0	2	

Table 4-2. Confidence Criteria and Scoring for Evaluating the Geometric Mean Toxicity Reference Value – Carbon Tetrachloride Results. (4 Pages)

Evaluation Category	Evaluation Criterion	Score	Weighting Factor [a]	Carbon Tetrachloride Weighted Score [b]
Chronic NOAEL-based effect level distribution is bimodal[b]	No.	2	2	
	Evaluation is not possible because data set is too limited.	1	2	
	Yes.	0	2	
Relationship of geometric mean TRV to chronic LOAEL-based effect levels	The geometric mean TRV is less than the lowest LOAEL-based effect level.	3	2	0
	The geometric mean TRV is higher than the lowest chronic LOAEL-based effect level by a factor of 3 or less and is protective of the majority of reproduction/development endpoints. Furthermore, the lowest chronic LOAEL-based effect level represents a chronic or chronic - critical life stage LOAEL or other effect level for a reproduction/development endpoint.	2	2	
	The geometric mean TRV is higher than the lowest chronic LOAEL-based effect level by a factor of 3 or less, and the lowest chronic LOAEL-based effect level represents a chronic LOAEL or other effect level for a survival, weight or size change endpoint.	1.5	2	
	The geometric mean TRV is higher than the lowest chronic LOAEL-based effect level by a factor of 3 or less, and the lowest chronic LOAEL-based effect level is extrapolated from a subchronic or acute LOAEL or other effect level (e.g., EC_{20}, LD_{50}) for an reproduction/development, survival, weight, or size change endpoint.	1	2	
	The geometric mean TRV is higher than the lowest chronic LOAEL-based effect level by a factor of 3 or less, and the lowest LOAEL-based effect level is derived from a subchronic or acute NOAEL for a reproduction/development, survival, or weight or size change endpoint.	0.5	2	
	None of the above.	0	2	
Relationship of geometric mean TRV to other published TRVs	Acceptable.	2	2	3
	No comparison available.	1.5	2	
	Not acceptable.	0	2	
Total Weighted Score[b]				**22**
Maximum Total Weighted Score[b]				**36.5**

Table 4-2. Confidence Criteria and Scoring for Evaluating the Geometric Mean Toxicity Reference Value – Carbon Tetrachloride Results. (4 Pages)

Evaluation Category	Evaluation Criterion	Score	Weighting Factor [a]	Carbon Tetrachloride Weighted Score [b]
Confidence Rating[b]				**Medium**

[a]Criterion scores are weighted according to the degree of influence the criterion group has on the magnitude of the geometric mean TRV and the uncertainty associated with the value. A weighting factor of 1 indicates a non-critical criterion while a weighting factor of 2 indicates a critical criterion.

[c]The overall total weighted score for the CCl_4 geometric mean TRV is 22. The MTWS for an inhalation geometric mean TRV is 36.5. The CCl_4 score is equal to 60% of the MTWS corresponding to a Medium confidence rating. For the confidence ratings: high = %MTWS ≥75%; medium = 50% ≤%MTWS < 75%; low = 25% ≤%MTWS < 50%; and unacceptable = %MTWS < 25%.

EL = effect level.
GSD = geometric standard deviation.
MTWS = maximum total weighted score.
LOAEL = lowest observed adverse-effect level.
NOAEL = no observed adverse-effect level.
TRV = toxicity reference value.

Table 4-3. Toxicity Reference Value and Ecological Screening Level for Inhalation of Carbon Tetrachloride.

Volatile Organic Chemical	CAS No.	Toxicity Reference Value[a]	Ecological Screening Level[b]	
		mg/kg/d	ppm(v)	mg/m^3
Carbon tetrachloride	56-23-5	4.88 (15)	0.91	5.7

[a]The toxicity reference value represents the geometric mean of 15 qualified CCl_4 effect levels. The number of effect levels used to calculate the geometric mean TRV is listed parenthetically. All effect levels are representative of chronic exposures resulting in no adverse effects.

[b]Ecological screening levels presented are converted between units of ppm(v) or mg/m^3 using the ideal gas law and assuming standard temperature and pressure conditions.

CAS = Chemical Abstracts Service.
ppm = parts per million.
TRV = toxicity reference value.

Table 4-4. Analytical Performance Requirements for Burrows Vapor Samples.

Contaminant of Potential Ecological Concern or Additional Analytes	Chemical Abstracts Service #	Name/ Analytical Technology	Units	Detection Limit Requirement (PQL)	Matrix-Specific Target-Required Quantitation Limits (Burrow Air)	Precision (%)	Accuracy (%)
Carbon tetrachloride and degradation products [a]	56-23-5	EPA Method TO-15 [b]	ppmv	0.010	0.91	±35	65-135

[a] chloroform, methylene chloride, chloromethane.

[b] EPA Method TO-15 is found in EPA/625/R-96/010b, *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air.*

EPA = U.S. Environmental Protection Agency.
ppmv = parts per million by volume.
PQL = practical quantitation limit.

WMP-29253 REV 0

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5.0 WEST LAKE

As an aquatic environment, West Lake represents a unique ecological entity within the Central Plateau. Before 1957, West Lake existed as a small riparian area with intermittent springs that flowed as a result of seasonal fluctuations in the water table. During Hanford Site operation, West Lake grew indirectly as a result of wastewater discharges from historical fuel reprocessing activities in the 200 Areas (e.g., the Plutonium-Uranium Extraction Plant and the B Plant); these discharges to the soil column elevated the water table and contaminated West Lake aquatic media as a result. The presence of tritium and Tc-99 in groundwater monitoring wells in the vicinity of West Lake provide evidence that 200 Area activities have impacted groundwater. There also are anecdotal reports of West Lake (also known as Honey Hill Pond) being used as a dumping location for sewage and other Hanford Camp wastes in past years. Contaminated wastewater discharges to the 200 Areas holding ponds ceased in 1995, so it is assumed that the 200 Areas are not a continuing source of chemical constituents to groundwater and West Lake.

Because releases of wastewater ceased in 1995, a connection between the lake and groundwater is unlikely, although periodic connections may occur because of seasonal water table fluctuations. Based on water table elevations measured in wells adjacent to West Lake, the lake has been cut off from the water table since 1990. Currently, the water table is approximately 1.5 m below the lake bottom. Because West Lake is no longer connected to the regional aquifer system, water levels will continue to drop if evaporation rates are greater than input from precipitation runoff. As the lake level declines, chemical constituents in surface water likely are deposited in newly exposed surface soils as salt deposits. Because West Lake is a closed system with no outlet, surface water is not a mechanism for contaminants to be transported offsite. While there is no objective evidence that direct releases of contaminants have occurred to West Lake, water and sediments represent secondarily contaminated media from the historical groundwater discharges that formed the lake.

The EcoDQOs for West Lake follow the ERAGS (EPA/540/R-97/006). Steps 1 and 2 of the 8-step EPA CERCLA guidance encompass the screening portion of the ERA. Step 1 of the ERAGS process is the screening-level problem formulation and ecological effects evaluation, which encompasses the description of the environmental setting, fate and transport mechanisms, identification of complete exposure pathways, and the selection of screening levels for media of concern. Step 2 of the ERAGS process is the screening-level exposure and risk calculations, where conservative exposure estimates are compared to the chemical-specific screening levels selected in Step 1 for each medium of concern.

5.1 RESULTS OF PRELIMINARY SCREENING ASSESSMENT: COPECS AND DATA GAPS

A preliminary screening-level ERA (ERAGS Steps 1 and 2) was conducted using existing data from West Lake, including analytical results for water, sediment, soil, and salt crust (Appendix E). With the exception of inorganic and organic chemicals in water, analytical results were limited to radionuclides in all other media. Salt crust data evaluated in the screening assessment were limited to uranium isotopes. Surface water was analyzed for metals,

radionuclides, and organic chemicals; detection limits for organic chemicals were, however, uniformly elevated above screening levels. The COPEC screening identified two radionuclides (U-234, and U-238) and several metals in West Lake surface water as potentially posing risk to aquatic biota (Appendix E). Existing soil data for West Lake had one result out of 11 samples that exceeded the Cs-137 ESL (BCG). However it was eliminated as a COPEC, because concentrations of Cs-137 in West Lake soils are much lower than those reported in the Central Plateau (see WMP-20570, Appendix G). Because soils in these areas are functionally and ecologically similar to other Central Plateau soils, specific evaluation of West Lake soils and the terrestrial community associated with them is not required. No radionuclide COPECs were identified for sediment or salt crust. Existing soil data for West Lake had one result out of 11 samples that exceeded the Cs-137 ESL (BCG). Salt crust data evaluated in the screening assessment were limited to uranium isotopes and none were identified as COPECs.

Several data gaps were identified as a result of the screening assessment and further data collection is recommended for proceeding with the risk assessment. For water, it was not known if analytical results for unfiltered water samples were representative of surface water; therefore, surface water will be differentiated into filtered and unfiltered fractions and analyzed for metals and radionuclides. Along with surface water samples, sediment interstitial water (pore water) will be collected and analyzed for metals, radionuclides, and non-COPEC constituents (total organic carbon, alkalinity, calcium, potassium, iron, magnesium, sodium, anions, total dissolved solids, and titrations for total hydroxide and total carbonate) to capture the worst-case conditions (highest concentrations) for contaminants in water and to provide information on the geochemical nature of this water body. For sediment, analyses for metals and semivolatile organic compounds (TBP and n-paraffin hydrocarbons), radionuclides, and general chemistry parameters (acid volatile sulfide and total sulfides) are recommended. The organic analyses will address the assumption that organic contaminants are not expected at West Lake because they represented a minor component of the waste stream in wastewater discharges. Given the Cs-137 exceedance in the surface soil and limited number of soil samples, radiation surveys are recommended for the perimeter of West Lake to better understand the extent of radionuclides in surface soils.

Another uncertainty resulting from the screening-level assessment was potential risk from ingestion of salt crusts from West Lake. While detected concentrations of uranium in salt crust samples were below levels of concern (BCGs) for sediment and soil, screening values used in the assessment do not take into account potential preferential ingestion of salts versus soil or sediment. The nature of the crust material is also unclear. Therefore, the salt crust around the perimeter of the lake will be sampled for radionuclides, metals, alkalinity, calcium, potassium, iron, magnesium, sodium, anions, titrations for total hydroxide and total carbonate, and by X-ray diffraction (for crystal structure) to estimate the potential dose to wildlife that might use this substrate as a salt lick and to assess the physicochemical nature of the material.

5.2 COPEC REFINEMENT AND CONCEPTUAL EXPOSURE MODEL

In addition to the data gaps identified above, there is limited documentation on wildlife use of West Lake. Lacking sufficient biological information, reconnaissance surveys will be conducted

to better describe current biological pathways, as well as to estimate the annual duration that potential exposure pathways exist. This information is integral to Step 3 of the EPA guidance, which allows for the refinement of the COPECs by applying more site-specific information to the exposure assessment.

Biota residing in contaminated water or sediments at West Lake could present a potential pathway for contaminant uptake to upper trophic-level receptors (Figure 5-1). Organisms higher in the food web are at increased risk from chemicals that biomagnify because their dietary exposure can be orders of magnitude greater than what a representative of a lower trophic-level feeding guild would receive. Because inorganic chemicals (e.g., metals and radionuclides) do not typically increase in concentration through trophic transfers, the risks posed to higher trophic-level organisms are generally of less concern than risks to organisms lower in the food web, assuming that toxicity does not increase to organisms higher in the food web. To the extent that inorganics do accumulate in biotic tissues, there is a greater propensity for them to be taken up by invertebrates, compared to plant uptake (WAC 173-340-900, Table 749-5). Therefore, relative to plant-eating wildlife (or to wildlife that eat a variety of foodstuffs), insectivorous wildlife should experience relatively greater exposure to radionuclides and metals. Aquatic macroinvertebrates were specifically identified for collection and tissue analysis (metals and radionuclides) in Phase III because consumption of contaminated macroinvertebrates associated with surface waters and sediments of West Lake (e.g., larval and adult brine flies or fairy shrimp) could pose a risk to insectivorous birds or mammals (e.g., killdeer, bats) that prey on them.

Because little has been documented with respect to usage of West Lake by other wildlife, reconnaissance surveys are planned to determine biological diversity and site use. Avian point surveys and surveys for evidence of mammalian use will help to determine the duration and seasonality of site use, and in turn be used to refine exposure models. As mentioned previously, ecological receptors also may have incidental exposures to surface water, salt, and sediment. Possible exposure pathways for abiotic media of West Lake and its immediate environs are dermal contact with contaminants in sediment, surface water, and soil; ingestion of surface water; incidental ingestion of sediment and soil; and ingestion of contaminated salt deposits.

5.3 ASSESSMENT ENDPOINTS

The primary ERA goal for CERCLA is to reduce ecological risks to levels that will result in the recovery and maintenance of healthy local populations and communities of biota (EPA 1999, *Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund Sites* [Memorandum], OSWER Directive 9285.7-28P). This is of particular importance because West Lake represents a unique habitat for the Central Plateau, and therefore unique communities are expected. While COPECs and their modes of action will be similar between West Lake and other areas of the terrestrial Central Plateau, management goals and the specific entities and attributes at risk from contaminants at West Lake are specific to this aquatic setting. These management goals are integrated with the results of the physical model (contaminated media) and COPEC refinement to develop assessment endpoints. The entities selected as assessment endpoints are based on an understanding of ecological interactions among West Lake plants, water biota, and wildlife as described in the next section (Figure 5-2).

Based on overall management goals, the aquatic conceptual exposure model and trophic relationships among riparian and near-shore receptors, assessment endpoints were developed that are representative of aquatic biota potentially at risk from Hanford Site COPECs. Assessment endpoints are specific ecological values to be protected and are a combination of an entity at risk and an attribute of entity at risk. The specific endpoints proposed include a mix of open water and riparian receptors and assume that the lake will have periods of time of open surface water.

The Central Plateau ecological evaluation (DOE/RL-2001-54) suggests representative ecological receptors for terrestrial areas of the Central Plateau, but does not suggest specific aquatic receptors. Based on biota collected, observed, or expected at West Lake, representative receptors are proposed for West Lake assessment endpoints. Reconnaissance surveys are planned to help determine site use by wildlife and to validate assumptions of receptor representativeness.

- **Plants** – West Lake and its adjacent wetlands were surveyed in 1997; native plant communities at West Lake appeared to be degraded (TNC 1999). *Castilleja exilis* and many other species documented at West Lake (PNNL-13688, *Vascular Plants of the Hanford Site*) were not located during the 1997 survey. Much of the lake basin has been infested with weedy species, primarily *Bassia hyssopifolia* (smotherweed). Wetland vegetation found at West Lake is limited to scattered patches of emergent macrophytes, such as cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.) Reconnaissance activities performed for the Phase III EcoDQOs will include aquatic and riparian plant species surveys.

- **Aquatic Invertebrates** – A variety of aquatic invertebrates have been recorded in West Lake. A number of different freshwater insects, annelids, and oligochaetes were recorded in the late 1970s. However, because the lake no longer experiences recharge from groundwater and evaporation has reduced the area of the lake, rising salinities may have created conditions that are not suitable for many freshwater invertebrates. Brine flies of the Ephydridae family (*Paracoenia bisetosa*) have been commonly found at West Lake and rarely seen were the Gymnomyzinae family (*Gymnoclasiopa argyrostoma*) (Zack 1998). *Paracoenia bisetosa* is common to the riparian areas of slightly to moderately alkaline ponds where the larvae feed on algal mats. *Gymnoclasiopa argyrostoma* was common at the time across the Hanford Site in aquatic and terrestrial environments, although rarely found at West Lake. Invertebrate surveys should be conducted to identify current invertebrate communities and current lake salinities. Aquatic invertebrate tissues will be used for modeling COPEC uptake by insectivorous species (i.e., birds, bats).

- **Birds** – Avian point counts conducted as part of the reconnaissance effort will be used to identify the number and types of species presently using West Lake. The screening-level evaluation identified a potential risk to insectivorous receptors; therefore, invertebrate feeding shorebirds will be evaluated specifically. Species of shorebirds that have been recorded at West Lake include American avocet and killdeer. Both of these species feed on benthic invertebrates around the lake margins and in shallow water. Killdeer are proposed as the insectivorous bird representative for terrestrial habitats on the Central

Plateau. For this reason, killdeer is proposed as the representative aquatic insectivorous bird.

- **Bats** – Several species of bats have been recorded on the Hanford Site. Representative aerial insectivore bats selected for exposure modeling include the little brown myotis (*Myotis lucifugus*). Potential bat roosting sites at Gable Mountain make West Lake an attractive forage source of aquatic macroinvertebrates. For this reason, exposure to bats from aquatic macroinvertebrates will be evaluated as part of the Phase III EcoDQOs.

- **Amphibians** – Little is known about West Lake's use by amphibians. Amphibian surveys are proposed as part of the site reconnaissance effort to determine the potential presence and use of the site by these receptors.

- **Terrestrial Mammals** – Use of West Lake by mammals is not well documented. Site use may include browsing of perimeter vegetation and ingestion of surface salt deposits as a source of dietary minerals. Reconnaissance surveys, including species observations, and indications of site use, will be documented as part of the Phase III EcoDQOs.

5.4 RISK QUESTIONS

The conceptual model summarizes the problem formulation results in terms of cause-and-effect relationships that link stressors to endpoint receptors. COPECs detected in water, sediment, soil, and salt crust were screened. The COPEC screening and refinement (Appendix E) identified two radionuclides and several metals in West Lake surface water as potentially posing risk to aquatic biota. Relative to plants, inorganic chemicals accumulate more in invertebrates. Consequently, relative to herbivores, upper trophic-level insectivores are most at risk from metals in West Lake surface water.

No radionuclide COPECs were identified in West Lake sediments, and no analyses for metals or organic constituents have been conducted on West Lake sediments. Additional data are needed regarding the current and likely future conditions in West Lake to assess risk to ecological receptors from COPECs in surface water, pore water, sediment and salt deposits. This section identifies risk questions for West Lake to help identify the types of data needed.

The following risk questions are relevant to the West Lake data being collected in Phase III.

- Are there elevated radiation measurements from a beta/gamma field radiation soil survey?

- Are metals in sediment, salt and/or water (filtered and unfiltered) in excess of published toxicity values for marine organisms?

- What is the physicochemical nature of the crust material (e.g., is it reasonable to expect animals could use it as a salt lick)?

- Are radionuclides in aquatic invertebrates above levels that would result in exceedances of radiological thresholds, based on a riparian receptor?

- Are metals in aquatic invertebrates above levels that would exceed a TRV for an aerial insectivore (bird, bat)?
- Is the assumption of a lack of organic chemical contamination valid for West Lake?
- Are radionuclides in water, sediment, biotic tissues, or salt above radiological screening thresholds?
- What ecological receptors are using West Lake; e.g., can wildlife be documented to use the lake as a source of drinking water or trace minerals?

5.5 MEASURES

The framework for ecological measures is derived from EPA/630/R-95/002F. Data collection efforts will address measures of exposure and effects, as well as measures of ecosystem and receptor characteristics. The assessment will include a combination of field and model data. The measures that address risk questions for West Lake-specific assessment endpoints are presented in Table 5-1.

These measures will support the refinement of the initial ecological screening assessment (Appendix E) through collection of additional data. The measures also will add site specificity to initial risk assumptions. The degree of conservatism in the screening assessment is reduced with increased ecological realism provided in this stage of an ERA (Fairbrother 2003, "Lines of Evidence in Wildlife Risk Assessments"). For example, initial assumptions of 100 percent bioavailability will be reassessed with direct measures of concentrations of contaminants in prey items (i.e., aquatic macroinvertebrates) and the duration/proportion of site use. This measure eliminates the imprecision inherent in literature-derived trophic transfer factors (e.g., WAC 173-340-900, Table 749-5) and directly assesses variations in site-specific bioavailability (Fairbrother 2003).

5.6 PHASE III DATA QUALITY OBJECTIVES FOR WEST LAKE

The DQO process is a strategic planning approach that provides a systematic process for defining the criteria that a data collection design should satisfy. Using the DQO process ensures that the type, quantity, and quality of environmental data used in decision making will be appropriate for the intended application. This section describes the Phase III EcoDQOs for West Lake, including study boundaries, decision rules, and risk questions.

5.6.1 Boundaries

To capture the unique nature of the West Lake study area and its potential exposure pathways, the boundaries of the evaluation are limited to the areal extent of the surface water, perimeter soils, and the area of exposed sediment and salt crust along the shoreline. Data collection will be

representative of the entire spatial extent of the exposure media present (i.e., sediment, salt crust, surface and pore water, resident aquatic macroinvertebrates)

5.6.2 Decision Rules/Risk Questions

Decision rules or risk questions/hypotheses used for ecological risk characterization support a weight-of-evidence evaluation of the potential for ecological risk. The following hypotheses have been developed to determine if COPECs adversely affect the assessment endpoints. Thus, decision rules are developed for measures of effect, measures of exposure, and measures of ecosystem/receptor characteristics. The hypotheses are stated generically for a receptor, with receptors replaced by the relevant measure species for each assessment endpoint. Risk hypotheses have been developed to address screening data gaps and form the basis for COPEC refinement and the assessment endpoints and associated measures.

Hypothesis 1:

(null) Perimeter surface soil radiation measurements are higher than regional background, leading to conditional soil sampling.

(alternate) Perimeter surface soil radiation measurements are consistent with Hanford Site background.

Hypothesis 2:

(null) Metals in sediment, salt, and/or water are less than published toxicity values for marine organisms.

(alternate) Metals in sediment, salt, and/or water are greater than published toxicity values for marine organisms.

Hypothesis 3:

(null) Organic chemicals in sediment are less than published toxicity values for marine organisms.

(alternate) Organic chemicals in sediment and/or water are greater than published toxicity values for marine organisms.

Hypothesis 4:

(null) Metals concentrations in aquatic invertebrates are below thresholds (i.e., TRVs) that result in dietary risks to aerial insectivores.

(alternate) Metals concentrations in aquatic invertebrates are greater than thresholds (i.e., TRVs) that result in dietary risks to aerial insectivores.

Hypothesis 5:

(null) Radionuclides in water, sediment, brine flies, or salt crusts are less than radiation dose limits.

(alternate) Radionuclides in water, sediment, or salt crusts are greater than radiation dose limits.

5.7 STUDY DESIGN

The study design for West Lake includes reconnaissance of the flora present and fauna using the site, beta and gamma radiological surface soil surveys along the lake perimeter, collection of abiotic and biotic media to characterize potential exposure to COPECs, comparison of media concentrations to toxicity thresholds for specific receptors, and dietary exposure modeling for aerial insectivores (birds and bats).

In the Phase III DQO workshop (February 22 and 23, 2006), Hanford Natural Resource Trustees indicated that MIS was the preferred method to obtain abiotic media data for this project (see Appendix A for DQO issues matrix). The media-specific subsections below identify sample depth, the spatial scale over which the MIS should be collected, and the number of increments needed to adequately characterize the area.

A synopsis of the proposed study design is provided in Table 5-2, which shows how the various data types (measures) relate to risk questions, the key features of the study design, and the basis for the design element. Aspects of the study design are subject to field verification, which may require selecting alternate measures for an assessment endpoint or other modifications to the study design.

5.7.1 Reconnaissance Surveys

Reconnaissance surveys (visual observations, radiological activity measurements, and mapping) are needed to better describe the current biological pathways and to estimate the percent of year these pathways exist. These efforts collectively include conducting periodic surveys of wildlife using West Lake between March and September. Biological pathway surveys will be conducted twice per month, and will include both daylight and evening periods. The following specific tasks will be performed as part of this reconnaissance effort:

- Avian point counts
- Mammalian use/activity surveys
- Amphibian surveys
- Aquatic invertebrate surveys
- Plant community composition surveys
- Water quantity/quality monitoring.

Avian use will be monitored by conducting several 5-minute point counts at one or more fixed stations located near the edge of West Lake. Indirect evidence of avian use (e.g., scat, tracks,

feathers) at West Lake also will be recorded in the field record book or on the point count survey forms. Relative abundance estimates, a complete species observation list, and types of avian use activities observed will be recorded.

Mammals using the West Lake habitats will be documented more qualitatively than avian species. Mammal use and activity observations will be accomplished by conducting a walk-through of the West Lake habitats during each daylight survey event. Indirect evidence (e.g., scat, tracks, burrows, evidence of browsing or licking salts, hair) will be recorded in the field record books. Indications of active animal use of West Lake also will be noted (e.g., animals observed drinking water, foraging on grasses). Night surveys using an echolocation device will be conducted each month to record bat presence and, to a more qualitative degree, the relative abundance of bat activity over West Lake.

Amphibian surveys will be conducted during both daytime and evening periods. Day surveys will include visually examining West Lake for egg masses or adult salamanders, frogs, or toads. Artificial cover (plywood boards) will be placed at three sites along the shoreline of West Lake and checked each daytime survey period to help confirm the presence/absence of amphibians. In addition, several 5-minute point count anuran breeding call surveys will be conducted during the night survey periods.

Aquatic macroinvertebrates in West Lake will be assessed by opportunistically collecting specimens by hand or using a kicknet (Turtox[3] bottom kick net-mesh 800 by 900 μm). Macroinvertebrate taxa may be identified down to Orders, Families, Genera, or in some cases the species. Numbers of individuals of each Order and in some cases families of each Order will be documented on a datasheet along with the date the samples were collected.

A single reconnaissance survey for saline-tolerant plants found in the riparian habitats surrounding West Lake will be conducted. The reconnaissance effort will include a general description of the flora communities surrounding West Lake, noting the location and general numbers/areal extent of unique plant populations found there.

Water quantity/quality will be evaluated periodically beginning in Spring 2006. Photographs of West Lake will be taken at three marked, fixed stations (an oblique aerial view from Gable Mountain and two points selected adjacent to West Lake) to help document changes in the lake size and availability of water over the spring and summer period. Measures of pH, temperature, conductance, and dissolved oxygen also will be recorded each month to help assess the water quality over the course of the spring and summer periods.

5.7.2 Perimeter Radiological Survey

Radiological surveys for gamma-emitting radionuclides will provide information on the general radioactivity levels across the investigation area and can help to evaluate biological transport. The field radiological survey of the perimeter of West Lake will be performed following a grid

[3] Turtox is a trademark of Wildlife Supply Company, Buffalo, New York.

survey technique. Systematic grid surveys are based on a specified pattern, with samples taken at regular intervals along a defined pattern. Radiological surveys will be conducted at every node on a grid laid over an area of interest representing sampling in two dimensions. Alternatively, the survey may be conducted from a mobile field unit with large tires to avoid damaging West Lake soils. The mobile field unit may conduct the survey by circumnavigating the lake perimeter. While the purpose of this survey is for site reconnaissance, detection of elevated radionuclide activity may trigger additional soil sampling.

5.7.3 Sediment and Salt Crust Collection

Sediment and salt crust will be sampled along the shoreline of West Lake using the MIS technique. Both the sediment and salt samples will consist of 40 increments that are combined into their respective MIS containers. The sediment samples will be collected from along the shoreline of West Lake to a depth of 10 cm. The sediment will then be spread evenly onto a stainless steel tray, and systematically subsampled in approximately equal fractions and placed into sample containers prescribed by the analytical laboratories.

The salt MIS will not be subsampled. The entire mass will be delivered to the laboratory where it will be dissolved in deionized water. The resulting salt solution will be used for all subsequent analyses.

5.7.4 Surface Water Collection

Surface water will be sampled by collecting roughly 20 increments. If the lake is about 200 by 50 m in size, and the stride length of the sampler is a meter, this would equate to pulling a sample every 25 strides. If the lake has receded when sampling occurs, samples would be pulled more frequently than every 25 strides to account for the necessary 20 increments. Approximately 6000 mL of water per sample (filtered and unfiltered each) will be needed; consequently, each increment should be approximately 300 mL. Increments will be collected with a wide-mouth plastic container attached to the end of a pole, extended out from the shore and dipped just under the surface of the lake water. Water will be filtered to exclude particles > 0.45μm size. The filtered sample and unfiltered sample will be drawn from the same multi-incremental surface water sample.

5.7.5 Pore Water

Pore water will be sampled by collecting more than 10 increments. Filtered and unfiltered samples will be collected. The lake's perimeter will be surveyed with a global positioning system and 20 points (± 1 m) will be randomly selected within the open water boundaries. A polyvinyl chloride (PVC) pipe approximately 3.8 cm in diameter and 2 to 3 m long slotted with approximately 1.5 mm wide openings will be driven into sediment to a depth of 1 m. The portion of PVC pipe above the sediment bed will not be slotted. Assuming the sampling requirement for both filtered and unfiltered samples is 6 L, approximately 200 mL of water will be drawn from each point and placed into a common container. The filtered sample and unfiltered sample will be drawn from the same multi-incremental pore water sample.

5.7.6 Aquatic Macroinvertebrate Collection

Five aquatic macroinvertebrate samples (brine flies) will be collected for analyses of metals and radionuclides using sweep nets or black-light traps along the shorelines of West Lake. Sample material will only be rinsed if large quantities of sediment particles are present in the sample. Aquatic macroinvertebrates will be analyzed for metals and radionuclides.

Table 5-3 identifies the COPECs and detection limits for all West Lake media.

5.7.7 Aerial Insectivore Dietary Exposure Modeling

Dietary exposure to aerial insectivores (birds and bats) will be calculated using the results of aquatic macroinvertebrate tissue analyses. Representative aerial insectivore receptors selected for exposure modeling include the killdeer (*Charadrius vociferus*) and little brown myotis (*Myotis lucifugus*). Table 5-4 reports the basis for the proposed target quantitation limits for radionuclides. Tables 5-5 and 5-6 present the target quantitation limits for dietary (i.e., invertebrate tissue) exposure of killdeer and bats, respectively.

Figure 5-1. West Lake Food Web.

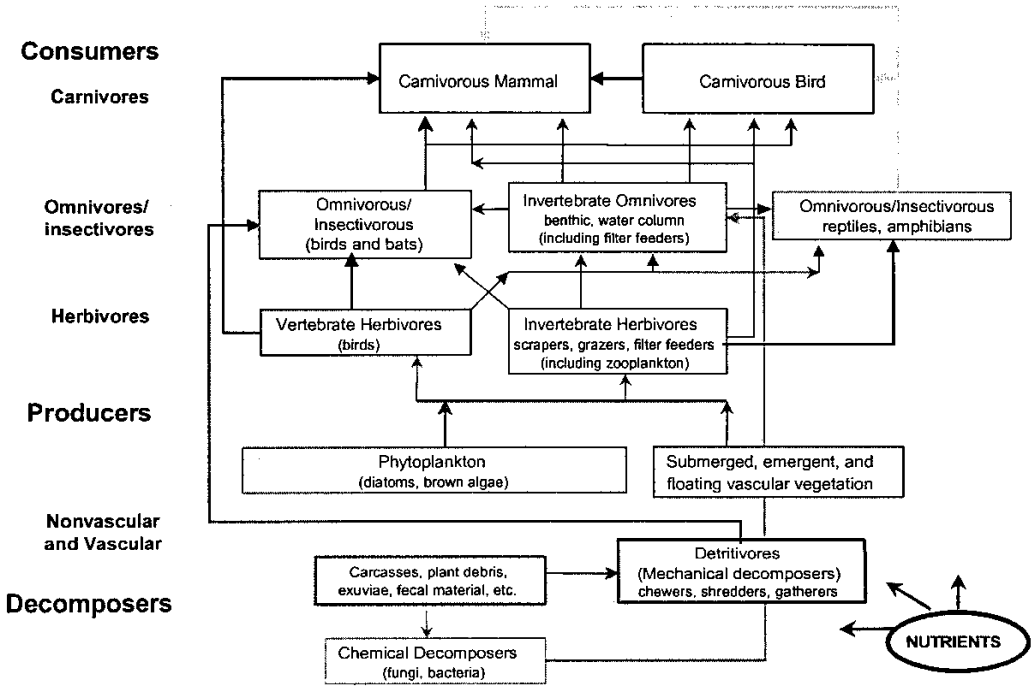

Figure 5-2. West Lake Assessment Endpoints.

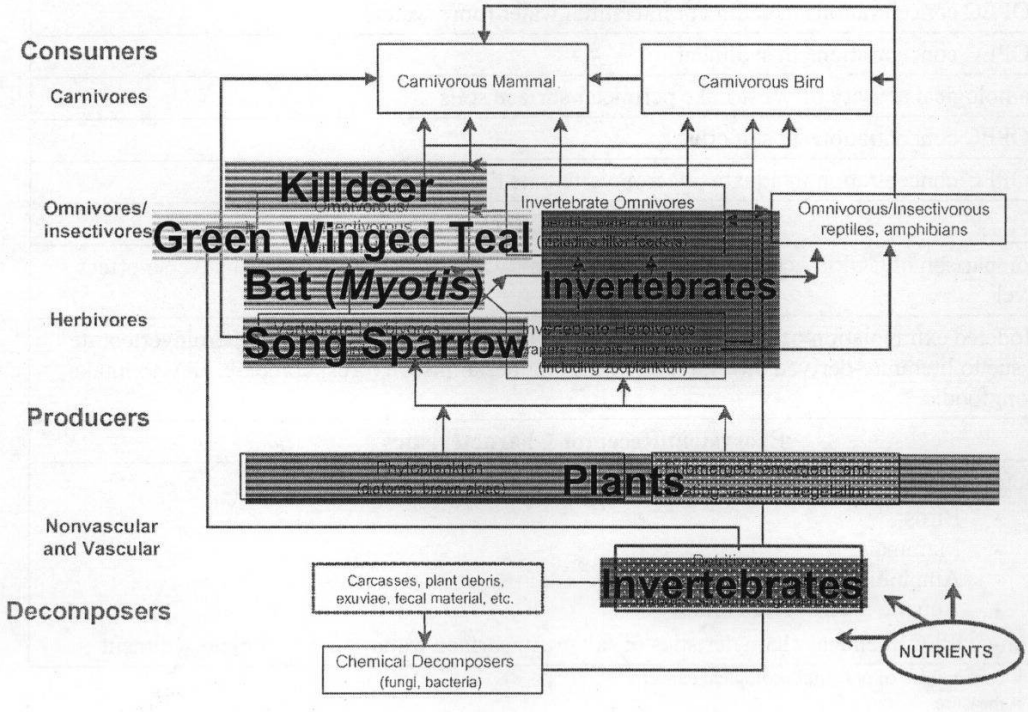

Table 5-1. Proposed Measures of Exposure and Ecosystem/Receptor Characteristics.

Code	Measure
Measures of Exposure	
M1	COPEC concentrations in surface water
M2	COPEC concentrations in sediment interstitial water (pore water)
M3	COPEC concentrations in sediment
M4	Radiological activity of West Lake perimeter surface soils
M5	COPEC concentrations in salt crust
M6	COPEC concentration in aquatic macroinvertebrate tissue
Measures of Effect	
M7	Comparison of COPEC concentrations in sediment/water to literature-derived adverse-effect level
M8	Modeled extrapolation of COPEC concentration in sediment/water/aquatic macroinvertebrate tissue to literature-derived adverse-effect level for aerial insectivores; compare TRV to intake from food.
Ecosystem/Receptor Characteristics	
M9	Incidence and duration of use by wildlife species, including: - Birds - Mammals - Amphibians - Aquatic macroinvertebrates Non-COPEC chemical characteristics of salt crust, surface water, pore water and sediment

COPEC = contaminant of potential ecological concern.
M = measure.
TRV = toxicity reference value.

Table 5-2. West Lake Phase III Study Design Summary Linking Proposed Measures to Risk Hypotheses. (3 Pages)

Measure	Risk Hypothesis	Sample Population	Study Design	Data Application	Data Purpose
Soil radiation surveys	Determine if concentrations of radionuclides in soil are elevated relative to background.	West Lake perimeter soils.	Perform radiological surveys around the perimeter of West Lake.	Determine if there are elevated radiological measurements in soils surrounding West Lake; conditional soil sampling based on results.	Locate areas of elevated radiological concentrations for further sampling, evaluate biological transport.
Surface water sampling	Support comparison to water quality benchmarks	West Lake surface water.	Collect multi-increment surface water samples from West Lake. Subsample into filtered and unfiltered sample. Analyze for radionuclides and metals. Non-COPEC analyses include: total organic carbon, alkalinity, Ca, K, Fe, Mg, Na, anions, TDS, and titrations for total hydroxide and total carbonate.	Provide an estimate of the mean concentrations of COPECs in West Lake surface water. Provide information on the geochemical nature of lake water.	Determine if existing data on unfiltered water are representative of surface water in West Lake.
Pore water sampling	Support comparison to water quality benchmarks	West Lake pore water.	Collect multi-increment pore water sample from West Lake. Subsample into filtered and unfiltered sample. Analyze for radionuclides and metals. Non-COPEC analyses include: total organic carbon, alkalinity, Ca, K, Fe, Mg, Na, anions, TDS, and titrations for total hydroxide and total carbonate.	Investigate a "bounding case" of COPEC concentrations by collecting water from interstitial spaces in sediment where COPEC concentrations are presumably highest. Provide information on the geochemical nature of lake water.	Determine if pore water represents most concentrated constituent conditions.

Table 5-2. West Lake Phase III Study Design Summary Linking Proposed Measures to Risk Hypotheses. (3 Pages)

Measure	Risk Hypothesis	Sample Population	Study Design	Data Application	Data Purpose
Sediment sampling	Support comparison to sediment quality benchmarks.	West Lake sediment.	Collect multi-increment sediment samples from the perimeter of the West Lake shoreline. Analyze for radionuclides and metals, TOC, AVS, and total sulfides.	Estimate mean COPEC concentrations in sediment.	Determine biotic exposure from sediments.
			Analyze sediment sample for SVOCs, tributyl phosphate, and normal paraffin hydrocarbons.	Determine whether or not SVOCs are present in West Lake sediment.	Test the conceptual model that organic COPEC are not in West Lake sediment.
Salt crust sampling	Support comparison of constituent content to screening thresholds.	Mineral deposits co-located with West Lake sediments.	Collect multi-increment salt crust samples around perimeter of West Lake. Analyze for radionuclides and metals. Non-COPEC analyses include: alkalinity, Ca, K, Fe, Mg, Na, anions, titrations for total hydroxide and total carbonate and by X-ray diffraction (for mineral structure).	Determine radionuclide and metals content of salts potentially ingested by wildlife. Characterize crust.	Evaluate radiological and metal exposure dose to animals using salt as a source of minerals. Non-COPEC analyses will provide insight into the chemical/geological nature of West Lake.
Brine fly sampling	Support comparison of tissue concentrations to thresholds that result in dietary risk to aerial insectivores.	Larval and adult brine flies.	Collect larvae or adult brine flies around West Lake and analyze for radionuclides and metals.	Provide a measure of exposure to aerial insectivores from contaminated prey.	Determine contaminant uptake in brine flies for modeling effects on aerial insectivores (bats, birds).

Table 5-2. West Lake Phase III Study Design Summary Linking Proposed Measures to Risk Hypotheses. (3 Pages)

Measure	Risk Hypothesis	Sample Population	Study Design	Data Application	Data Purpose
Reconnaissance surveys	Provide information to evaluate presence of receptors and their use of West Lake.	Plant and wildlife community of West Lake (including mammals, invertebrates, amphibians, birds)	Monthly biological surveys at West Lake and two samples for aquatic macroinvertebrate diversity at West Lake. Include monthly measurements on conductance, pH, DO, temperature at West Lake.	Determine biological use and diversity at West Lake.	Collect site-specific use information to verify conceptual model and exposure parameters.
Aerial insectivore exposure modeling	Support modeling of dietary risks to aerial insectivores from aquatic invertebrate tissues.	Aquatic invertebrate tissues.	Use site-specific tissue concentrations to determine dietary exposure to aerial insectivores.	Use of Hanford Site-specific uptake factors for prey reduces uncertainty in the use of non-site-specific literature values.	Exposure modeling is especially useful in assessing endpoints for which field measures would not be resource effective.

AVS = acid volatile sulfide.
DO = dissolved oxygen.
RCBRA = River Corridor Baseline Risk Assessment.
SVOC = semivolatile organic compound.
TDS = total dissolved solids.
TOC = total organic carbon.
XRD = X-ray diffraction.

Table 5-3. Synopsis of Contaminant-of-Potential-Ecological-Concern Detection Limits for West Lake Media. (3 Pages)

Contaminant of Potential Ecological Concern	Chemical Abstracts Service #	Name/Analytical Technology[a]	Target Reference Values			Precision	Accuracy
			Water (pCi/L or µg/L)	Sediment (pCi/g or mg/kg) or Salt Crust (Radionuclide Only; pCi/g)[b]	Aquatic Invertebrates (pCi/g or mg/kg Fresh wt)[c]		
Americium-241	14596-10-2	GEA	428	5,150[d]	15.6	±30%	70-130[e]
Cesium-137	10045-97-3	GEA	42.6	3,120[d]	352	±30%	70-130[e]
Cobalt-60	10198-40-0	GEA	3,670	1,460[d]	55.4	±30%	70-130[e]
Plutonium-239/240	Pu-239/240	Plutonium isotopic – AEA	N/A	N/A	18.3	±30%	70-130[e]
Radium-226	Ra-226	GEA	4.08	101[d]	3.04	±30%	70-130[e]
Radium-228	Ra-228	GEA	3.4	87.8[d]	2.63	±30%	70-130[e]
Strontium-90	Rad-Sr	Total radioactive strontium – GPC	278	582[d]	283	±30%	70-130[e]
Uranium-238	U-238	Uranium isotopic – AEA (pCi)	223	2,500[d]	5.89	±30%	70-130[e]
Antimony	7440-36-0	Metals[f]	N/A	2	1.27	±30%[g]	70-130[g]
Arsenic	7440-38-2	Metals[f]	36	7.2	22.3	±30%[g]	70-130[g]
Barium	7440-39-3	Metals[f]	N/A	N/A	349	±30%[g]	70-130[g]
Bismuth	7440-39-3	Metals[f]	20,000	N/A	[h]	±30%[g]	70-130[g]
Boron	7440-69-9	Metals[f]	1,000	N/A	13.8	±30%[g]	70-130[g]
Cadmium	7440-43-9	Metals[f]	8.8	0.68	16.5	±30%[g]	70-130[g]
Calcium	7440-70-2	Metals[f]	N/A	N/A	N/A	±30%[g]	70-130[g]
Chromium (III)	7440-47-3	Metals[f]	50	52.3	23.7	±30%[g]	70-130[g]
Copper	7440-50-8	Metals[f]	3.1	18.7	110	±30%[g]	70-130[g]
Iron	7439-89-6	Metals[f]	N/A	N/A	N/A	±30%[g]	70-130[g]
Lead	7439-92-1	Metals[f]	8.1	30.2	53.6	±30%[g]	70-130[g]
Magnesium	7439-95-4	Metals[f]	N/A	N/A	N/A	±30%[g]	70-130[g]
Mercury	7439-97-6	Method 7471	0.94	0.13	4.27	±30%[g]	70-130[g]
Molybdenum	7439-98-7	Metals[f]	500	N/A	167	±30%[g]	70-130[g]
Nickel	7440-02-0	Metals[f]	8.2	15.9	94.2	±30%[g]	70-130[g]
Potassium	--	Metals[f]	N/A	N/A	N/A	±30%[g]	70-130[g]
Selenium	7782-49-2	Metals[f]	71	N/A	4.29	±30%[g]	70-130[g]
Silver	7440-22-4	Metals[f]	1.9	0.73	25.8	±30%[g]	70-130[g]
Sodium	--	Metals[f]	N/A	N/A	N/A	±30%[g]	70-130[g]
Thallium	7440-28-0	Metals[f]	50	N/A	0.152	±30%[g]	70-130[g]
Tin	7440-31-5	Metals[f]	100,000	N/A	32.3	±30%[g]	70-130[g]
Uranium	7440-61-1	Metals[f]	40,000	N/A	131	±30%[g]	70-130[g]
Vanadium	7440-62-2	Metals[f]	200	N/A	5.22	±30%[g]	70-130[g]
Zinc	7440-66-6	Metals[f]	81	124	622	±30%[g]	70-130[g]

Table 5-3. Synopsis of Contaminant-of-Potential-Ecological-Concern Detection Limits for West Lake Media. (3 Pages)

Contaminant of Potential Ecological Concern	Chemical Abstracts Service #	Name/Analytical Technology[a]	Target Reference Values			Precision	Accuracy
			Water (pCi/L or µg/L)	Sediment (pCi/g or mg/kg) or Salt Crust (Radionuclide Only; pCi/g)[b]	Aquatic Invertebrates (pCi/g or mg/kg Fresh wt)[c]		
SVOCs	Varies	SVOA – 8270B	N/A	Chemical-specific	N/A	±30%[g]	70-130[g]
Alkalinity	Alkalinity	Method 310.1/310.2	N/A	N/A	N/A	±30%[g]	70-130[g]
Phosphorus in phosphate	PO_4-P	Method 300	N/A	N/A	N/A	±30%[g]	70-130[g]
Nitrate	14797-55-8	Method 300	N/A	N/A	N/A	±30%[g]	70-130[g]
Nitrite	14797-65-0	Method 300	N/A	N/A	N/A	±30%[g]	70-130[g]
Sulfate	14808-79-8	Method 300	N/A	N/A	N/A	±30%[g]	70-130[g]
Chloride	16887-00-6	Method 300	N/A	N/A	N/A	±30%[g]	70-130[g]
Fluoride	16984-48-8	Method 300	N/A	N/A	N/A	±30%[g]	70-130[g]
Bromide	24959-67-9	Method 300	N/A	N/A	N/A	±30%[g]	70-130[g]
Total carbonate/ hydroxide titrations	3812-32-6/ 14280-30-9	Titration for carbonate and hydroxide	N/A	N/A	N/A	±30%[g]	70-130[g]
Tributyl phosphate	126-73-8	SVOA-8270B	N/A	N/A	N/A	±30%[g]	70-130[g]
Normal paraffin hydrocarbons	N/A	NWTPH-Diesel and Kerosene	N/A	N/A	N/A	±30%[g]	70-130[g]
Acid soluble sulfide	N/A	Preparation – 9030B Analysis by either 9034 or 9215	N/A	N/A	N/A	±30%[g]	70-130[g]
Acid insoluble sulfide	N/A	Preparation – 9030B Analysis by either 9034 or 9215	N/A	N/A	N/A	±30%[g]	70-130[g]
Total sulfides	N/A	TBD	N/A	TBD	N/A	±30%[g]	70-130[g]
TOC	TOC	Method 9060	N/A	TBD	N/A	±30%[g]	70-130[g]

[a]For 4-digit EPA Methods, see SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update III-A*. For Method 300, see EPA/600/4-79/020, *Methods of Chemical Analysis of Water and Wastes*.

[b]Value based on SQuiRT threshold effect concentration for marine sediment (NOAA 1999, *Screening Quick Reference Tables*).

[c]Radionuclide detection limits based on lowest calculated value following LA-UR-05-7424, *ECORISK Database*, Release 2.2, or those calculated from BCGs (Table 5-4). Detection limits for metals based on back calculating from TRVs using LA-UR-05-7424 parameters for the riparian swallow and bat.

[d]Riparian animal BCG from ANL (2003), *RESRAD Biota*, Version 1.0.

[e]Accuracy criteria for associated batch laboratory control sample percent recoveries. Except for GEA, additional analysis-specific evaluations also performed for matrix spikes, tracers, and carriers as appropriate to the method. Precision criteria for batch laboratory replicate sample analyses.

[f]SW-846 Method 6010 or 6020, or EPA/600/R-94/111, *Methods for the Determination of Metals in Environmental Samples, Supplement 1*, Method 200.8.

[g]Accuracy criteria for associated batch matrix spike percent recoveries. Evaluation criteria based on laboratory statistical limits or fixed limits as defined in the referenced methods. Precision criteria for batch laboratory replicate matrix spike analyses or replicate sample analysis.

[h]No toxicity data on which to base a detection limit.

Table 5-3. Synopsis of Contaminant-of-Potential-Ecological-Concern Detection Limits for West Lake Media. (3 Pages)

Contaminant of Potential Ecological Concern	Chemical Abstracts Service #	Name/Analytical Technology[a]	Target Reference Values			Precision	Accuracy
			Water (pCi/L or µg/L)	Sediment (pCi/g or mg/kg) or Salt Crust (Radionuclide Only; pCi/g)[b]	Aquatic Invertebrates (pCi/g or mg/kg Fresh wt)[c]		

AEA = alpha energy analysis.
BCG = biota concentration guideline.
GEA = gamma energy analysis.
GPC = gas proportional counter.
N/A = not applicable.
NWTPH = Northwest total petroleum hydrocarbon.
PCB = polychlorinated biphenyl.
SQuiRT = screening quick reference table.
SVOA = semivolatile organic analysis/analyte.
SVOC = semivolatile organic compound.
TBD = to be determined.
TOC = total organic carbon.
VOA = volatile organic analysis/analyte.

Table 5-4. Basis for Proposed Radionuclide Target Quantitation Limits in Soil and Biota.

Radionuclide	Aerial Insectivore		
	BCG (pCi/g)	BIV (Concentration in Animal [Fresh wt]/ Concentration in Soil)	Concentration in Animal (pCi/g fresh wt)([BCG × BIV)
Am-241	3890	4.0E-3	15.6
Co-60	692	8.0E-2	55.4
Cs-137	20.8	1.1E+2	2290
Pu-239	6110	3.0E-3	18.3
Ra-226	50.6	6.0E-2	3.04
Ra-228	43.9	6.0E-2	2.63
Sr-90	22.5	7.6E+1	1706
U-238	1580	3.7E-3	5.89

BCG = biota concentration guideline.
BIV = bioaccumulation factor.

Table 5-5. Basis for Detection Limits in Killdeer Food (Aerial Insectivore Feeding Guild).

Suite	Analyte	TRV (mg-COPEC/ kg-BW/day)	Killdeer Body Weight BW (g)[a]	Killdeer Food Intake - Fresh Weight I (g/day)[b]	Proposed Insect Detection Limit (mg/kg-fresh wt) (TRV x BW)/I
Inorg	Antimony	N/A	70	14.7	N/A
Inorg	Arsenic	5.14	70	14.7	24.4
Inorg	Barium	73.5	70	14.7	349
Inorg	Boron	2.92	70	14.7	13.8
Inorg	Cadmium	20	70	14.7	95
Inorg	Chromium	5	70	14.7	23.7
Inorg	Copper	61.7	70	14.7	293
Inorg	Hexavalent chromium	11	70	14.7	52.2
Inorg	Lead	11.3	70	14.7	53.6
Inorg	Lithium	N/A	70	14.7	N/A
Inorg	Mercury	0.9	70	14.7	4.27
Inorg	Molybdenum	35.3	70	14.7	167
Inorg	Nickel	107	70	14.7	508
Inorg	Selenium	1	70	14.7	4.75
Inorg	Silver	5.44	70	14.7	25.8
Inorg	Thallium	N/A	70	14.7	N/A
Inorg	Tin	6.8	70	14.7	32.2
Inorg	Uranium	78	70	14.7	370
Inorg	Vanadium	1.1	70	14.7	5.22
Inorg	Zinc	131	70	14.7	622

[a]Purdue and Haines, 1977, "Salt Water Tolerance and Water Turnover in the Snowy Plover."
[b]Allometric relationship for passerines (EPA-600/R-93/187, 1993, *Wildlife Exposure Factors Handbook*).
BW = body weight.
COPEC = contaminant of potential ecological concern.
I = food intake.
PCB = polychlorinated biphenyl.
TRV = toxicity reference value.

Table 5-6. Basis for Detection Limits in *Myotis* spp, Food (Aerial Insectivore Feeding Guild).

Suite	Analyte	TRV (mg-COPEC/ kg-BW/day)*	*Myotis spp.* BW (g)*	*Myotis* Food Intake - Fresh Weight I (g/day)*	Proposed Insect Detection Limit (mg/kg-fresh wt) (TRV x BW)/I*
Inorg	Antimony	0.059	8.8	0.41	1.27
Inorg	Arsenic	1.04	8.8	0.41	22.3
Inorg	Barium	51.8	8.8	0.41	1100
Inorg	Boron	28	8.8	0.41	601
Inorg	Cadmium	0.77	8.8	0.41	16.5
Inorg	Chromium	39.6	8.8	0.41	850
Inorg	Copper	5.13	8.8	0.41	110
Inorg	Hexavalent chromium	5.66	8.8	0.41	121
Inorg	Lead	4.7	8.8	0.41	101
Inorg	Lithium	NA	8.8	0.41	N/A
Inorg	Mercury	1.41	8.8	0.41	30.3
Inorg	Molybdenum	N/A	8.8	0.41	N/A
Inorg	Nickel	43.9	8.8	0.41	94.2
Inorg	Selenium	0.02	8.8	0.41	4.29
Inorg	Silver	19	8.8	0.41	408
Inorg	Thallium	0.0071	8.8	0.41	0.152
Inorg	Tin	N/A	8.8	0.41	N/A
Inorg	Uranium	6.1	8.8	0.41	131
Inorg	Vanadium	4.16	8.8	0.41	89.3
Inorg	Zinc	126	8.8	0.41	2700

*Parameter from LA-UR-05-7424, 2005, *ECORISK Database*, Release 2.2 (September 2005).

BW = body weight.
COPEC = contaminant of potential ecological concern.
I = food intake.
N/A = not applicable.
PCB = polychlorinated biphenyl.
TRV = toxicity reference value.

6.0 REFERENCES

Alexeeff, G. V., and W. W. Kilgore, 1983, "Learning Impairment in Mice Following Acute Exposure to Dichloromethane and Carbon Tetrachloride," *Journal of Toxicology and Environmental Health* 11: 569-581.

ANL, 2003, *RESRAD BIOTA*, Version 1.0 Software, Argonne National Laboratory, Argonne, Illinois.

Ballschmiter, K. and M. Zell, 1980, "Analysis of Polychlorinated Biphenyls (PCB) by Glass Capillary Gas Chromatography," *Fresenius Z. Anal. Chem.* 302:20-31.

BHI-00032, 1994, *Ecological Sampling at Four Waste Sites in the 200 Areas*, Rev. 0, Bechtel Hanford, Inc, Richland, Washington.

BHI-01119, 2001, *Hanford Site Atlas,* Rev. 2, Bechtel Hanford, Inc., Richland, Washington.

BHI-00172, 1995, Preoperational Environmental Baseline Survey Conducted at the Environmental Restoration Disposal Facility (ERDF), Rev. 0, Bechtel Hanford Inc., Richland, Washington.

Carlsen, T. M., 1996, "Ecological Risks to Fossorial Vertebrates from Volatile Organic Compounds in Soil," *Risk Analysis* 16:211-219.

Carlsen, T. M., J. D. Coty, and J. R. Kercher, 2004, "The Spatial Extent of Contaminants and the Landscape Scale: An Analysis of the Wildlife, Conservation Biology, and Population Modeling Literature," *Environmental Toxicology and Chemistry* 23:798-811. [Appendices available on-line as document UCRL-JC-155043 at http://www-erd.llnl.gov/library/ .]

Chase, J. D., W. E. Howard, and J. T. Roseberry (eds.), 1982, "Pocket Gophers: Geomyidae," J. A. Chapman and G. A. Feldhammer, *Wild Mammals of North America*, The Johns Hopkins University Press, Baltimore, Maryland, pp. 239–255.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq.

D&D-29483, 2006, *Re-Issue Meeting Minutes for the Central Plateau Ecological DQO/SAP – Site Investigation Conducted by Ron Mitchell and Wade Riggsbee*, Rev. 1 Re-Issue, Fluor Hanford, Inc., Richland, Washington.

Daubenmire, R., 1959, "A Canopy-Coverage Method of Vegetational Analysis," *Northwest Science* 33:43-64.

Dindal, D. L. (ed.), 1990, *Soil Biology Guide*, John Wiley and Sons, New York, New York, 1349 pp.

DiToro, D. M., J. D. Mahony, D. J. Hansen, K. J. Scott, A. R. Carlson, and G. T. Ankley, 1992, "Acid Volatile Sulfide Predicts Acuye Toxicity of Cadmium and Nickel in Sediments," *Environmental Science and Technology* 26:1487-1502.

DOE/EH-0676, 2004, *RESRAD-BIOTA: A Tool for Implementing a Graded Approach to Biota Dose Evaluation*, User's Guide, Version 1, ISCORS Technical Report 2004-02, Interagency Steering Committee on Radiation Standards, U.S. Department of Energy, Washington, D.C.

DOE-RL, 1984, "EPA PCB Inspection Report and Notice of Compliance" (Letter to Contractors, Richland, Washington, from R.E. Gerton), Safety and Quality Assurance Division, U.S. Department of Energy, Richland Operations Office, Richland, Washington, August 1.

DOE/RL-92-24, 1995, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, Rev. 4, 2 vols., U. S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-93-24-4, 1994, *Hanford Environmental Information System (HEIS)*, U.S. Department of Energy, Richland Operations, Richland, Washington.

DOE/RL-95-55, 1995, *Hanford Site Background: Evaluation of Existing Soil Radionuclide Data*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-96-12, 1996, *Hanford Site Background: Part 2, Soil Background for Radionuclides,* Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2001-54, 2005, *Central Plateau Ecological Evaluation*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2004-42, 2005, *Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase I*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2005-30, 2005, *Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase II*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2005-37, 2005, *Status of Hanford Site Risk Assessment Integration, FY 2005*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2005-40, 2005, *100-B/C Pilot Project Risk Assessment Report*, Draft B, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2005-49, 2005, *RCBRA Stack Air Emissions Deposition Scoping Document*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-STD-1153-2002, 2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*, DOE Technical Standard, U.S. Department of Energy, Washington, D.C. Available on the Internet at http://www.eh.doe.gov/techstds/standard/std1153/1153.htm .

DTS-RPT-077, 2005, *Central Plateau Terrestrial Ecological Sampling Report – Phase I*, Rev. 0, Duratek Technical Services, Richland, Washington.

DTS-RPT-078, 2005, *Central Plateau Terrestrial Ecological Sampling Report – Phase II*, Rev. 0, Duratek Technical Services, Richland, Washington.

Duratek, 2004, *Soil and Biota Collections at Gable Mountain Pond, B-Pond and Control Site*, Duratek Technical Services, Richland, Washington.

Eisler, R., 1991, "Cyanide Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review," U.S. Fish and Wildlife Service Biological Report 85(1.23), U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, Maryland. Available on the Internet at http://www.pwrc.usgs.gov/infobase/eisler/CHR_23_Cyanide.pdf, 2/4/06).

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington, as amended.

EPA, 1999, *Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund Sites* (Memorandum), OSWER Directive 9285.7-28P, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 2003, *Guidance for Developing Ecological Soil Screening Levels*, Attachment 1-3, *Evaluation of Dermal Contact and Inhalation Exposure Pathways for the Purposes of Setting EcoSSLs*, OSWER Directive 9285.7-55, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. Available on the Internet at http://www.epa.gov/ecotox/ecossl/pdf/ecossl_attachment_1-3.pdf .

EPA, 2005, *Guidance for Developing Ecological Soil Screening Levels*, OSWER Directive 9285.7-55, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

EPA/540/R-97/006, 1997, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final)*, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

EPA/600/4-79/020, 1983, *Methods of Chemical Analysis of Water and Wastes*, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio.

EPA/600/R-93/187, 1993, *Wildlife Exposure Factors Handbook*, Vol. I and II, Office of Research and Development, U.S. Environmental Protection Agency, Washington, D.C.

EPA/600/R-94/111, 1994, *Methods for the Determination of Metals in Environmental Samples, Supplement I*, Office of Research and Development, U.S. Environmental Protection Agency, Washington, D.C.

EPA/630/R-95/002F, 1998, *Guidelines for Ecological Risk Assessment*, U.S. Environmental Protection Agency, Risk Assessment Forum, Washington, D.C. Available on the Internet at: http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=12460

Fairbrother, A., 2003, "Lines of Evidence in Wildlife Risk Assessments," *Human and Ecological Risk Assessment* 9:1475-1491.

Gilbert, R. O., 1987, *Statistical Methods for Environmental Pollution Monitoring*, Von Nostrand Reinhold Company, Inc., New York, New York.

Gilbert, R. O., and J. C. Simpson, 1992, *Statistical Methods for Evaluating the Attainment of Cleanup Standards*, Volume 3: Reference-Based Standards for Soils and Solid Media, Pacific Northwest Laboratory, Richland, Washington.

HNF-6150, 2000, *Preoperational Environmental Survey for the Spent Nuclear Fuel Project Facilities*, Fluor Hanford, Inc., Richland, Washington.

Hodges, W. R., 1989, *Radiological History of the PUREX Facility 1955 to 1989,* Westinghouse Hanford Company, Richland, Washington.

Hole, F. D., 1981, "Effects of Animals on Soil," *Geoderma* 25: 75–112.

Johnson, M. S., and G. W. Jay, 1999, "Development and Derivation of Inhalation Benchmark Values for Wildlife: An Application to Identify Ecological Risk for the Anniston Chemical Disposal Facility Incinerator, Anniston, AL," Health Effects Chemical Research Program, Toxicology Directorate, U.S. Army Center for Health Promotion and Preventative Medicine, *Health Effects Research Study*, 87-1299-99, Aberdeen Proving Ground, Maryland.

Kapustka, L. A., C. A. Bradlee, J. W. Gorsuch, N. Scholz, D. Mackay, I. Cousins, T. Dueck, R. Zaleski, J. Staveley, J. N. Cape, R. Roshon, K. Wiench, T. Pfleeger, 2003, "Challenges in Organic Vapor-Phase Phytotoxicity Testing," *SETAC Globe* 4:33-35.

LA-13719-MS, 2000, *The Relationship Between Pocket Gophers (Thomomys bottae) and the Distribution of Buried Radioactive Waste at the Los Alamos National Laboratory*, Los Alamos, New Mexico.

LA-UR-04-8246, 2004, *Screening-Level Ecological Risk Assessment Methods*, Rev. 2, Los Alamos National Laboratory, Los Alamos, New Mexico.

LA-UR-05-7424, 2005, *ECORISK Database*, Release 2.2, Environmental Stewardship Division Environmental Remediation and Surveillance Program, Los Alamos National Laboratory, Los Alamos, New Mexico.

Landeen, D. S., and J. Crow, 1997, *A Nez Perce Nature Guide - I am of this Land Wetes pe m'e wes*, Western Printing, Clarkston, Washington.

Laundré, J. W, 1993, "Effects of Small Mammal Burrows on Water Infiltration in a Cool Desert Environment," *Oecologia* 94: 43–48.

Markwiese J. T., R. T. Ryti, R. Mirenda, P. Newell, J. Podolsky, 2003, "Abstract, Wildlife Screening Thresholds for Volatile Organic Chemicals" (poster presentation), 24th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Austin, Texas (November 9-13).

Markwiese J. T., 2004, "Collection and Evaluation of Existing Data: An Ecological Risk Assessment Perspective," *Quality Assurance: Good Practice, Regulation and Law* 10: 107-16.

McFarland, V. A., and J. U. Clarke, 1989, "Environmental Occurrence, Abundance And Potential Toxicity Of PCB Congeners: Consideration for a Congener-Specific Analysis," *Environmental Health Perspectives* 81:225.

Nevo, E., 2000, *Mosaic Evolution of Subterranean Mammals: Regression, Progression and Global Convergence*, Oxford University Press, Oxford England, 413 pp.

NOAA, 1999, *Screening Quick Reference Tables*, Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration, Seattle, Washington.

O'Connor, G., and K. Wieda, 2001, *Northwest Arid Lands: An Introduction to the Columbia Basin Shrub-Steppe*, Battelle Press, Columbus, Ohio.

Pettigrew, R., and G. S. Fell, 1973, "Microdiffusion Method for Estimation of Cyanide in Whole Blood and Its Application to the Study of Conversion of Cyanide to Thiocyanate," *Clin. Chem.* 19, 466-471.

Pitard, F. F., 1993, *Pierre Gy's Sampling Theory and Sampling Practice: Heterogeneity, Sampling Correctness, and Statistical Process Control*, 2nd ed, CRC Press, Inc., Boca Raton, Florida.

PNL-4140, 1984, *Habitat Requirements and Burrowing Depths of Rodents in Relation to Shallow Waste Burial Sites*, Pacific Northwest Laboratory, Richland, Washington.

PNNL-6415, 2003, *Hanford Site National Environmental Policy Act (NEPA) Characterization*, Rev. 15, Pacific Northwest National Laboratory, Richland, Washington. Available on the Internet at http://www.pnl.gov/ecology/Library/NEPA.html .

PNNL-13688, 2001, *Vascular Plants of the Hanford Site*, Pacific Northwest National Laboratory, Richland, Washington.

Prendergast, J. A., R. A. Jones, L. J. Jenkins Jr., and J. Siegel, 1967, "Effects on Experimental Animals of Long-Term Inhalation of Trichloroethylene, Carbon Tetrachloride, 1,1,1-Trichloroethane, Dichlorodifluoromethane, and 1,1-Dichloroethylene," *Toxicology and Applied Pharmacology*, 10: 270-289.

Purdue, J. R., and H. Haines, 1977, "Salt Water Tolerance and Water Turnover in the Snowy Plover," *The Auk*, Vol. 94, pp. 248-255.

Ramsey, C., 2004, *Sampling for Environmental Activities*, DQO Training Course, Envirostat, Fort Collins, Colorado.

RHO-RE-ST-45P, 1985, *PUREX Preoperational Environmental Survey Report*, Rockwell Hanford Operations, Richland, Washington.

Schulte, E., and R. Malisch, 1983, "Berechnung der Vahren PCB-Gehalte in Umweltproben I. Ermittlung der Zusammensetzung Zweier Technischer PCB-Gemische," *Fresenius Z. Anal. Chem.* 314:545-551

Schwetz, B. A., B. J. Leong, and P. J. Gehring, 1974, "Embryo- and Fetotoxicity of Inhaled Carbon Tetrachloride, 1,1-Dichloroethane, and Methyl Ethyl Ketone in Rats, *Toxicology and Applied Pharmacology* 28: 452-464.

Seigler, D. S., 1976, "Plants of Oklahoma and Texas Capable of Producing Cyanogenic Compounds," *Proceedings of the Oklahoma Academy of Science*, Vol. 56, pp. 95. Available online at: http://digital.library.okstate.edu/OAS/oas_htm_files/v56/p95_100nf.html .

Smallwood, K. S., M. L. Morrison, and J. Beyea, 1998, "Animal Burrowing Attributes Affecting Hazardous Waste Management," *Environmental Management*, 22: 831–847.

Spring, S. E., A. K. Miles, and M. J. Anderson, 2004, "Effects of Trichloroethylene and Perchloroethylene on Wild Rodents at Edwards Air Force Base," *Environmental Toxicology and Chemistry* 23: 2162–2169.

SW-846, 1999, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update III-A*, as amended, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. Latest updated methods are online at www.epa.gov/SW-846/main.htm .

Thal, D. I., *Application of Database Technology for the Selection of PCB Congeners for Multipurpose Studies*, Severn Trent Laboratories, Knoxville, Tennessee.

TNC, 1999, *Biodiversity Inventory and Analysis of the Hanford Site, Final Report 1994-1999*, The Nature Conservancy of Washington, Seattle, Washington.

Tsuge, K., M. Kataoka, and Y. Seto, 2000, "Cyanide and Thiocyanate Levels in Blood and Saliva of Healthy Adult Volunteers," *Journal of Health Science* 46(5) 343–350.

University of Washington, 2006, *Burke Museum of Natural History and Culture*, Online reference: *Mammals of Washington*. Entry: Northern Pocket Gopher, *Thomomys talpoides*. Available on the Internet at http://www.washington.edu/burkemuseum/collections/mammalogy/mamwash/thta.html .

Vogel, S., C. P. Ellington, and D. L. Kilgore, 1973, "Wind-Induced Ventilation of the Burrow of the Prairie-Dog, *Cynomys ludovicianus*," *Journal of Comparative Physiology* 85:1-14.

VSR07-003, 2007, *200 Area Ecological Study - Phase I Soils and Animals,* Rev. 0, Fluor Hanford, Inc., Richland, Washington.

VSR07-004, 2007, *200 Area Ecological Study - Phase II Soils and Animals,* Rev. 0, Fluor Hanford, Inc., Richland, Washington.

WAC 173-340-707, "Analytical Considerations," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340-900, "Tables," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WHC-EP-0150, 1988, *Grout Treatment Facility Environmental Baseline and Site Characterization Report*, Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0771, 1994, *Comparison of Radionuclide Levels in Soil, Sagebrush, Plant Litter, Cryptogams, and Small Mammals*, Rockwell Hanford Operations, Richland, Washington.

WHC-SD-C018H-RPT-004, 1995, *Preoperational Environmental Survey Report: 200 Areas Effluent Treatment Facility (ETF), State Approved Land Disposal Structure (SALDS), and Liquid Effluent Retention Facility (LERF) (C018H)*, Westinghouse Hanford Company, Richland, Washington.

Whicker, F. W., T. G. Hinton, M. M. MacDonell, J. E. Pinder III, and L. J. Habegger, 2004, "Avoiding Destructive Remediation at DOE Sites," *Science* 303:1615-1616, March 12.

Wiemeyer, S. N., E. F. Hill, J. W. Carpenter, and A. J. Krynitsky, 1986, "Acute Oral Toxicity of Sodium Cyanide in Birds," *Journal of Wildlife Diseases* 22(4), pp. 538-546.

WMP-20570, 2005, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase I*, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

WMP-25493, 2005, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase II*, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

Zack, R. S., 1998, "Shore Flies (Diptera: Ephydridae) of the Hanford Site, Washington," *Northwest Science* 72, pp. 127-141.

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APPENDIX A

NATURAL RESOURCE TRUSTEES/HANFORD ADVISORY BOARD/ U.S. DEPARTMENT OF ENERGY, RICHLAND OPERATIONS OFFICE/ DECISION-MAKER ISSUES MATRIX

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APPENDIX A

NATURAL RESOURCE TRUSTEES/HANFORD ADVISORY BOARD/U.S. DEPARTMENT OF ENERGY, RICHLAND OPERATIONS OFFICE/DECISION-MAKER ISSUES MATRIX

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
	General		
1	The [Phase III] data collection and risk assessment approach presented was thorough, well planned, and is appropriately conservative. A number of risk assessment tools that rely on statistical theory to more "accurately" portray the risks that exist on a site, and introduce an added layer of complexity for the reader and the practitioner, are generally being avoided here. This will make the current assessment more of a conservative or "worst case scenario" and may simplify the communication of the risk results.	Y	Noted
2	The only overriding issue that appears to be deficient is a treatment of sample size and the associated uncertainty with such a large geographic area. The warnings about the use and abuse of traditional power analysis and statistical hypothesis testing are so noted, but do not dismiss the need for its consideration and an appropriate level of certainty and representation attained. The sample size in most cases is minimally sufficient, but in others not possible as presented. For example, the total acreage in Figure 3-3 and a brief summary of where those boundaries were arrived at, or the total road miles considered for PCB contamination, if known, should be so stated.	Y	Issues of sample size adequacy have been raised by several participants. It must be recognized that the sampling proposed for Phase III is augmented by a wealth of existing information for the Hanford Site. In addition to Phase I and Phase II data, this investigation is making use of thousands of records on COPECs resulting from previous remedial investigations of operational areas as well decades of monitoring data for areas outside of waste sites (see Appendix C for an example of data available for non-waste site areas). Considering the amount of information that is being gleaned from existing data, the sample sizes proposed in the Phase III SAP are adequate for decision making. The justification for selection of sample sizes (e.g., PCB sampling locations near roads) is developed further in revisions to the SAP.
3	The Phase III SAP for the Central Plateau is strongly grounded in data needs and gaps identified through the Phase I and Phase II Central Plateau Terrestrial Risk Assessment documents and findings. An understanding of the Phase III document without familiarity with the Phase I and II documents would be difficult, and the reader is appropriately warned and those earlier documents cited. The current document is also shaped by, and indeed cites, comments and concerns raised at the February 22-23, 2006, Phase III DQO Workshop to summarize the Central Plateau Data Quality Summary Report (WMP-20570).	Y	Noted

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#		Interview Issues	Accept?	Comment Resolution
4		Scope Issues: The scope (in space, time, and future management scenarios) that the current risk assessment is intended to cover is not clear and seems to be changing regularly. This presents unneeded uncertainties when evaluating data and decision making with regard to how the risk assessment moves forward.	Y	See responses to specific issues below
	a	Space – Space or geographic boundaries that the current risk assessment is intended to cover is changing. The US Ecology sites and tank farms sites were, for apparently good reason, removed from consideration under the current risk assessment. Yet, the general area is still referred to as the 200 Area and/or the Central Plateau. The risk assessment needs to explicitly state to which areas it pertains and excluded properties need to be so stated and identified. The perspective of a reader from the general public should be considered. Also, the outer boundaries of the area of inference to which these results apply are not clear and should be so stated. Perhaps maps with areas considered within and outside the area of inference with respect to the risk assessment should be provided	Y	The Phase II EcoDQO and SAP (WMP-25493 and DOE/RL-2005-30, respectively) provide a detailed basis for excluding the US Ecology sites and tank farms sites from the 200 Areas. Phase III SAP Figure 1-1, Spatial Boundary for the Central Plateau Ecological Data Quality Objectives (DOE/RL-2006-27) shows the spatial boundary of the Central Plateau. In addition, Figure 1-3 of the Phase III SAP shows the spatial areas evaluated for Phase III of the Central Plateau EcoDQO activities. See response to comment 12 for more information.
	b	Time – Habitat types are evolving phenomena. Decisions about sampling that hinge on presence or absence of habitat types or species that are missing from a currently disturbed site may not be sufficient 3, 5, or 10 years in the future when those habitats or species have returned to those disturbed areas. Some statement as to the expected and appropriate life span of the current risk assessment needs to be so stated.	Y	It is recognized that ecological systems are dynamic in nature. The intent of the risk assessment, however, is to characterize current-day risk for the Central Plateau. The risk assessment is planned to begin in October 2006 and to be finished by September 2007.
	c	Management Activity – Similarly, current land-management activities, full and selective herbicide applications in particular, are intended to reduce contaminant mobility, exposure, and, ultimately, risk. The current risk assessment does not address other land management scenarios and, therefore, is only relevant and applicable in some locations under the current land-management regime. Changes in management that, for example, resulted in the establishment of deep-rooted shrubs, might create an exposure pathway not currently considered.	Y	The risk assessment evaluates the "baseline" conditions that are inclusive of these land-management activities. This will be clearly indicated in the risk assessment report.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#		Interview Issues	Accept?	Comment Resolution
	d	The Trustees recommend that the 200 Area ORP and RL sites should be included in the Central Plateau Ecological DQO process. Questions were also raised about excluding the 40-acre US Ecology site.	Y	Because ORP has interim actions planned that will change the habitat, assessment of the ORP sites has been decoupled from RL sites. Concerns regarding cumulative effects on groundwater are covered by the groundwater operable units. In addition, US Ecology will have a WAC 173-340 investigation for the vadose zone and groundwater starting in the spring of 2006 and thus characterization in the Central Plateau EcoDQO is unnecessary. See response to comment 12 for more information.
	e	Concern was voiced over the approach of the Central Plateau EcoDQO focusing on the top 15 ft and the groundwater operable units evaluating deeper contamination. How is integration occurring?	Y	Rather than repetitively documenting risk assessment integration in many documents, Hanford Site risk assessments integration is addressed in DOE/RL-2005-37, a comprehensive integration document. And while risk assessments are pathway specific, the Tri-Parties write records of decision that are protective of all pathways. The Central Plateau ERA does not address groundwater or any contamination below 15 ft.
	f	Is there a Tri-Party Agreement milestone associated with this Central Plateau EcoDQO schedule? This project schedule should be modified to acknowledge the Trustee efforts to identify data gaps. RL is providing $200,000 in funding for this (lead by Ridolfi), and a concern was raised that this money would be wasted if the data matrix is not ready until September 2006. Thus there is a disconnect in the planning process. Suggested that the Phase III DQO/SAP be postponed.	Y	After the Ecological Risk Assessment report is issued in fiscal year 2008, it will link with individual Central Plateau Feasibility Studies in support of the Tri-Party Agreement Major Milestone TPA-15-00C "Complete all 200 Area Non-Tank Farm Operable Unit Site Investigations under Approved Work Plan Schedules through Feasibility Study Reports and recommended remedy(ies)....". The completion date for the milestone is 12/31/11. The Central Plateau EcoDQO will continue as planned, and Phase III sampling will occur in fiscal year 2006. The scope of the Central Plateau EcoDQO DQO report is to identify additional ecological data needs to support remedial action decision making. If the Trustees identify significant data gaps, then the DOE is willing to consider requests for more data collection on a case-by-case basis.
5		A Conceptual Site Wide Cause/Effect Model was presented to the Environmental Restoration Contractor for the 100 BC Pilot Project. The diagram represents thoughts on conceptual model needs.	Y	The Conceptual Site Wide Cause/Effect Model presented for the 100 BC Pilot Project was developed further with regard to assessing risks to ecological receptors in the Central Plateau. For example, the conceptual model of contaminated media and biotic exposure pathways associated with Hanford Site facility processes presented in the Phase I Ecological DQO (Figure 2-1, WMP-20570), uses the structure of the cause/effect model and develops linkages for contaminant fate and transport in a terrestrial environment.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
6	Be definitive on what information is needed for waste-site decision making. Document this information very clearly in the data quality assessment or DQO.	Y	The basis for the proposed sampling has been clearly documented in the EcoDQO and SAP. Sampling is defined in the context of waste-site decision making and characterizing potential effects from past operations in non-waste site areas.
7	Coordinate other interviews in one large group that includes all interested parties – Regulators, tribes and other trustees. Ensure that the DOE is available for the interview.	Y	A large group interview was held on November 16, 2005 during a Trustee briefing meeting. At that time, the trustees expressed a general concern over the timing of the Phase I/II data quality assessment and the subsequent Phase III DQO. Additional DQO/SAP meetings were held with all interested parties in attendance to discuss comments on ERAGS (EPA/540/R-97/006) Steps 3 and 4 (to include Phase I/II data analysis summary) on February 22-23, 2006, and comments on the Phase III SAP on April 12, 2006.
8	Provide a time line to show the Phase I/II data quality assessment and Phase III DQO process.	Y	A timeline was prepared as documented in the RL interview minutes.
9	Make sure that it is understood that the Central Plateau EcoDQO interview issue 10b is stressed: "10b issue: Ecological data should be collected to support Trustee natural-resource damage assessment risk assessment."	Y	The scope of this DQO is to identify additional ecological data needs to support remedial action decision making. The additional ecological data collected to support remedy decision making may be used to support the DOE natural-resource damage assessment process. Requests to collect data that are outside of this scope will be considered on a case-by-case basis.
10	Make sure that the project continues to be consistent with ERAGS and other CERCLA requirements and guidance. The project shall also emphasize sound science in the analysis of data and in making recommendations for additional data collection.	Y	Requirement noted. The project is consistent with ERAGS and other CERCLA requirements and guidance.
11	In reviewing the overall approach for the Phase III work, we concur with the topics to be addressed by the plan; they are important issues that must be addressed in making cleanup decisions for the Central Plateau. We have serious reservations, however, about the sampling program proposed by the plan, for several reasons.		Specific issues addressed below
	a In some cases, the purpose and goals of proposed work are poorly articulated, so the resulting sampling plan lacks focus and is unlikely to result in data that will support informed decision-making about cleanup (e.g., sampling for vegetation, PCBs).	Y	The SAP has been revised to include additional information on the basis for the amount and type of planned data collection. The main body of this DQO report contains further detail and evaluation of the existing data for each spatial domain.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#		Interview Issues	Accept?	Comment Resolution
	b	The plan often lacks sufficient detail to determine whether data will inform a reliable decision process.	N	The SAP has been revised to provide more detail for the proposed sampling. However, the SAP should be reviewed along with the main body of this DQO report for complete information on the decision process.
11 (cont)	c	In some cases, sample sizes are simply too small to inform the decision process. This is especially true for West Lake, where only one sample each is planned for water, soils, and sediment.	N	Please see response to comment 2 regarding sample size adequacy in general. Regarding West Lake, it was the suggestion of the participants in the February 22-23, 2006, Phase III DQO Workshop that MIS be used for all media. MIS provides more representative estimates of the mean than grab samples. Note that one quality control sample is planned for each of the primary samples collected. This results in two filtered water and two unfiltered water samples and two sediment samples. Salt crusts will likewise be characterized with one primary MIS and one field replicate. Five samples of brine flies will be collected to characterize invertebrate tissues. No soil samples are planned unless high counts are detected during radiation surveys. Please see response to comment 129 for more information.
	d	Sampling in some cases is almost exploratory in nature (e.g., chloroform [*sic;* carbon tetrachloride]), collecting a small amount of data that will provide first cuts at characterizing an issue, rather than definitive information. The document makes clear, however, that Phase III is planned as the final phase of field sampling for the Central Plateau ERA. Unless additional sampling is performed there will be insufficient data to inform the decision process.	N	The appropriate amount and types of data have been proposed for each spatial domain. Data collected for some spatial domains are more exploratory in nature. An example is the assessment for the potential for adverse ecological effects from the diffuse carbon tetrachloride plume. The plan includes assessment decision logic for this spatial domain.
	e	Time Frame for Review – The DOE and its contractors have provided an unreasonably short timeframe for review and comment on a draft study plan. The very short time in this instance (eight working days from receipt to the April 12, 2006, Phase III SAP Review Workshop) minimizes the opportunity for thoughtful or thorough review. Moreover, because we were given a preliminary draft, we were instructed not to share it. This guidance effectively precluded any "public" review of the proposed work. So long as the DOE persists in rushing the review process to meet the expedience of "We need to get to the field by April (or whenever)" the quality and efficiency of fieldwork will be compromised. In this instance, we believe that the frenzied pace for preparation of DQOs and the SAP for Phase III likely has contributed to major shortcomings of the plan.		Noted

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
12	Phase III is described in the draft SAP as the final phase of data collection for the Central Plateau ERA. As the study is currently designed, it seems almost certain that there will be substantive, unanswered issues at the end of this phase (e.g., carbon tetrachloride effects on burrowing animals, West Lake). We don't believe that such issues can be resolved without additional sampling. Similarly, U.S. Ecology and tank farm areas were initially included in the Central Plateau ERA, and text says that they are still part of it, yet they were not sampled in Phase I or II and will not be sampled in Phase III. How will an ERA for these areas be made? How can decisions for the Central Plateau be made without considering these areas, especially given the long history of leaks from tank farms?	N	The sampling outlined in the Phase III DQO will provide data necessary to write an ERA using data from all three phases. The risk assessment also will use relevant existing monitoring data (e.g., non-waste site data). The basis for excluding U.S. Ecology and tank farm areas is provided in the DQO and SAP for Phase II and is reproduced below. Tank Farms. Tank farms are actively managed by ORP using herbicides, pesticides, and physical barriers to prevent biological intrusion. Furthermore, little attractive habitat exists for biotic use. Every effort is made to capture biological intruders, and captured animals are disposed of. Tank farm sites are being evaluated using the *Resource Conservation and Recovery Act of 1976* corrective action process, and the resulting remedies almost certainly will change the quality of ecological habitat within the tank farms. Tank farms also are subject to interim stabilization methods that include removing liquids from the tanks and sampling the waste. Until all interim tank remediation is finished, final remedial alternatives will not be evaluated. For these reasons, tank farm sites are not appropriate for ecological sampling at this time.
		N	US Ecology. The US Ecology site is a commercial low-level radioactive waste disposal site within the Hanford Site boundaries. It is a licensed state facility and is not operated or regulated by the DOE. Thus, the US Ecology site is not a CERCLA waste site, although it is operated on Federal land being leased to the State of Washington. The site has been in operation since 1965 and consists of containerized solid wastes that are buried under a cover of deep fill. The site contains radionuclides and a limited set of nonradioactive constituents. Because the US Ecology site is not a Central Plateau CERCLA waste site, ecological data collected from the US Ecology site will not be used to support Central Plateau operational area decision making. Remedial actions are based on closure plans already under way that include capping the low-level radioactive waste trenches. Furthermore, the US Ecology site will remain operational for another 50 years (until 2056). The site is scheduled for closure when the lease expires in September 2063, which further limits the utility of sampling current conditions at US Ecology and the local environs. As such, Phase II did not include sampling at the US Ecology site.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
13	Phase I sites have all been covered with clean fill to isolate wastes and have been treated with herbicides to prevent establishment of deep-rooted plants that might bring contaminants to the surface. How well do you believe limited sampling of a few of these sites represents the whole Central Plateau, now and in the future? Weekly incident reports have frequent descriptions of hot tumbleweeds and hot mouse droppings, so there are obviously ecological exposures to contaminants that are not represented by the Phase I and II data. Also, what about long-term conditions on sites such as the Phase I sites after closure; some of the sites will presumably be cleaned up, others will not, and at some time herbicide treatments will cease and erosion may remove some of the fill over the sites. Can data from sampling in 2005 (when the sites were actively managed) represent conditions and risks that might exist on the Plateau a generation or a century from now?	N	The representative approach for Phase I and Phase II waste sites resulted from careful consideration of over 800 candidate waste sites. The selection of representative waste sites was endorsed by the Tri-Parties for Phases I and II. While it is true that incident reports do occasionally identify contamination on waste sites. The contamination levels associated with these incidents is normally low, confined to a small area, and dealt with promptly. The animal incident reports cited as evidence of ecological exposure are almost entirely associated with facilities, not waste sites. The "hot" tumbleweed reports are the result of an active management and surveillance program. This information is germane to understand the context for what is "baseline" for the Central Plateau waste sites. Data collected at the waste sites under current management practices are not intended to represent future conditions under different management situations.
14	The locations of all samples taken should be recorded so that it is possible to identify the locations where effects are observed.	Y	Soil and radiation survey sampling locations are identified with Global Positioning System coordinates within an investigation area. Biota data are more generally identified spatially by the investigation area from which they were collected.
15	Revise the third sentence as follows: "The activities described in this document will result in contaminant and biotic data that will assist in waste site decision making." The ecological risk data are just some of the data needed for waste site decision making. (Exec. Summary, p. iii, 1st paragraph)	Y	Comment accepted.
16	It is mentioned that tiers are types of data collected. However, this term is not used elsewhere in the document, and examples of tiers are not provided. Give the tiers in this paragraph or refer to tiers in the document where they are discussed. (Exec. Summary, p. iv, 2nd full paragraph)	Y	Comment accepted.
17	For non-waste site soil radiological sampling, explain the MIS along transects near Phase I and Phase II reference sites. (Exec. Summary, Table ES-1 and Table 1-1, p. vii and 1-25, Table ES-1)	Y	Comment accepted.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
18	Include replicates for the West Lake multi-increment samples. Ecology has not approved of MIS without replication. Change the text to: "Collect multi-increment surface water samples…" Make this change for porewater, sediment, and salt crusts as well. (Exec. Summary, Table ES-1, and Table 1-1, p. vii, 1-25 and 1-26)	Y	Comment accepted.
19	Delete the 5th column – notice that it cites WAC 173-340-745, which is not appropriate for direct exposure to radionuclides and not appropriate for ecological receptors. (Table 2-2, p. 2-9).	Y	Comment accepted.
20	Delete the 6th column. This risk assessment is for ecological receptors only. (Table 2-2, p. 2-9)	Y	Comment accepted.
21	Detection limits for several analytes are given as TBD. Replace the TBDs with values. (Tables 2-6, 2-7 and 2-8, p. 2-14-2-18)	Y	Comment accepted.
22	Add TBP and normal paraffin hydrocarbons to the analyte tables. (Tables 2-6 and 2-7, p. 2-14-2-17)	Y	Comment accepted.
23	The arsenic detection limit for water, 10 µg/L, is too high relative to the WAC 173-340 groundwater cleanup level. Use atomic absorption spectroscopy with hydride generation to achieve lower detection limits. (Table 2-7, p. 2-16)	Y	The basis for this SAP is ecological risk assessment, not groundwater protection. Nevertheless, the comment was accepted to provide a margin for analytical error, not for compliance with GW standards.
24	Reduce the detection limit for uranium detection limit to ≤30 µg/L (the maximum contaminant level). (Table 2-7, p. 2-17)	N	The basis for the request is unclear. The PQL is 500 µg/L, orders of magnitude lower than that needed for ecological screening (40,000 µg/L).
25	The SAP should contain more detail. Provide text to cover the first bullet, Identify the investigation area…. How will this be done? For the 5th bullet, use a subheading on p.3-13 to show the reader which of the steps includes the soil preparation. (Section 3.5.2, p. 3-11 – 3-12, Bullets)	Y	Comment accepted.
26	The formula for d appears to have an extraneous period before the cubed root symbol. Please correct. Section 3.5.3 p. 3-13, #9)	Y	Comment accepted.
27	It is unclear why the two columns that refer to human health cleanup levels, i.e., "Direct Exposure, Industrial (WAC 173-340-745)" and "Soil Concentration Protective of Groundwater (WAC 173-340-747)" are included, because the Phase III SAP is for an ERA.	Y	Comment accepted.
28	Provide rationale for not validating physical property data and field screening analytical results. (p. 2-21, para 2 and 3)	N	The physical property data and field screening analytical results are of secondary importance to data on COPECs and thus do not warrant the same degree of quality assurance.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
29	The exposure model presented is similar but not equivalent to the model in WAC 173-340-900, Table 749-4. The model does not include area use factor but includes other terms to potentially lower COPEC intake (e.g., P, RGAF). P may include the area use factor but may also include other factors that reduce intake of contaminated food (e.g., TF). (p. 2-22, para 4)	-	Noted
30	Please describe the uncertainty analysis for exposure and toxicity parameters, as described in LA-UR-04-8246). (p. 2-23, para 2)	Y	The considerations outlined in Los Alamos National Laboratory's uncertainty analysis have been developed further in the SAP.
31	EPA Method 1668A (SW-846) may be needed for dioxin-like PCB analysis. (p. 2-27, Table 2-11)	N	Dioxin-like congeners will be adequately quantified with the measures proposed.
32	"Tables 2-9 through 2-13" should read "Tables 2-9 through 2-14." Also a typo, "insect" (not inset). (p. 2-24, para 4)	Y	Comment accepted.
33	Does the Blaustein and Johnson (2003) reference on amphibians apply similarly to reptiles (e.g., lizards)? (p. 3-7, para 1)	Y	The reference is applicable in a general sense of what to consider with regard to abnormalities in wildlife
34	Detection limits higher than those listed in Tables 2-2 through 2-8 (not just Table 2-2) should be regarded as significant deviations. Also, PQLs higher than target required quantitation limits are problematic (e.g., cyanide in Table 2-4; selenium and vanadium in Table 2-5; mercury in Table 2-6; copper, nickel, and silver in Table 2-7). (p. 3-23, para 3)	-	Noted
35	If a multi-increment sample is designed with a random start, this type of sample is better characterized as a systematic sample with a random component. It is not a completely randomized sample, because all members of the population do not have an equal probability of selection. That is, after the initial location is randomly selected in the first cell, subsequent increment locations are fixed. Therefore, MIS should be discussed under "Systematic Grid Surveys" (rather than under "Random Sampling"). (p. 3-2, bullet 2)	Y	The points made are appreciated. The subsection "random sampling" has been renamed, "systematic sampling with a random start."

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
Phase I/II Data: Results, Analysis and Interpretation			
36	Phase II sampling included only three samples in the BC Controlled Area, representing a miniscule portion of the Area. The BC Controlled Area covers almost 3000 ha and cannot be adequately characterized by data for three small (1 ha) plots. Decisions based on that data would not be defensible. Moreover, the sampling design violates fundamental premises of the MIS approach (random sample of the entire decision unit).	Y	It is understood that additional data could be obtained in most environmental sampling activities. However, it was agreed in the Phase II Eco DQO and SAP review meetings that it would be prudent to sample a range of contaminated surface soils that included the most highly contaminated, moderately contaminated, and low-contamination concentration areas. Those areas were selected after comparing the results of radiological surveys in the BC Controlled Area. By taking this approach, the conditions within the BC Controlled Area were bounded for ecological risk characterization. It is noted that radiological surveys performed in the BC Controlled Area in fiscal year 2006 for the 200-UR-1 Operable Unit revealed that radiological surface contamination is much less widespread than indicated by the aerial radiological surveys, affecting approximately 10% of the area thought to be contaminated. It was noted in the April 12, 2006, Phase III SAP Review Workshop that the radionuclide sum of fractions of 0.083 was, rounding up, basically the same as the 0.1 rad/day dose threshold set by the DOE based on international consensus. For these reasons, an additional investigation area will be deployed in the BC Controlled Area high zone (Zone A). It is also noted that the 1 ha investigation area is the "decision unit" for ecological risk evaluations.
37	We disagree with the notion of identifying cause-effect relationships using regression models. Regression identifies relationships between or among variables; it does not, in and of itself, infer anything about cause and effect.	Y	It is recognized that regression analyses provide an assessment of correlative, not causal, relationships. Results of regression analyses will not be interpreted as bounds for establishing causal relationships.
38	A "weight-of-evidence" approach must be used with caution. We note especially that the downplaying of "outliers" in Section 1.3 does not bode well for application of the weight of evidence approach.	Y	A "weight-of-evidence" approach will be used with caution. Please see responses to comment 42 regarding outliers.
39	Please clarify the distinction between field replicate for quality control vs. multiple field samples for statistical estimation.	Y	A field replicate is employed to provide an estimate of COPEC variability associated with a given field sample. Multiple field samples are used to characterize the COPEC variability of a spatial area.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
40	The MIS approach for soils in this study (sampling to a depth of 1 in., or 2.5 cm) is different from some previous sampling efforts, in which soils were sampled to a depth of 6 in. (15 cm). We suggest that there be more than one duplicate sample and that several replicates be sampled to test this method. We also strongly encourage the DOE to have at least a few plots sampled two ways, using both 0 to 2.5 and 0 to 15 cm depth increments, to allow a comparison and at least a preliminary intercalibration of data using the two sampling methods.	N	Results from the two sampling depths, 0 to 2.5 cm and 0 to 15 cm, will be used for different purposes. The shallower depth will be used to assess potential contaminant deposition from stack releases of radionuclides; deeper sampling will characterize biological exposure to all surficial soil COPECs. Because these two types of data will not be combined, there is no need for intercalibrating results from the two methods.
41	In Tables 2-9 through 2-13, the lack of storage requirements (refrigeration or freezing) and holding times for most types of samples, particularly biological materials, is surprising. We do note that detailed procedures call for storage under refrigerated or freezing conditions and recommend that the tables be made consistent with stated protocols.	Y	Tables were reevaluated for errors; storage requirements (refrigeration or freezing) and holding times are correct as stated. Biological samples do not have holding times associated with analyses.
42	Some of the language on pp 1-6 to 1-8 is troubling. There's a lot of speculation to explain high concentrations, which are referred to as "outliers." There seems to be an effort to explain away the legitimacy of high values, along with repeat analyses of those samples. If the quality assurance/quality control program is working, why question the validity of high concentrations? Instead of looking for reasons not to believe high values, treat them appropriately – as red flags identifying hot spots, to be used to focus additional sampling? If you don't trust data, why is there not an equivalent level of effort to reanalyze the samples with very low concentrations to see if they under-reported actual concentrations?		Outliers are retained and represented graphically in the data analyses. The focus on the outliers for the purpose of the DQO and SAP is whether additional data are needed, and outliers were used to identify COPECs. Outliers will be included in the ERA report. Generally, the values identified as "outliers" are not unusual from a quality assurance/quality control perspective. Regarding potentially under-reported COPECs, isotopic uranium data were investigated after observing that the results were lower than expected. It was determined that the results are valid, because the methods used to measure isotopic uranium have not changed since the background samples were collected.
43	How are outliers being handled? What are the implications for how data will be accepted/used? Are outliers being tossed out?		Please refer to the response to comment 42.
44	The term "outlier" is used in Section 1.3 with regard to data points with 30%, 2 to 4 times, and 10 times greater than other values. Its use in these various ways leaves the meaning unclear. Consider defining or dropping its use.		The term outlier is clarified to convey the understanding that such data do not group within the primary distribution of data.
45	Because multiple "outliers" were observed in tissues for both thallium (invertebrates) and U-235 (lizards), these COPECs should be sampled more extensively to better characterize their distribution.	N	Additional lines of evidence led to the decision not to collect further thallium or U-235 data. For example, the thallium levels recorded are within the range of crustal abundance levels. For U-235, no waste site soils had concentrations greater than background.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
46	To offset an inflated Type I error, note that the P level may need to adjusted downward (e.g., Bonferroni adjustment) in the case of multiple tests.	-	Noted
47	A reporting of the total number of samples (n=) with the number of exceedances in the Data Summaries of Section 1.3 would be helpful to the reader.	Y	Section 1.3 has been revised to include this information.
48	Box-plot reference in Section 1-14 is not needed.	Y	The reference to box plots has been deleted.
49	Is there more deep sampling information that supported the decision to restrict surface sampling to the top 6 in. than the 8 locations referred to? The statement that 8 locations, each with a shallow (0 to 1 ft?) and deep (2 to 4 ft?) sample were considered sufficient to restrict Phase I and II soil sampling to the 0 to 6 in. layer, clearly lacks strong statistical power. More information on contaminant trends in deep vs. shallow soil layers should be presented as stronger rationale for the current sampling design. (Perhaps comments were already received and discussed regarding this issue, but written explanation describing the rationale for the 0 to 6-in. layer in the body of the report is anticipated.)	-	Surface soils were collected along with specific biological samples to test for COPEC uptake. Methods for collecting surface soil samples are less intrusive than those needed for deeper soil characterization (e.g., truck-mounted drill rigs); therefore, such methods minimize the impacts of data collection on the shrub-steppe ecosystem. The conceptual model of the possible downward mobility of surficial contamination through animal burrowing and plant uptake was assessed using field radiological data. Ant mound, vegetation, and burrow spoils were not elevated in radiation relative to surrounding soil; consequently, there was no justification for Tier 2 deeper soil sampling following the first tier of data collection in Phases I and II.
50	Please clarify that "BZ" numbers for PCB congeners also are IUPAC numbers (assuming this is the case, see http://www.epa.gov/toxteam/pcbid/bzviupac.htm). Note that "Total PCBs" may be a misnomer, because not all 209 congeners are quantified. Also, please label the 12 World Health Organization dioxin-like congeners. Please provide a footnote explaining the derivation of the 0.1 mg/kg (formula weight) target quantitation limit for vertebrates.	Y	Clarifications made. The 0.1 mg/kg quantitation limit was based on back-calculating the concentration in prey necessary to exceed the WAC PCB mixtures TRV for terrestrial wildlife (WAC 173-340-900, Table 749-5).
51	The use of total PCB homologs to evaluate tissue concentrations is applauded as an appropriate, cost-saving step for comparison to criteria based on total PCB exposure.	-	Noted

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#	Interview Issues	Accept?	Comment Resolution
52	PCBs were purportedly used as dust suppressant on old arc loop (security) roads. Trustees cited a document that PCB-laden oils were used in the 200 Areas.	Y	An action item of the April 12, 2006, Phase III SAP Review Workshop was to determine where roads may have been sprayed to control dust. A representative of the project team interviewed retired Hanford Site employees to find out if dust control measures were employed historically and concluded that there was no knowledge of PCB-containing waste oils being used. A representative of the Yakama Nation had different information suggesting that PCB-containing waste oils may have been used. Thus, historical information could not rule out that PCB-containing waste oils were used as dust suppressants on unpaved security roads. These two representatives met to discuss the potential for historical PCB use and agreed on two non-waste sites to target for PCB sampling in biotic tissues (DOE/RL-2006-27, Figure 3-2). No other locations were identified for sampling. It is noted that the number of sampling locations was doubled prior to issuance of the Phase III Eco SAP.
53	Regarding PCB congener analysis, thanks for including the 12 dioxin-like PCBs with toxicity equivalent factors from the World Health Organization (http://www.epa.gov/toxteam/pcbid/tefs.htm). Although the cost is higher, PQLs for dioxin-like PCBs are much lower with EPA Method 1668A than with EPA Method 8082 (Ecology Publication Number 02-03-003, p. 13). In addition to "total PCBs," dioxin "total equivalents" (i.e., TEQ or 2,3,7,8-TCDD equivalents) should be calculated as the sum of products of the 12 World Health Organization PCBs and toxicity equivalent factors. (In theory, it would be informative to measure the entire suite of dioxin-like compounds [7 dioxins, 10 furans, 12 PCBs], rather than only the PCB component, although the cost is high.) Both total PCBs and PCB TEQ in lizards and mice can be used in exposure modeling. Also, consider measuring total PCBs and PCB TEQ in invertebrates for exposure modeling (if sufficient invertebrate tissue can be collected). Mammalian or avian toxicity equivalent factors (Van den Berg et al. 1998; EPA/630/P-03/002A) should be used for calculating dietary TEQ concentration (mg TEQ/kg prey) for higher trophic level mammalian or avian receptors ingesting mice, lizards, or invertebrates. Dietary TEQ concentrations then could be converted into a dose (mg TEQ/kg BW-d), via an ingestion rate (kg prey/kg BW-d), and compared to a TRV (mg TEQ/kg BW-d), where BW = body weight, TEQ = total equivalent, and TRV = toxicity reference value.	-	The exposure modeling suggestions will be considered for the risk assessment.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
54	Re total PCB TRVs in WAC 173-340-900 (Table 749-5), clarify which TRVs (i.e., shrew, vole, robin) will be used to represent Hanford Site receptors to compare with modeled intake. In addition to total PCBs, calculate PCB TEQ in mammals and lizards, using World Health Organization mammalian and avian toxicity equivalent factors. Intake (mg TEQ/kg BW-d) can be modeled for higher trophic level mammalian and avian receptors ingesting this prey. This intake, in turn, can be ratioed to the dioxin TRV in Table 749-5 to assess potential effects to a receptor ingesting PCB-contaminated prey.	Y	The suggested comparisons will be considered in the risk assessment.
55	The purpose of PCB sampling is not clear. The statement "Sampling of PCBs in biota is planned to address uncertainty regarding the nature and extent of PCBs in animal tissues" doesn't inform the reader and doesn't guide sampling design. Our recollection from the February 22-23, 2006, Phase III DQO Workshop is that the underlying issue was concern about a past practice of using waste PCBs on roads for dust control. In any case, the occurrence of PCBs in lizards and mice indicates the presence of PCBs in the area and motivates a need to identify and characterize sources and exposure. For reasons equivalent to those noted above for cyanide, the clean fill placed over wastes (i.e., the "soils" sampled in Phase I) is unlikely to have significant contamination of PCBs. The sampling program should be designed to identify and characterize the actual sources.		PCBs were detected in waste site and reference site animals. PCBs were not detected in invertebrates. The reference detection in particular was unexpected and lent credence to the hypothesis that roads outside of operational areas may have been sprayed with PCB-containing oils to control dust. The path forward is to broaden the collection of middle trophic-level receptors outside of Central Plateau operational areas. Sampling in all phases of the Central Plateau EcoDQO targeted the middle trophic level with the expectation that receptors such as rodents and lizards would integrate exposure from soil and diet. For the case of bioaccumulative COPECs such as PCBs, sampling for PCBs in tissues is more efficient than sampling soils. There also are remedial investigation characterization data on PCBs at the Central Plateau waste sites; PCBs were not commonly detected at these sites (10 of 227 for Aroclor-1254; 12 of 229 for Aroclor-1260).
56	Page 1-14 states that "This is consistent with the Aroclors routinely observed in waste samples from the Hanford Site waste sites." Please expand on this comment. Where are the waste sites with PCBs? Have they been remediated, or will they be? What kinds of biological sampling have been done to determine ecological risks from PCBs on those sites?		The statement was in reference to the remedial investigation PCB data. Of the nine PCBs sampled historically, only Aroclor-1254 and Aroclor-1260 have ever been detected in remedial investigation samples (WMP-20570, Appendix D).

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#	Interview Issues	Accept?	Comment Resolution
57	"Six lizards or mammals are targeted because *it is believed that this is a reasonable number...*" (emphasis added). The fact that one can generate a box plot from six data values in no way makes six an appropriate number of samples for a specific sample or analysis. This is an example of the kinds of planning that Trustees have criticized in DOE research plans. "It seems like a reasonable number" is not a defensible rationale for design decisions. At some point before design of the field sampling program, someone needs to look at existing data, do some arithmetic, and determine, based on variability of the data, how many data points are needed to resolve a question.	N	The existing data have been evaluated. The spread in PCB results per matrix was relatively low, and six samples are considered adequate to capture PCB variability. We acknowledge that the sample size of six animals per investigation area is based on best professional judgment including information on data variability, other sources of data for making inferences on ecological risk, and consideration for adversely impacting the environment by collecting tissue samples. If one uses statistical sampling formulae to calculate the desired number of samples for a particular measure – for example the concentrations of COPECs in small mammals – then the assumption is that ecological risk is solely characterized by this measure alone. The SAP and DQO both indicate that ecological risks are evaluated based on multiple measures for the various assessment endpoints. The arithmetic being proposed in this comment does not take this overriding aspect of risk characterization into consideration.
58	As an aside, if more than six lizards or mice are captured at an individual site, will the surplus animals be retained for analysis or released?	-	Animals in excess of the target number will be released.
59	We assume that lizards will be weighed and that this measurement was inadvertently omitted from the list of attributes to be described/determined.	Y	Lizards will be weighed and the text was revised accordingly.
60	DDTs and PCBs – Given their common modes of action and ability to degrade from one form to another, these two groups of compounds each should be assessed as a sum of all congeners/degradation products, and total concentrations screened against appropriate TRVs.	-	For the Phase III PCB analyses, EPA Method 8082 (SW-846) will be used to measure selected congeners and then will be summed to total the PCBs. This method has adequate sensitivity and is sufficiently robust to the environmental weathering or food-chain transport that could affect the ratios of congeners from the original Aroclor mixture. In total, 43 dioxin-like congeners were selected for analysis in mouse and lizard tissue samples. DDT was not detected.

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#	Interview Issues	Accept?	Comment Resolution
61	Thallium TRVs – Thallium is an understudied metal, and appropriate TRVs are understandably hard to find. However, more thorough searching is warranted, and the current use of a TRV based only on one study is insufficient. Safety factors applied to LD_{50} data or lowest observed effect level data may be needed. Casarrett and Doull's 5th Edition lists oral LD_{50} of rats at 30 mg/kg and estimated human lethal dose of 8 to 12 mg/kg. Nogami and Terashima 1973 report dwarfism. In addition, Peter and Viraraghavan 2005 list a German soil standard of 1 mg/kg and an "environmental threshold exposure" of 0.1 mg/m^3. The World Health Organization has online rodent toxicity data (IPCS 1996, Section 7.3, "Long-Term Exposure: Chronic Toxicity") with several endpoints related to growth and survival. Incorporation of multiple toxicity endpoints in deriving a TRV, similar to the approach taken with carbon tetrachloride, is suggested here.	Y	The literature provided for thallium is appreciated and will be incorporated into the assessment.
62	The reader agrees that the thallium risk likely is inflated by limited and conservative TRVs and overly conservative, given the exposure scenario here. An alternative method of summarizing literature-based experimental toxicity data and selecting some appropriate concentration from those toxicity ranges, say the fifth percentile of those hazardous concentrations, should be considered here as a more appropriate TRV.	Y	This suggestion for characterizing thallium toxicity is appreciated and will be considered for the risk assessment.
63	What is the underlying goal/question to be answered by plant sampling? The only hint in Chapter 1 is a comment that it might yield more species. If plant cover and species composition are (or are not) different from the 2005 survey, how will the data be used? There is no explanation of the purpose for sampling or the need for these data.	Y	The goal is to gather representative data for Phase I flora. The vegetation composition surveys may not have captured all potential diversity on Phase I waste sites because of the timing of the surveys and the relatively dry winter conditions preceding the 2005 sampling. Plant cover/diversity will be recorded again in 2006 for the Phase I waste sites for a more representative assessment of community composition.

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#	Interview Issues	Accept?	Comment Resolution
64	The sampling reports for Phase I and II do not clearly identify what plant material was sampled, except that it was sampled in late winter or early spring when many plant species would have been dormant or just starting to grow. What was sampled – dead material from 2004 (from which many of the nutrients would have been resorbed, and from which some mass would have been lost during winter), or freshly germinated 2005 plants (only some species would have germinated, and biomass would be expected to have been very low)? In either case, it seems unlikely that the 2005 rad surveys or plant species/cover surveys provided representative information. Species composition and percent cover in 2006 almost certainly will be different, but this likely will reflect the time of year when the material was sampled, as much as or more than the fact that 2006 is a wetter year than 2005. How will a difference be interpreted? We believe this work should be dropped or incorporated into a comprehensive redesign and resurvey of all Central Plateau vegetation work at a time during the year when vegetation conditions would be representative of the site.	Y	Radiation surveys in 2005 measured beta and gamma radiation levels for live vegetation. It is important to note that gamma surveys for a plant also reflect ground shine – or soil radiation levels – at that location. To some extent the same is also true for beta radiation levels. Thus, no plant samples were collected for this project – only radiation surveys were used as a gross indication of contamination in plants. It is agreed that the plant species/cover surveys may not have provided representative information. Consequently, plant cover and composition data will be collected in 2006. The new plant composition information will be used as another measure of ecosystem and receptor characteristics. A comprehensive survey to include Phase II sites is not needed, because the shrub community is expected to be less influenced by annual variation in precipitation.
65	More reasoning, besides the climatic conditions, as to why resampling of vegetation is appropriate is needed. Was richness significantly below what has been previously reported? If vegetative cover is so variable, from climate and/or management activity, how meaningful are the data even after a repeated sampling?		See responses to comments 63 and 64.
66	Line transects: Are samplers only counting plants that intersected the line? The problem is that if a shrub is in the way, they can't get the line through.		Samplers ran the line over shrubs so this was not an issue.
67	Could bare ground be defined? Is bare ground related to management practice?	Y	Three non-vegetative categories were recorded and separated into litter, cryptogamic crust, and bare ground. Bare ground lacks cover, vegetative or otherwise. Bare ground has resulted from mechanical disturbance in the Central Plateau, regardless of contaminant effects.
68	Did reference sites include disturbed or remediated sites? Were reference sites sprayed with herbicides?	Y	Yes, reference site 1 is comparable to waste sites, specifically a wheat grass site that was burned and revegetated; it is disturbed. Reference site 2 is a sagebrush site comparable to the BC Controlled Area. This reference site will be measured again in the River Corridor Closure project. No reference sites were sprayed with herbicides.

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#	Interview Issues	Accept?	Comment Resolution
69	Regarding Phase I waste sites, how many have been remediated? How many have had herbicide application? It is surprising that there's high diversity where herbicides have been applied.	Y	No waste sites have been remediated. All have been sprayed to control broad leaf plants and stabilized with a layer of cover. Sites were selected based on depth of cover, with preference for sites with thin cover layers. The vegetation composition surveys may not have captured all potential diversity because of dry conditions preceding plant cover measures. Plant cover/diversity will be recorded again for the Phase I waste sites.
70	Request that validation flag key and summary of the validation be published in the risk assessment report. Where is the data validation report for results of BC Controlled Area grab samples?	Y	The data validation reports provide the list and explanation of the qualifiers. The data validation reports will be referenced in the EcoDQO, and the qualifiers will be provided in the risk assessment report as requested.
71	Regarding grain size, larger soil pieces have a veneer of calcium carbonate, and sieving to <2 mm excludes the larger particles that may have bound strontium.	Y	The planned approach is biasing results toward higher contaminant concentrations given a greater surface area of smaller (<2 mm) particles.
72	Were the detection limits that were picked adequate to meet thresholds?	Y	Detection limits specified for the study were the lowest achievable with regard to applicable toxicity thresholds. Where toxicity thresholds are lower than detection limits, the potential for uncertain results with regard to non-detects is acknowledged and will be addressed in the risk assessment.
73	The target quantitation limit for cyanide is <PQL, so will there be a problem with food chain modeling?	Y	There is no problem with food chain modeling if cyanide is detected. Non-detects will be treated as uncertainties.
74	How is dermal exposure being addressed in the Central Plateau Eco DQO?	Y	Dermal exposure is considerably less significant than ingestion; <0.2% compared to 99%, respectively (Table 2-2, WMP-20570).

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#	Interview Issues	Accept?	Comment Resolution
75	The goal of cyanide sampling is unclear. From reading the plan, it looks like the goal of sampling primarily is to collect more invertebrates to document the presence (and concentrations) of cyanide in insects. It's unclear what will be learned from such an approach; it won't determine the source of cyanide and can't support any analyses of cyanide uptake or accumulation in insects, regardless of the source. Moreover, by sampling in borrow pits with nominally clean fill, the proposed approach likely will bias data toward samples with low concentrations of cyanide. Sampling needs to be done in representative areas, where fauna are living intimately with the contaminants, and where cyanide concentrations in fauna can be related to possible sources. Borrow pits do not meet this need.	N	Although cyanide was not detected in soil, it was detected at roughly the same levels in invertebrate and vertebrate tissues for Phase I waste sites and for the Phase I reference site (cyanide was not a Phase II COPEC). Existing remedial investigation data indicate that soils are not a source of cyanide contamination (297 samples and <2% detection rate). These lines of evidence suggest that cyanide in tissues is an analytical laboratory artifact. There is not, however, enough information to rule out this possibility. While development of a more appropriate method would help address this uncertainty, it would be prohibitive from a resource perspective. The most expedient means of assessing cyanide is to document the site-wide distribution of cyanide in invertebrates. This action will not address the cyanide analytical method accuracy or precision, but it will address the method's potential bias. By greatly expanding the data collection at River Corridor reference sites, adequate data will be available to statistically assess whether cyanide in tissues is related to Hanford Site operations.
76	If soils are hypothesized as the source of cyanide, sampling should be conducted in areas with relatively undisturbed soils and a representative plant community. The borrow pits can be expected to have very low concentrations of cyanide for several reasons:	N	It is agreed that borrow pits could be expected to have low constituent concentrations for the reasons mentioned. This makes them attractive as reference sites. Borrow pits are references for remediated waste sites in the 100/300 RCBRA; they represent disturbance associated with site stabilization or with backfilling waste sites. The undisturbed, native soil sites (RCBRA) will address the concerns listed for borrow pits. It is important to recognize, however, that soils do not appear to be the source of positive cyanide detections in tissues.
77	The currently exposed material is composed of subsoils that were never exposed to possible historical airborne or surficial deposition of cyanide.	N	Soils do not appear to be the source of positive cyanide detections in tissues.
78	The subsoils probably have negligible concentrations of organic matter of historic origin, so they likely don't have any cyanide derived from historic vegetation.	N	Soils do not appear to be the source of positive cyanide detections in tissues.
79	Plant cover on these soils is sparse, so there is presumably little potential for contemporary production of cyanide by plants and little potential for accumulation of plant-derived cyanide in soils.	Y	Agree. There is one cyanogenic-plant species, yarrow, known to occur at waste sites. However, yarrow was not recorded in the plant composition surveys. The vegetation resurvey will help address hypotheses about the potential for plant-derived cyanide in soils.

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#	Interview Issues	Accept?	Comment Resolution
80	Section 3.2.2 indicates that collected materials will be pooled, then split into three aliquots. This could be viewed as three aliquots of the same sample, not three samples. In addition, why not split samples into groups based on taxonomy or functional guilds.	Y	The invertebrate samples represent a collection of individuals, and the mass requirements for the analytical methods require that one analyze multiple individuals. Thus, splitting of the sample into three aliquots provides information on variability between collections of individual invertebrates. We recognize that each subsample is a pseudoreplicate, because it represents a potentially unique collection of invertebrates. However, it still represents variability in cyanide concentrations for groups of invertebrates and is relevant when considering variation in potential exposure to invertivores. For the Phase I investigation, the samples were split based on taxonomy, so this information is available. We will consider the suggestion to separated invertebrates according to taxa for Phase III.
81	If plants are hypothesized as a source of cyanide, the sampling plan needs to include sampling and analysis of plant tissue, and it needs to be done in an undisturbed area with a representative naturally occurring plant community.	N	Cyanide was not detected in plant tissues collected at waste sites and at a control site in BHI-00032.
82	Why are we doing any further data collection for cyanide in tissues? Concerns that there are invertebrates that produce cyanide naturally. Is cyanide in species associated with the Hanford Site? No reason to expect cyanide in reference site soils. If cyanide is not in the soil, then there is nothing to clean up.	N	Cyanogenic species of invertebrates have not been documented at the Hanford Site, but not all species at the Site have been measured for cyanide. See above responses for the other issues mentioned.
83	If insects contain or produce natural cyanides (as do certain plants, bacteria, fungi, and algae [see ATSDR 2004]), why are detections in lizards and small mammals (insectivorous or herbivorous species) unexpected, given potential food chain transfer (assuming cyanide is incompletely metabolized)?	N	Cyanide was unexpected in vertebrates because it is not typically produced in this class. Regarding trophic transfer, it was found at roughly the same levels in predators as in prey. Like most inorganics, cyanide is not known to be bioacumulative, so one would expect lower levels in predators than in prey.
84	It was remarked that the lack of organochlorine pesticides was surprising, because these had been detected in the North Slope and the Arid Lands Ecology Reserve. Questions were raised about the ability to detect such pesticides in various matrices.	Y	There are no routine applications of pesticides at waste sites, so the lack of detections in waste sites is not surprising. The project is aware that pesticides have been detected in biotic tissues at the Horseshoe Landfill.
85	Discussion on radionuclides included questions about why there were negative values for Pu-238 and why isotopic uranium seemed so low, and concerns were raised over uranium at the U Pond.	N	It was clarified that negative values are valid, simply a result of counting error. The methods used to measure isotopic uranium have not changed since the background samples were collected. This point has been clarified in the EcoDQO. Concerns about uranium at the U Pond are obviated by the remedial actions planned for that site.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
86	Concern was voiced that comparison of modeled contaminant intake (based on soil and tissue concentrations) to TRVs is not an appropriate screening step; e.g., what about mixtures?	Y	Exposure modeling of contaminant intake and subsequent comparison to TRVs is one line of evidence employed in the assessment of potential ecological effects. The effects of mixtures for nonradionuclides was evaluated in a qualitative manner. Radionuclides are addressed by calculating the sum of fractions approach to total radionuclide dose.
87	Are the detection limits different between the Central Plateau EcoDQO and the 100/300 RCBRA?	Y	The detection limits are the same to the extent that targeted receptors overlap; detection limits for tissues are based on the ability to achieve levels low enough to be comparable to TRVs for specific receptors. In some cases, receptors are different (e.g., the RCBRA uses the kingbird for avian insectivore detection limits along the Columbia River, whereas the Central Plateau uses the killdeer for the avian insectivore in all cases).
Radionuclide Air Stack Deposition			
88	For the 100 and 300 Areas, soil multi-increment samples are being collected at a depth of 0 to 6 in.; for Phase III, sampling at 0 to 1 in. depth is proposed. We endorse the latter, but we also suggest that for the Central Plateau, multi-increment samples be taken on a few plots at both the 0 to 1 in. and 0 to 6 in. depths to establish comparability (or perhaps lack of comparability) of soil samples from the different depths.	N	The goal of this action is to evaluate surface deposition of plant-stack radionuclides, not to compare distribution with depth. The spatial areas targeted for sampling were identified with existing data. The Near-Facility and Surveillance programs collect samples from the top inch. The proposed multi-increment samples will be collected from 0 to 1 in. to be consistent with these data, and it also is a logical depth to assess surface deposition.
89	There seems to be an inconsistency in locations of past soil sampling around the Central Plateau. Figure 1-5 of the SAP shows virtually no sampling south and east of the 200 East Area; slides at the February 22-23, 2006, Phase III DQO Workshop appear to indicate extensive sampling of soils and vegetation in that area. If existing data can be used to characterize rad and metal contamination southeast of the 200 East Area, we encourage you to avoid unnecessary sampling and use the old data.	N	Existing data have been used to identify areas of relatively low data coverage. Existing data will continue to be used in the Central Plateau EcoDQO. The area immediately south of the 200 East Area is the BC Controlled Area, a 13 mi^2 surface contamination waste site characterized in Phase II that does not fit in the same category as the nonoperational areas being discussed in this comment.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
90	We don't understand the rationale for setting 0.0625 ha as the sampling area for collection of multi-increment samples. If a multi-increment sample is intended to support a cleanup decision, the entire decision unit area should be sampled. If, as in this instance, the objective is to assess spatial patterns of contaminant deposition, then smaller units can and should be sampled. The concern is that in previous SAPs an area of 1 ha was elected to represent the home range of mid-trophic species, but in this instance a much smaller area is identified to meet the same criterion. The rationale for 25 increments doesn't make sense to me. Neither the between-year variability nor "...the cumulative number of composite samples collected from each location over a 5-10 year period..." seems pertinent. Chuck Ramsey has defined specific, quantitative criteria for setting sample sizes and numbers of increments; we suggest limiting consideration to those factors.	N	The objective of this study is to assess spatial patterns of contaminant deposition. Because the focus is not on assessment population areas, units smaller than the Phase I and Phase II 1-ha investigation areas will be sampled. The MIS approach was proposed at the February 22-23, 2006, Phase III DQO Workshop as the best methodology for characterizing soil potentially impacted by radionuclide deposition from stack emissions. The area of 0.0625 ha was selected to be consistent with the pocket mouse and deer mouse home ranges. Twenty-five increments were selected to provide adequate coverage of various microsites within the sample area.
91	Note that the random offset will be the same in each grid cell for locating each increment of a single multi-increment sample (if this is the case). Please provide rationale for 25 increments/multi-increment sample.	Y	Noted. 25 increments/MIS was selected to adequately characterize microsites within the investigation area that could affect surface deposition. Note that 25 increments/0.0625 ha represents 8 times the sample point density that was used to characterize Phase I and II waste sites
92	If Phase III soil sampling is not coupled with tissue sampling at the same locations, what is the rationale of matching the selected area (625 m^2) to the home range of mice? How many MIS soil samples will be collected to comply with WAC 173-340 requirements?	Y	Please see response to comment 90 regarding the 625 m^2 MIS area. The WAC has no requirements with regard to soil samples collected to evaluate ecological risks.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
93	Please provide a brief rationale for only analyzing Cs-137, Sr-90, and isotopic plutonium for evaluating air stack deposition in surface soils.	Y	Stack contaminants primarily were radionuclides, including short-lived radionuclides such as Co-60 and I-131 (Hanford Environmental Dose Reconstruction Project) and longer half-life radionuclides (Cs-137, I-129, Pu-239/240, Sr-90). Iodine-129 is not found in surface soils except in small concentrations near the stacks of the separation plants in the 200 Areas, and it is very mobile in water and easily transported through the soil column to groundwater. Therefore, I-129 was not typically measured in background or non-waste-site soil samples and will not be measured in this project. Cobalt-60 also is not included because it has a 5-year half-life and is no longer routinely detected in Hanford Site soil and vegetation. Radionuclides considered as contaminants of interest are Cs-137, Pu-239/240, and Sr-90. Plutonium-238 also will be evaluated, given its long half-life and its association with Hanford Site operations. Note, Am-241 was added to the radionuclide list after consultation with the primary author of the Hanford Environmental Dose Reconstruction Project report.
94	Discussion of radionuclide concentrations in non-waste areas runs headlong into a major concern that has repeatedly been expressed by Trustees. Phase III samples are planned for collection in areas farther from Central Plateau processing plants than the sites that were sampled in Phase I and II as reference sites. It is irrational to propose that an area close to an emission source be used as a reference site for sample points located farther from that same source. We believe that the Phase I and II "reference site" data do not represent reference conditions and should not be used as such. Despite repeated comments from Trustees and a lengthy consideration of references sites by the Hanford Trustee Council, the DOE still has not confronted the need to find valid reference sites for the Hanford Site.	N	A chart will be produced for the risk assessment report showing the relative dose contribution from the BC Controlled Area waste sites and non-waste sites to show radiological risk in perspective to screening thresholds. 1. The selection of reference sites was based on several criteria that were discussed in the February 22-23, 2006, Phase III DQO Workshop and reports. This comment does not take any of those considerations into account. 2. Two goals were inherent in the surface soil sampling in Phase III. The first was to determine the plant stack contribution in the vicinity of the reference sites. The second was to fill in spatial data gaps in the non-operational areas around the 200 East and 200 West Areas. It is further noted that the SAP was revised to include soil sampling at two offsite reference site locations in response to a commitment made to EPA.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
95	The SAP indicates that soils in the non-waste areas will be sampled and analyzed only for select radionuclides. What about metals, organics, or other materials that might have been deposited from Central Plateau processing operations?	N	Organic chemicals were a relatively minor component of Central Plateau processing operations. Considering more predominant contaminants, focus on radionuclides will provide a more protective measure than metals, given the greater sensitivity of radiation detection. For example, a metals concentration of Cs-137 at 1 ppm has an equivalent rad activity of 87 E+06 pCi/g. For Sr-90, 1 ppm is 139 E+06 pCi/g. Further, metals were not present in significant concentrations in the 200 Areas fuel reprocessing facilities. This is evident in the waste sites that received the liquid discharges. The detected metals concentrations are very low in comparison with the radionuclide activity levels.
96	Soil sampling methods propose analysis of the entire mass of each multi-increment sample. If the required mass is only 18 g and one collects 25 increments, that works out to less than 1.0 g/grab. That seems to invite unequal sampling from one point to the next. Why not collect a specified, easily managed volume of soil at each point, then subsample for analysis?	Y	The SAP does not presently specify a minimum mass of soil to be collected at each sample grab location. The minimum mass used in Phase I and II for each laboratory digestion was 20 g. Because many digestions were performed, the sampling under the Phase I and II SAPs collected much more than 20 g at each sampling location. The minimum sample size will ensure that adequate sample mass is collected in MIS and is available for laboratory subsampling for laboratory analytical suites.
97	What information will be collected as part of the soil description (p. 3-13)?	Y	The volume of material associated with the excluded soil fraction (>2 mm) will be estimated.
98	Provide a figure showing where the MIS plots will be located on the transects. Revise the figure to indicate the transects given on Table 3-4. Also, provide text in the document giving the rationale for choosing the plot locations. (Section 3.5, p. 3-10, 1st paragraph)	Y	The SAP has been revised to show the approximate locations of the transects within targeted sampling zones (DOE/RL-2006-27; Figure 3-4) The discussion in Section 3.6.1 explains the rationale for placement of the transects. The sample plots were selected to provide good spatial coverage along the transects
99	Table 3-4 indicates that 22 soil samples will be collected, not counting duplicates and quality control samples. The high number is good, but we'd like to see a design of exactly where they will be collected. More specifically, is it possible to drop sampling in the area south and east of the 200 East Area (as discussed above) and to extend the transects farther to the north and northeast. We also strongly urge the DOE and its contractors to confront the issue of reference sites and to locate and sample good, representative sites located farther from the Central Plateau.	Y	An additional transect was added as a result of the April 12, 2006, Phase III SAP Review Workshop. The DOE is committed to identifying and using suitable reference sites. The soil sampling transects were shown in the April 12 workshop and agreed-to by the participants. The transects are shown in the final version of the SAP in Figure 3-4. Note: as a result of input from EPA, two offsite reference site locations were added to the sampling design for additional soil sampling and comparison with the Phase I and Phase II reference sites.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
100	Could a mechanized roll-over radiation survey of non-waste sites be conducted for total radiation that might indicate the presence of cesium or strontium in a cost-effective manner over areas in the downwind direction? Is there any notion where the sites would be for sampling plant-stack radionuclides?	Y	There are no plans for mobile radiological surveys over the non-waste site areas. Multi-increment samples will be collected in five general zones that were identified as having limited data on radionuclides that may have been deposited as a result of plant stack emissions. The purpose of this data collection is to assess the radionuclide levels in this area and in the areas where we have no coverage of radionuclides. There also is an interest in measuring radionuclides around reference areas to assess whether reference site radionuclide concentrations are consistent with worldwide fallout. The plant stack radionuclide sampling will be performed along transects as shown in Figure 3-4 in the SAP.
101	It was commented that the approach for assessing potential radionuclide deposition in areas outside of waste sites is not an air deposition study, because there is no evaluation of all sources and wind roses, etc.	Y	A reevaluation of the approach led to considering source areas, predominant wind directions, and directions of less frequent but relatively strong gusts of wind (DOE/RL-2006-27, Figure 3-4).
102	It was recommended that MIS soil sampling be used to measure surface radionuclide concentrations.	Y	It was agreed to use MIS instead of grab samples if the Trustees would create a resolution that accepted MIS data for this purpose.
103	How can one assume that the mean value of background is representative of MIS results? At what depth was background data collected?	Y	Background samples are comparable to MIS results, because background is based on <2 mm fraction. Background data were collected from the top several inches for radionuclides and at more variable but still shallow depths for inorganic chemicals.
104	The question of defining Central Plateau boundaries was raised, particularly with regard to deposition of radionuclides from plant stack emissions.	Y	All relevant radionuclide monitoring data for non-operational areas were collected and plotted spatially to assess placement of reference sites. In addition, spatial data gaps were identified from existing information. Areas with limited monitoring data were identified for further MIS for radionuclides in Phase III.
105	What is the basis for the conclusions regarding I-129? (DOE/RL-2005-49)	Y	The conclusion for I-129 is based on samples collected around the Hanford Site and the known chemical properties of iodine.
106	Field replication does not appear to be sufficient (only 2), and it is not clear where the replicates will be taken. Increase the replicates to 4 and explain what is meant by North area. (Table 3-4, p. 3-14)	N	For quality assurance purposes, the expert consultant on MIS, Chuck Ramsey recommends collecting three samples to assess variability in the field. The 2 field replicates to augment the primary sample in the North area (northernmost sampling zone in Figure 3-4) makes for three total samples, which is considered adequate. Note also that Figure 3-4 clearly labels each of the locations of the targeted sampling zones.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
Dispersed Carbon Tetrachloride Plume			
107	Note that in addition to CCl_4 (including its transformation products) and other volatile organic compounds (e.g., trichloroethylene; see Carlsen 1996), burrowing mammals may be exposed to metals (e.g., manganese, cadmium) via inhalation (olfactory uptake) of contaminated subsurface air (Bench et al. 2001). There also is evidence that PCBs can enter the olfactory system via inhalation (e.g., Apfelbach et al. 1998). This may be relevant to burrowing mammals that inhabit soils contaminated with PCBs. Please cite these references in the CCl_4/burrow discussion, and consider measuring several key metals and PCB congeners (along with CCl_4 and transformation products) in burrow soils and possibly in burrowing mammal tissues (e.g., olfactory bulbs).	N	Burrowing mammals would be exposed to metals and PCBs in the subsurface, although there is no reason to expect that contamination of these COPECs is greater in the vicinity of the carbon tetrachloride plume relative to other waste site areas sampled in Phase I. Because whole organisms were sampled for metals and PCBs in investigation areas, the actual exposure to metals and PCBs was evaluated by collecting the Phase I small mammals.
108	Please describe the derivation of the inhalation ecological screening level for CCl_4. Also, there may be additional volatile organic compounds (e.g., CCl_4 transformation products, including $CHCl_3$, CH_2Cl_2, CH_3Cl) that should be evaluated in burrow air.	Y	The derivation of the CCl_4 ecological screening level is detailed in Newell et al. 2006, "Wildlife Ecological Screening Levels for Inhalation of Volatile Organic Chemicals," *Environmental Toxicology and Chemistry*. The transformation products identified will also be evaluated.
109	How is inhalation exposure being addressed in the Central Plateau EcoDQO?	Y	Inhalation risks are being considered for the dispersed carbon tetrachloride plume.
110	Will the study address chronic or acute exposure, or both?	Y	The study will attempt to capture chronic exposure by collecting representative in situ burrow-air concentrations of carbon tetrachloride and associated degradation products.
111	Please provide a basis for the number of samples specified for passive and active gas sampling.	Y	Sample numbers are based on professional judgment.
112	The amount of air movement through burrows, and thus the accumulation of carbon tetrachloride, is likely to change greatly with time and climatic factors – wind speed and direction, changes in barometric pressure, soil moisture, depth in the soil, etc. How will (can?) these factors be represented in a sampling design that proposes a total of 10 active air samples for all burrows, sample points, times, etc.?	Y	Experts in soil gas sampling in Fluor Hanford, are being consulted to devise an appropriately representative protocol for burrow-air sampling. The variables noted will be considered and the suggestions are appreciated. Thank you.
113	In addition to CCl_4, please consider measuring CCl_4 transformation products in soil gas (e.g., $CHCl_3$, CH_2Cl_2, CH_3Cl). (p. 2-28, Table 2-14)	Y	Degradation products have been added to the SAP and will be measured.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
114	When will samples be collected and how many times? Because carbon tetrachloride concentrations will vary with time, burrows need to be sampled more than once to describe temporal variability and support an assessment of exposure.	Y	The EMFLUX timing model (used in support of passive gas sampling events) was consulted to estimate maximum exposure periods, based on lunar and solar cycles. This resulted in collection of one sample during the day and another at night. The Hanford Meteorological Stations nearest the sampling sites was also monitored to select a sampling period during low barometric pressure. This sample was collected at nighttime.
115	How and where will air in burrows be sampled – in the "tube," or in chambers off the tube, where there is likely less effective ventilation and carbon tetrachloride concentrations might be higher?	Y	The burrow-air samples will be collected from the central portion of the tube, which is indicative of the concentrations in the main nest pocket. The Field Team Lead for Central Plateau ecological characterization, Ron Mitchell can validate this based on the previous burrow investigations performed onsite.
116	Carbon tetrachloride is much denser than air (5.3 times); will the design assume that carbon tetrachloride is well mixed and dissolved in the air; that it is forming a dense layer of highly concentrated gas at low points in the burrow and/or chambers in the burrow, or what?	Y	Burrow-air will be collected with the intent of capturing worst case conditions within the tube. If this involves sampling from the floor of the burrow, then that is what will be done.
117	What organisms will be considered in defining the ecological screening level for carbon tetrachloride and for which life stages? Will just pocket gophers be considered? What about burrowing owls? Other mammal species? Invertebrates? Plants?	Y	While pocket gophers are not as abundant as other burrowing mammals on the Hanford Site (e.g., Great Basin pocket mouse), they were considered in developing the ecological screening level, because their primary habitat is below ground. Consequently, their cumulative exposure is expected to provide a protective estimate of exposure relative to other subterranean receptors. Plant roots would be exposed to a greater degree than mammalian receptors, but currently there is not enough information for a vapor-phase phytotoxicity assessment.
118	Is there a tentative plan for selection of burrows to be sampled, relative to hazard data shown in Figure 3-4? It looks like much of the area with the highest carbon tetrachloride concentrations is in areas not considered as potential wildlife habitat. How was habitat defined? Will those non-habitat areas be searched for gophers?	Y	Field reconnaissance will be performed to identify areas of ecological screening level exceedances where potential habitat is located. Habitat will be defined in terms of plant cover and soil characteristics as well as receptor presence/absence.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
119	What do you know about avoidance by gophers? Do they actively avoid areas with contaminated soils? If there are no burrows in contaminated areas, will this be taken as an indication that gophers have all been killed out, that they actively avoid contaminated soils, or something else?	Y	It is unknown if gophers or other burrowing mammals can or would avoid areas of elevated volatile organic compounds in soil gas. If burrows are not observed in suitable habitat, the possibility of avoidance and/or adverse effects will be investigated by sampling soils for volatile organic compounds. Based on input from EPA, a commitment was made to install 6 artificial animal burrows if the reconnaissance surveys show that burrows are not present in the contaminated areas. If artificial burrows are installed, 3 vapor samples will be collected from burrow tube (total of 18 samples).
120	Are there trigger points (e.g., exceedance of a specific concentration of carbon tetrachloride in the En Core sample data) that will signal a decision to sample burrow air. How will burrows be sampled? The hottest ones, or a gradient?	Y	Burrows will be screened with passive gas (EMFLUX) samplers to verify the presence of CCl4 and to assess the CCl4 magnitude. The highest concentrations obtained through passive gas measurements will be used to select burrows for active gas measurements.
121	Will there be any effort to sample animals to look for physical abnormalities and/or physiological effects of carbon tetrachloride? If elevated levels of carbon tetrachloride are found in burrows and animal sampling is not done in Phase III, when will it be done?	N	Sampling of animals is not planned at this stage of the investigation. The need for animal sampling will be considered once representative burrow exposure concentrations have been measured.
122	Page 3-16 states that "the approximate quantity and density of these indictors will be recorded" (indicators refers to burrow holes and mounds, droppings, and other similar indicators of gopher presence). These data need to be systematically assessed and recorded (i.e., not as approximations) so possible relationships between carbon tetrachloride concentrations in the soil and animal presence/absence or abundance can be evaluated.	Y	Data will be systematically recorded in field log books, if noted during the field reconnaissance. Preliminary indications are that there is little or no fossorial activity in the subject area.
123	In the discussion of endpoints that comprised TRVs, it was questioned why lesion levels were not being used as an endpoint. It was noted that lesions (cancerous effects) were typical for human-health-related studies on effects of carbon tetrachloride. It also was suggested that animals be collected for histopathology if found in the area of the plume.	Y	In contrast to standard endpoints like death, growth, or reproductive effects, lesions are sub-organismal endpoints. This makes extrapolation to population-level effects more difficult. Health-effect studies (e.g., histo-pathological) on burrowing animals may be warranted if measured burrow-air data indicate exceedances of the carbon tetrachloride ecological screening level.
124	It was requested that a passive sampler (EMFLUX) in the soil matrix be paired with the burrow air.	Y	Passive samples will be collected along with active gas measures at target burrows.
125	There were discussions about locations in the proximity of the burial grounds that could likely be used as habitat. A question was raised about habitat suitability – what is unsuitable?	Y	Unsuitable habitat is that which does not provide food, water, or shelter for subsistence (i.e., bare ground).

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#	Interview Issues	Accept?	Comment Resolution
126	It was asked if an open hole is really a worst case for measuring CCl_4 concentrations.	Y	Concentrations in an open hole (e.g., artificial burrow) should be high relative to a natural burrow because the latter employs architecture to promote flushing with surface air that would minimize the accumulation of CCl_4 in the burrow under all conditions.
127	Mark the Hanford Site facilities on this map or give building and parking lot outlines. (Figure 3-4, p. 3-15)	Y	The Hanford Site facilities will be marked on this map.
	West Lake		
128	Although organic chemicals may have been a "minor" component of the processes associated with PUREX and B Plant, organics may not be minor toxicologically (e.g., TBP). Also, this statement appears more accurate than the one on p. xi (para 2) which claims that organic chemicals were not used in these processes. Please correct this inconsistency.	Y	Comment accepted.
129	The proposed sampling of the area at West Lake has the feel of being very exploratory, that little is known about the chemistry of the lake and soils/salt crusts around it. As such, it is unreasonable to collect only one sample each for water, soil, sediment, and salts. One sample is vastly inadequate for developing a quantitative or even a qualitative, understanding of conditions at West Lake. Much more sampling is needed.	Y	The sampling planned for West Lake will address data gaps identified in the screening assessment. These results will provide information to assess the potential for effects in the Central Plateau ERA. Regarding sample size, each of the sample media at West Lake will employ two multi-increment samples (a primary and a field duplicate), including surface water, porewater, sediment, and salt. For biotic media, five separate samples of brine flies will be collected.
130	It is unclear to the reviewer how the MIS theory applies to water samples.	Y	MIS theory applies to any matrix. The basic goal is to obtain representative samples. Use of multiple increments decreases variability and increases the potential of accurately characterizing the average concentration more than use of one or a few grab samples would.
131	The West Lake sampling is exceptionally thorough in the proposed media types given that this is the first sampling to occur there. The opportunity for a phased approach there, if needed, is assumed.	Y	This is not the first time sampling will occur at West Lake. Several reports on this water body have been drafted and, until recently, the lake was sampled quarterly as part of a routine monitoring program. The proposed sampling will augment gaps in the existing data for West Lake. Further investigation at West Lake is dependent on the results and inferences of potential risk based on existing data and proposed data collection activities.

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#	Interview Issues	Accept?	Comment Resolution
132	The statement, "Organic chemicals were not utilized in the processes associated with PUREX and B Plant," is incorrect. Organic solvents, including TBP, are used in the PUREX process (Dodi and Verda 2001). Because TBP (as well as its degradation products) may be mobile in groundwater, it should be included in the semivolatile organic compound analysis in West Lake sediments. Please explain in more detail how dose to wildlife will be calculated from salt crust, used as a salt lick (e.g., define ingestion rates of salt crust for receptors).	Y	The observation is correct. TBP and normal paraffin hydrocarbons will be added to semivolatile organic compounds for organic analyses of sediments. The calculation for dose associated with ingesting salt crust (e.g., as a salt lick) will be developed as part of the ERA.
133	Regarding sampling abiotic media at West Lake, provide rationale for random sampling porewater vs. systematic sampling other media (i.e., surface water, sediment, salt crust).	Y	The indication of random sampling was an error that has been corrected.
134	Specify that surface water samples will be collected around the lake perimeter (assuming this is the case). However, why not collect surface water samples (as well as sediment samples) with a more representative spatial design for the entire lake (i.e., not limited to shoreline locations)?	Y	Sampling was designed to capture exposure for wildlife using the lake as a potential source of drinking water or perhaps as a salt lick. Thus, the lake's perimeter was logical to characterize because wildlife would not be expected to venture into the middle of the lake.
135	Salt ring at West Lake – The unique hydrology and mineralogy surrounding West Lake create a situation that leaves a salt ring around the lake that may be an attractant to mammals in the area. The apparent exchange with contaminated groundwater would warrant a specific sampling of this salt layer. Interpretation of this concentration is less straightforward, but could be based on the salt requirements of wildlife and/or mammals, adjusted by body weight, and perhaps area use factor, to give an estimated dose from "licking." Such an exposure should be combined with an oral exposure from drinking of the surface water using lake water sampling data.	Y	The crust around West Lake will be measured for radionuclides and metals to assess the potential exposure that animals may receive from using the material as a source of minerals. In addition, the crust will be characterized with regard to structural mineralogy and anionic/cationic composition to assess the nature of the material (e.g., would it represent a salt attractant to wildlife?). Further consideration of the material and field reconnaissance suggests that, in contrast to "salty" material, it may be more representative of carbonate, and hydroxide-rich crusts such as those bordering alkaline lakes.
136	Soil sampling should be done to cover the entire "salt flat" at the lake, not just the perimeter of the area with standing water. Salt composition may change significantly across the salt flat, reflecting changes in water volume and chemical content as the lake dries out.	Y	Soil sampling is not proposed at this time. Instead, a radiation survey encompassing the green, hatched-in area on Figure 3-7, p. 3-34 will be completed. Soil sampling is conditional on the results of this survey. Salt flats are included in this area and salts will be analyzed for metals, radionuclides, alkalinity, calcium, potassium, iron, magnesium, sodium, anions, titrations for total hydroxide and total carbonate, and by X-ray diffraction.

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#	Interview Issues	Accept?	Comment Resolution
137	Along the same line of thought, text on p. 3-22 describes salts with different colors. These salts should be sampled and analyzed separately to better understand the West Lake system. There are apparently spatial patterns in the formation of minerals and consequently of the nature and availability of contaminants; compositing will cause loss of that information.	N	Characterization of West Lake media through MIS was considered the best approach for obtaining representative samples. The MIS approach may result in loss of mineralogical information but will provide for an estimate of what wildlife would be exposed to on average. Up to three color variants will be captured with three primary salt MIS; this, combined with information on metals and radionuclides, will provide insight into salt mineralogy.
138	It was requested that soil samples be collected for rad analysis if elevated [radiation survey] readings are noted.	Y	Agree to collect soil samples at areas associated with elevated radiation survey readings.
139	Chemical analyses of water, soil, and salt crusts should include characterization of major cations and anions, and of silica, as well as mineralogic analyses of the crusts. It is important to develop an understanding of biogeochemical controls on radionuclides and metals in the lake system. Understanding the mineral phases that control solubility and bioavailability of contaminants is an essential step in assessing potential ecological risk at West Lake.	Y	Comment accepted. Please refer to the analytical list in the response to comment #136.
140	Are the salts at West Lake a result of Hanford Site operations? Anecdotal tale of West Lake's use as a water source for horses suggests its use by Native Americans for foods and medicines; it was not always saline.	Y	The answer to this question is not known at this time. It was suggested that salt crust resulted from precipitation of carbonates in groundwater over the seasonal wetting/drying cycle typical of West Lake hydrology. The Phase III effort will measure radionuclide and metal COPECs in salt at West Lake to address the potential for ecological risks due to salt ingestion to obtain trace minerals.
141	How will radiological screening levels be defined for salt crust?	Y	This is not a typical exposure calculation for wildlife and will be developed in the ERA.
142	Page 3-22 describes "driving" a slotted PVC pipe into the ground for sampling of porewater. If the sediments are solid enough that they can be walked across, significant troubles can be envisioned in trying to drive slotted PVC into the ground. Conversely, if the pipe can be readily driven into the ground, walking may be hazardous. Is there a "Plan B" for sampling porewater, perhaps using stainless steel well points?	Y	Plan B could involve driving steel-screened points into the ground. During this year's first site visit (March), a slotted PVC pipe was driven into the sediment at the water's edge to about ½ ft; water quickly filled the bottom of the pipe, which indicated success. However, stainless steel mesh on a stainless steel port probably would work well too.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
143	We suggest an initial survey of lake water chemistry, using quick, electrometric measurements (e.g., conductivity and temperature, maybe pH and dissolved oxygen) to look for significant spatial variability in water chemistry. If spatial patterns occur, design sampling to capture that variability.	Y	The suggested surveys are currently underway at West Lake and the suggested electrometric data are being collected. However, the design is focused on eliminating variability to the extent practicable by using MIS procedures; the mean values are of interest for estimating exposure. This approach was endorsed by participants in the February 22-23, 2006, Phase III DQO Workshop.
144	Please add a footnote to the column, "Matrix-Specific Target Quantitation Limits, Invertebrates," to identify the source of these limits. Many of these limits appear to be soil radiological BCGs and nonradiological WAC 173-340-900, Table 749-3 soil concentrations.	Y	Sources of radiological limits for tissue are cited and the source calculations are presented in the Phase III DQO.
145	There may be a problem with mercury, because SQuiRT TEL<PQL. Please explain how this will be addressed.	Y	Non-detects above the TEL will be treated as an uncertainty.
146	Please clarify how the 200 Area effluent was discharged in a way that influenced West Lake.	Y	It was explained that discharges directly to the soil column percolated to groundwater and artificially raised the water table in the West Lake area.
147	Regarding the Oak Ridge National Laboratory reference, values attributed to this reference could not be located. Also, this reference lists sediment benchmarks (not surface water benchmarks). (p. 2-16, Table 2-7)	Y	The correct reference has been added. It is ES/ER/TM-85/R3. Although that document is based on plants, the values came from hydroponic studies and the Oak Ridge National Laboratory used them for wetlands assessments.
148	What is the riparian receptor?	Y	Field reconnaissance will identify species use of West Lake; however, shorebirds are presumed to be the most likely riparian receptors in the conceptual model.
149	The conversion of water data to sediment (on a mass basis) was questioned. The objection was that one cannot convert water to sediment as this would concentrate by 95%.	Y	The conversion was used for illustrative purposes as a bounding analysis; the ERA will not use converted data.
150	It was recommended that AVS be measured for sediments because West Lake is more like a marine environment and because AVS provides a measure of bioavailability. It also was suggested that total sulfides and total organic carbon be measured for the same reasons.	Y	Total sulfides, acid volatile sulfides, and total organic carbon will be measured.
151	Ecological receptors were suggested to be associated with West Lake and include (but are not limited to) flies, wading birds, bats, deer, and coyotes.	Y	Field reconnaissance surveys are underway to document wildlife use of West Lake in order to evaluate potential exposure pathways and to validate the conceptual model of receptors there.
152	It was suggested that a radiation survey be performed to assess whether hot spots exist at West Lake.	Y	A radiation survey will be performed for soils bordering West Lake.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
153	Concern was voiced over not analyzing for organic chemicals at West Lake. How many groundwater samples were analyzed for organics?	Y	It was noted that upon review of groundwater data for organic chemicals, the results showed no detections. These results are based on one sampling event between 1990 and 1991 for selected wells. These results formed the basis for the Tri-Parties' decision to stop sampling groundwater near West Lake for organics. These observations notwithstanding, sediments will be sampled for organics to test the conceptual model that organic contamination is not expected at West Lake.
154	It was suggested that porewater (sediment interstitial water) be collected to represent conditions of maximum solute concentrations in water.	Y	Porewater will be collected as suggested.
155	It was suggested that all abiotic media at West Lake should be collected as multi-increment samples.	Y	All abiotic media samples from West Lake will be multi-increment samples as suggested.
156	Questions were raised over the basis for BCGs, such as the basis for the dose limits.	Y	The Bechtel Hanford analysis of studies that formed the basis for BCG dose limits is available for review (DOE/RL-2005-40, Appendix J). It was clarified that the Washington State Department of Ecology does not consider dose limits as an applicable or relevant and appropriate requirement, rather the BCGs are screening levels that are "to be considered" under CERCLA.
157	If the historic condition of West Lake was that of a freshwater system, it is important to assess the risk and injury to the Central Plateau and Gable Mountain area that was caused by loss of what was likely the only freshwater drinking supply between Rattlesnake Mountain and the Columbia River. If West Lake's historic condition was that of a freshwater lake or spring, would restoration be done to recover to the historic condition?	N	This natural resource damage concern will be addressed as part the CERCLA remedial options evaluation for West Lake. The ERA is not addressing natural resource injuries. It evaluates COPECs and the potential for ecological risk from those COPECs.
158	For the West Lake surface water and sediment samples, add TBP and normal paraffin hydrocarbons to the list of analytes. TBP is both toxic and carcinogenic. (Exec. Summary, Table ES-1, and Table 1-1, p. vii, 1-25 and 1-26)	Y	Comment accepted.
159	Delete the 2nd sentence, which states that organic chemicals were not associated with the processes at PUREX and B Plant. This statement is not correct. The PUREX process involved solvent extraction with TBP and normal paraffin hydrocarbon (PNL-SA-23121 S). Also, a fission product recovery process was used at B Plant; the process used TBP, normal paraffin hydrocarbon, organic complexing agents such as HEDTA, and tartaric acid. All are organics. Samples from West Lake should be analyzed for TBP and normal paraffin hydrocarbons. (Exec. Summary, p. xi, 2nd paragraph)	Y	Comment accepted.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
160	Because the lake perimeter will be sampled systematically, the open-water portion of the lake also should be sampled systematically. (Section 3.7.3, p. 3-22, 1st paragraph)	Y	Please see response to comment 134.
161	Add TBP and normal paraffin hydrocarbon to the analyte list for sediment and surface water. (Table 3-7, p. 3-23)	Y	Comment accepted.
162	The number of multi-increment samples for each sample type will need to be increased. In addition to a need to compensate for field variability, if there are any analytical errors for the single samples (such as spillage, contamination, low spike recovery, exceedance of holding times), the site will have to be re-sampled. It would be more cost-effective to get more samples during the upcoming sampling effort than to re-sample later. The Washington State Department of Ecology is evaluating the performance evaluation done for the 100/300 Area component of the RCBRA, and will recommend a number of samples based on those results. (Table 3-7, p. 3-23)	N	The performance assessment results for the 100/300 Area component of the RCBRA are not relevant to West Lake because the assessment deals with soil only and this medium is not currently targeted for sampling at West Lake. Duplicate multi-increment samples for each media at West Lake are adequate considering the relative homogeneity of aquatic matrices compared to heterogeneous soil. Enough material will be collected so that excess exists to provide backup material in the event of sample loss.
163	The number of increments for MIS, set at 20, does not appear to have a basis. Why was 20 chosen? (Table 3-7, p. 3-23)	Y	Twenty increments were chosen based on a conversation with the expert consultant on multi-increment sampling, Chuck Ramsey and on considerations of the homogeneity of aquatic matrices.
Reference Sites			

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
164	Reference Media Contamination – The elevated Aroclor and Sr-90 detections at reference sites in the Central Plateau are disconcerting and warrant further inspection. The extent of elevated PCBs and Sr-90 at non-waste sites is a question that needs to be addressed. This was suggested in Phase I sampling and was to be answered by the screening of multiple, non-waste sites. It was suggested that different modes of release may have resulted in these conditions, i.e., oiling roads with recycled oils and stack emissions. Each is a separate question that may need investigation in addition to the task of identifying how widespread reference site contamination is and, therefore, the suitability of those chosen reference sites. The recommendations presented to look at more non-waste sites, with an MIS approach, are encouraged.	Y	Regarding Sr-90, reanalysis of mouse tissue with the highest detections of Sr-90 resulted in non-detected concentrations, indicting potential analytical error with the original analyses. The samples are being submitted to a third laboratory for independent assessment of the material. While it would appear that Sr-90 is not a risk driver, Sr-90 data will be collected in the BC Controlled Area having the highest activities of Sr-90 and Cs-137 (BC Controlled Area, Zone A) to represent worst-case conditions for radionuclide contamination in soil and biota. Specifically, an additional investigation area will be deployed in the BC Controlled Area, Zone A and soil, invertebrate, and vertebrate (mice, lizards) data will be collected. Strontium-90 also will be analyzed in lizards and mice at select sites targeted for Phase III vertebrate sampling. In addition to collecting data from waste sites, this effort will provide Sr-90 tissue results from reference sites and from non-waste site areas to address the spatial extent of Sr-90 in the Hanford Site food web in non-operational areas. An extensive sampling campaign is planned to assess the distribution of PCBs in animal tissues outside of waste site boundaries.
165	Both of the reference sites sampled for Phase I and II of the Central Plateau ERA are located within the 200 East and 200 West Area perimeters, in areas presumably subject to past stack emissions. It makes no sense to have "reference sites" (i.e., supposedly clean, uncontaminated sites) located closer to emission sources than the "non-waste area" sites proposed for sampling in Phase III, and for which the Phase I and II reference sites will serve as benchmarks. These are areas for which the DOE acknowledges poor information about effects of stack air releases. The illogic of this sampling scheme makes a compelling argument that so-called reference sites for Phase I and II should be dropped as reference sites.	N	See response to comment 94.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
166	It doesn't make sense that much of the invertebrate sampling planned for Phase III would be carried out in old borrow pits and that these are characterized as "reference sites" for studies of cyanide in invertebrates. The borrow pits are relatively sterile areas with poorly developed soils, plant, and animal communities; they do not provide any meaningful benchmark for assessing the reference condition of soils, plants, or invertebrates in terms of cyanide inventories or concentrations. For reasons discussed above, we recommend below that the entire cyanide study be rethought and redesigned, and selection of meaningful reference sites is a part of that recommendation.	N	See response to comment 76.
167	It is essential to identify and sample some kind of reference site. This might be a nearby, non-saline lake comparable to the reputed historic character of West Lake, and/or a saline lake comparable to current conditions at West Lake, but lacking radioactive wastes, metals, and other materials (e.g., perhaps nitrates or sulfates) that might have leached into West Lake from Hanford Site operations. The West Lake system can not be characterized, and the potential for ecological risks at the lake from Hanford Site operations cannot be ascertained without an appropriate reference site (see additional comment below under the heading "Reference Sites").	N	To our knowledge, there are no nearby saline lakes comparable to West Lake. Rattlesnake Springs was suggested as an onsite reference water body. Rattlesnake Springs is structurally and functionally different from West Lake. The former represents emergent groundwater, and a lotic (flowing water) system. West Lake is a lentic (standing water) system that is cut off from groundwater and collects overland flow. Such dissimilar environments are not suitably paired as study/reference sites. It is important to note that we are comparing abiotic and biotic data to toxicity thresholds, and not comparing ecosystem properties.
168	Is West Lake distinct relative to other lakes? Are there plans to identify a reference site?	Y	Other pothole lakes are not saline. See above response to comment 167.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
169	We note with dismay that there will not be any reference site used as an analogue to samples collected at West Lake. Two excuses are given, first that West Lake is unique, so there is no good analogue for the site; second, that no reference site is needed for interpretation of West Lake data. We disagree with both arguments. The first assertion possibly could be true, but we have not seen evidence that the DOE has looked diligently for a reference site. Have sites such as Saddle Mountain Lake, or sites removed from the Hanford Site, been investigated and considered? If not, why not? If so, why were they dropped? We disagree in principle with the claim that no reference site is needed; lacking a good reference site, there is no way of assessing possible incremental effects of Hanford Site releases on the lake ecosystem, or of quantifying possible effects. We also note that if West Lake is in fact unique, that fact would make a persuasive argument about the extent to which Hanford Site activities have fundamentally changed the nature of the hydrology and geochemistry of the West Lake system. There is anecdotal evidence that a lake historically existed as a freshwater system that was used for watering stock or horses (as was discussed at the February 22-23, 2006, Phase III DQO Workshop). If so, the historic lake was very different from today (i.e., a freshwater system used as a watering stop for horses and livestock, not the saline, playa-like system of today), and it is critical that the DOE characterize the nature and extent of changes, both for flora and fauna living in and adjacent to the lake, and for upland fauna that would have relied on the site for drinking water.	N	See response to comments 167 and 157, respectively.
170	In addition to generic dose guidelines (e.g., DOE BCGs) or chemical screening levels (e.g., WAC 173-340-900, Table 749-3 ecological soil levels), an uncontaminated reference site provides a data set to compare ecosystem properties (e.g., species diversity, trophic structure, vegetative cover) with those same properties at a contaminated waste site. So, it should be noted that in the case of West Lake (where no suitable reference site has been selected), comparisons will be limited primarily to generic dose or contaminant screening levels. In particular, without a reference site, it may be difficult to evaluate reconnaissance survey information (e.g., see Table ES-1, which lists biological surveys and physical/chemical properties) or salt crust and porewater COPEC concentrations.	Y	Comparisons of West Lake reconnaissance survey information to another site are not planned. Exposure from abiotic media or modeled from food web transport will be compared to toxicity thresholds. Consequently, a reference site is unnecessary for West Lake.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution
171	Samples for Phase I were taken from highly disturbed areas that have been covered with clean fill and routinely subjected to herbicide treatments. It is hardly surprising that PCBs and cyanide were not commonly found in those soils, or that they were rarely found in fauna from those sites. Soils on these sites were taken from below grade at borrow pits, they are virtually devoid of organic matter from the site of origin, and have a minimal development of a plant community. Consequently, they would not be expected to have organic materials such as PCBs or cyanide that were derived from spraying or deposition, or that might have originated from vegetation on the site. If the DOE wants a valid assessment of occurrence and exposure to those contaminants, DOE needs to look at sites with relatively undisturbed soils and at the flora and fauna on those sites.	N	The reference sites for remediated/native soil sites employed in the 100/300 RCBRA address this concern. The reference site soils for these sites are native surface soils. While the surface soil types at the Hanford Site can vary considerably across short distances (BNWL-243), having five undisturbed reference locations widely spaced apart (Figure 3-7) will help to mitigate the influence of variations in specific soil types. The reference sites selected for the remediated/native soil sites are at a greater distance from all the remediated sites and borrow pit reference sites to help provide a range of distances to further evaluate the issue of past spread of Hanford Site contamination affecting the background levels of contaminants. The vegetation at these "undisturbed" reference DOE/RL-2005-42 3-4 sites is also more of a sagebrush climax community than the remediated/native soil sites. While there will be some vegetation differences, the animal species present are expected to be similar. This comment seems to be focused on sampling a waste site without any stabilizing cover because of the attention given to the borrow material. This is one of the primary points made during the Phase I study: that the thickness of the cover soils is of primary importance, because it controls the contaminant pathways to receptors.

Aroclor is an expired trademark.
EMFLUX is a registered trademark of Beacon Environmental Services, Inc., Bel Air, Maryland.
En Core is a trademark of En Novative Technologies, Inc., Green Bay, Wisconsin.

Table A-1. Phase III Central Plateau Ecological Data Quality Objectives Issues Matrix. (38 Pages)

#	Interview Issues	Accept?	Comment Resolution

100/300 RCBRA = River Corridor Baseline Risk Assessment.
BCG = biota concentration guideline.
BW = body weight.
CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (also known as Superfund).
COPEC = contaminant of potential ecological concern.
DDT = dichlorodiphenyltrichloroethane.
DOE = U.S. Department of Energy.
DQO = data quality objective.
EcoDQO = ecological data quality objective.
EPA = U.S. Environmental Protection Agency.
ERA = ecological risk assessment.
ERAGS = Ecological Risk Assessment Guidelines for Superfund (*Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final)* [EPA/540/R-97/006]).
HEDTA = hydroxyethylethylenediaminetriacetic acid.
IUPAC = International Union of Pure and Applied Chemistry.
LD_{50} = dose at which 50% of the animals were killed.
MIS = multi-increment sampling.
ORP = Office of River Protection (DOE).
P = proportion of contaminated food (plants).
PCB = polychlorinated biphenyl.
PQL = practical quantitation limit.
PUREX = Plutonium-Uranium Extraction Plant.
PVC = polyvinyl chloride.
RGAF = relative gut adsorption factor.
SAP = sampling and analysis plan.
SQuiRT TEL = *Screening Quick Reference Tables*, threshold-effect level (NOAA 1999).
TBD = to be determined.
TBP = tributyl phosphate.
TCDD = tetrachlorodibenzodioxin.
TCE = trichloroethylene.
TEQ = total equivalent.
Tri-Parties = U.S. Department of Energy, U.S. Environmental Protection Agency, and Washington State Department of Ecology.
Tri-Party Agreement = *Hanford Federal Facility Agreement and Consent Order.*
TF = transfer factor.
TRV = toxicity reference value.
VOC = volatile organic compound.
WAC = *Washington Administrative Code.*
WHO = World Health Organization.

REFERENCES

Apfelbach, R., A. Engelhart, P. Behnisch, and H. Hagenmaier, 1998, "The Olfactory System as a Portal of Entry for Airborne Polychlorinated Bipheynls (PCBs) to the Brain?", *Arch Toxicol* 72: 314-317. Available on the Internet at http://www.tat.physik.uni-tuebingen.de/~pcb-info/literatur/r.apfelbach.pdf .

ATSDR, 2004, *ToxFAQs for Cyanide*, Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Washington, D.C. Available on the Internet at http://www.atsdr.cdc.gov/tfacts8.html .

Bench, G., T. Carlsen, P. Grant, J. Wollett, R. Martinelli, J. Lewis, and K. K. Divine, 2001, "Olfactory Bulb Uptake and Determination of Biotransfer Factors in the California Ground Squirrel (*Spermophilus beecheyi*) Exposed to Manganese and Cadmium in Environmental Habitats," *Environmental Science and Technology* V35:270-277.

BHI-00032, 1994, *Ecological Sampling at Four Waste Sites in the 200 Areas*, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

Blaustein, A. R., and P. T. J. Johnson, 2003, "The Complexity of Deformed Amphibians," *Frontiers in Ecology and the Environment,* Vol. 1, No. 2, pp. 87-94.

BNWL-243, 1966, *Soil Survey – Hanford Project in Benton County, Washington*, Battelle-Northwest, Richland.

Carlsen, T. M., 1996, "Ecological Risks to Fossorial Vertebrates from Volatile Organic Compounds in Soil," *Risk Analysis* 16:211-219.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq.

Dodi, A., and G. Verda, 2001, "Improved Determination of Tributyl Phosphate Degradation Products (Mono- and Dibutyl Phosphates) by Ion Chromatography," *J Chromatogr A* 920(1-2):275-81.

DOE/RL-2005-30, 2005, *Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase II*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2005-37, 2005, *Status of Hanford Site Risk Assessment Integration, FY 2005*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2005-40, 2005, *100-B/C Pilot Project Risk Assessment Report*, Draft B, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available on the Internet at http://www.washingtonclosure.com/Projects/EndState/docs/100B-C/RL2005-40_Vol_3_Appendices_Draft_B.pdf .

DOE/RL-2005-42, 2005, *Field Sampling Plan Draft A 100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2005-49, 2005, *RCBRA Stack Air Emissions Deposition Scoping Document*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2006-27, 2006, *Central Plateau Terrestrial Ecological Sampling and Analysis Plan – Phase III*, Draft, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington, as amended.

EPA/540/R-97/006, 1997, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final)*, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

EPA/630/P-03/002A, 2003, *Framework for Application of the Toxicity Equivalence Methodology for Polychlorinated Dioxins, Furans and Biphenyls in Ecological Risk Assessment, (External Review Draft)*, Risk Assessment Forum, U.S. Environmental Protection Agency, Washington, D.C. Available on the Internet at http://cfpub.epa.gov/ncea/raf/recordisplay.cfm?deid=55669 .

ES/ER/TM-85/R3, 1997, *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1997 Revision*, Lockheed Martin Energy Systems, Inc., Oak Ridge, Tennessee.

IPCS, 1996, *Environmental Health Criteria 182*, "Thallium," IPCS International Programme on Chemical Safety, World Health Organization, Geneva, Switzerland. Available on the Internet at http://www.inchem.org/documents/ehc/ehc/ehc182.htm .

Klaassen, C. D., and J. B. Watkins (eds.), 1996, *Casarett and Doull's Toxicology: The Basic Science of Poisons*, 5th ed., Macmillan Publishing Company, New York, New York.

LA-UR-04-8246, 2004, *Screening-Level Ecological Risk Assessment Methods*, Rev. 2, Los Alamos National Laboratory, Los Alamos, New Mexico.

Newell, P., J. Podolsky, J. Markewiese, R. Ryti, and R. Mirenda, 2006, "Wildlife Ecological Screening Levels for Inhalation of Volatile Organic Chemicals," *Environmental Toxicology and Chemistry*.

NOAA, 1999, *Screening Quick Reference Tables*, Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration, Seattle, Washington.

Nogami, H., and Terashima, Y., 1973, "Thallium-Induced Achondroplasia in the Rat," *Teratology* 8:101-102.

Peter, A. L. J., and T. Viraraghavan, 2005, "Thallium: A Review of Public Health and Environmental Concerns," *Environment International* 31:493-501.

PNL-SA-23121 S, 1993, *Hanford Technical Exchange Program: Process Chemistry at Hanford (Genesis of Hanford Wastes)*, Pacific Northwest Laboratory, Richland, Washington.

Publication Number 02-03-003, 2002, *PCBs in Sediments at Selected Sites in Puget Sound*, U.S. Environmental Protection Agency, Washington, D.C. Available on the Internet at http://www.ecy.wa.gov/pubs/0203003.pdf .

Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq.

SW-846, 1999, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update III-A*, as amended, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. Available on the Internet at www.epa.gov/SW-846/main.htm .

Van den Berg, M., L. Birnbaum, A. T. C. Bosveld, B. Brunström, P. Cook, M. Feeley, J. P. Giesy, A. Hanberg, R. Hasegawa, and S. W. Kennedy, 1998, "Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife," *Environmental Health Perspectives*, 106: 775-792.

WAC 173-340, "Model Toxics Control Act -- Cleanup," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340-745, "Soil Cleanup Standards for Industrial Properties," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340-747, "Deriving Soil Concentrations for Ground Water Protection," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340-900, "Tables," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WMP-20570, 2005, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase I*, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

WMP-25493, 2005, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase II*, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

APPENDIX B

SUPPORTING PLOTS AND TABLES FOR DATA ASSESSMENT

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FIGURES

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Figure B-2. Box Plots of Plant-Gamma (gross cpm) by Site. B-11

Figure B-3. Box Plots of Soil-Beta (net dpm/m^2) by Site. B-12

Figure B-4. Box Plots of Soil-Gamma (gross cpm) by Site. B-12

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Figure B-19. Scatter Plots of Mammal Relative Density vs Measures of Plant Cover and Density. Symbols vary by phase. B-24

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Figure B-21. Box Plots of Antimony by Sample Type. Open circles are non-detects and filled circles are detects. B-26

Figure B-22. Box Plots of Arsenic by Sample Type. Open circles are non-detects and filled circles are detects. B-26

Figure B-23. Box Plots of Barium by Sample Type. Open circles are non-detects and filled circles are detects. B-26

Figure B-24. Box Plots of Boron by Sample Type. Open circles are non-detects and filled circles are detects. B-26

Figure B-25. Box Plots of Cadmium by Sample Type. Open circles are non-detects and filled circles are detects. B-27

Figure B-26. Box Plots of Chromium by Sample Type. Open circles are non-detects and filled circles are detects. B-27

Figure B-27. Box Plots of Hexavalent Chromium by Sample Type. Open circles are non-detects and filled circles are detects. B-27

Figure B-28. Box Plots of Copper by Sample Type. Open circles are non-detects and filled circles are detects. B-27

Figure B-29. Box Plots of Cyanide by Sample Type. Open circles are non-detects and filled circles are detects. B-28

Figure B-30. Box Plots of Lead by Sample Type. Open circles are non-detects and filled circles are detects. B-28

Figure B-31. Box Plots of Molybdenum by Sample Type. Open circles are non-detects and filled circles are detects. B-28

Figure B-32. Box Plots of Nickel by Sample Type. Open circles are non-detects and filled circles are detects. B-28

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APPENDIX B

SUPPORTING PLOTS AND TABLES FOR DATA ASSESSMENT

This appendix contains plots and tables that support Chapter 2.0 of the main text. The information is grouped into the following types of data and analyses:

- Radiation surveys
  - Box plots of radiation survey data that display beta and gamma radiation readings for plants, soil, ant nests, and mammal burrow spoils for each site (Figures B-1 to B-8)
- Animal metrics and relative animal abundance
  - Box plots of small-mammal metrics and species captured by site, phase, and site type (Figures B-9 to B-11)
  - Cross tabulations of small-mammal species, reproductive status, age, gender, phase, site type, and site (Tables B-1 to B-18)
  - Time series plots that show mammal species, reproductive status, gender, and age class (Figure B-12)
  - Relative animal captures (invertebrates, lizard, small mammals) by site type and phase (Figures B-13 to B-14)
- Plant cover and diversity surveys
  - Measures of plant cover and diversity by site type and phase (Figures B-15 to B-16)
- Relating relative animal abundance and plant cover/diversity
  - Scatter plots of relative animal density vs measures of plant cover and diversity (Figures B-17 to B-19)
  - Scatter plot matrix of animal relative density and plant measures (Figure B-20)
- Using contaminant concentrations to identify contaminants of potential ecological concern (COPEC)
  - Box plots of contaminant concentrations in soil and tissues showing overall comparability of soil and tissue sample results (Figures B-21 to B-62)

- Box plots of contaminant concentrations in soil, invertebrates, lizards, and small mammals showing overall comparability of sample results for site types and sites (Figures B-63 to B-93)

- Scatter plots that show if there is a correlation in average tissue concentrations and average soil concentrations. Tissues include invertebrates, lizards, and small mammals collected from a site (Figures B-94 to B-124).

DATA CD FILES

The following files are included on the data CD for Appendix B. Data fields within the files are described in the tables under each file name.

All Rad Survey data.xls. (2 Pages)

Excel Column Header	Definition
Site	Investigation area
Stake	Stake number (out of 121) for an investigation area
easting	Easting coordinates
northing	Northing coordinates
Elev	Elevation
Survey date	Date survey was conducted
Plant species	Plant species nearest to stake
Plant height	Height of plant (in.)
Plant width	Width of plant (in.)
Plant/soil beta BKGD	Background reading for beta radiation
Plant/soil gamma BKGD	Background reading for gamma radiation
Plant-beta (net dpm/m^2)	Beta radiation in plants corrected for background
Plant-gamma (gross cpm)	Gamma radiation in plants not corrected for background
Soil-beta (net dpm/m^2)	Beta radiation in soil corrected for background
Soil-gamma (gross cpm)	Gamma radiation in soil not corrected for background
Ant survey date	Date of ant survey
Ant flag no.	Stake associated with ant mound
Ant beta BKGD	Background reading for beta radiation on ant mound
Ant gamma BKGD	Background reading for gamma radiation on ant mound
Ant-beta (net dpm/m^2)	Beta radiation in ant mounds corrected for background
Ant-gamma (gross cpm)	Gamma radiation in ant mounds not corrected for background
Mammal survey date	Date of mammal survey
Mammal flag no.	Stake associated with burrow spoils
Mammal beta BKGD	Background reading for beta radiation on burrow spoils

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All Rad Survey data.xls. (2 Pages)

Excel Column Header	Definition
Mammal gamma BKGD	Background reading for gamma radiation on burrow spoils
Mammal-beta (net dpm/m^2)	Beta radiation in burrow spoils corrected for background
Mammal-gamma (gross cpm)	Gamma radiation in burrow spoils not corrected for background

Excel is a trademark of Microsoft Corporation, Redmond, Washington.

Animal vs Plants.xls.

Excel Column Header	Definition
Site	Investigation area
Group	Waste vs reference site
Phase	Phase I or Phase II
Trap night	Number of nights pitfall traps left out for invertebrates
Total Mass Inverts (g)	Total invertebrate mass
Insect mass/effort	Total invertebrate mass/trap night
Trap Nights 2	Number of nights mammal traps left out
Total Number Mammals	Total number mammals
Mammals/effort	Total number mammals/trap night
Trap Nights 3	Number of nights pitfall traps left out for lizards
Total Number Lizards	Total number lizards
Lizards/effort	Total number lizards/trap night
Site 2	Alternate designation for investigation areas
Litter	Plant litter
Bare Ground	Bare ground
Crypto	Cryptogamic crust
SUM of plant cover	Total plant cover
total plant spp	Number of plant species
Diversity (H)	Shannon-Weaver diversity index

CP Mammal & Lizard.xls. (2 Pages)

Excel Column Header	Definition
rec	Record
Collector(s)	Individual responsible for collection
Collection Date	Date of collection
Processor(s)	Individual responsible for processing
Process date	Date of processing
EAS SPECIMEN RECORD ID	Unique identification code
Study or sampling purpose	Project code

CP Mammal & Lizard.xls. (2 Pages)

Excel Column Header	Definition
General_Region_ID	General areas consisting of the BC Controlled Area, 200 East Area, and 200 West Area
Sample_Site_ID	Investigation area
Phase	Phase I or Phase II site
Site Type	Waste site or reference site
Class	Mammal vs reptile
Species	Organism species code
Whole Organism wt (g)	Organism weight
Total Body Length (fork length, or carapace length) (mm)	Total body length
Tail Length (mm)	Self-explanatory
Ear Length (mm)	Self-explanatory
Hind Foot Length (mm)	Self-explanatory
Gender (M/F)	Male vs female
Reproductive status	Scrotal vs non-scrotal for males, lactating vs non-lactating for females or unknown
Age (approx)	Juvenile vs adult
Whole Organ Liver weight (g)	Self-explanatory
External Body Condition	Essentially normal vs non-normal
Stomach/crop contents	Diet
External Condition/ Necropsy	Description of external condition observations
HEIS # (or other label ID)	*Hanford Environmental Information System* database code

Data_all_w_RCBRA.xls. (2 Pages)

Excel Column Header	Definition
Phase	Phase I or Phase II
Site Type	Waste or reference site
Site	Site location description
samp_site_name	Investigation area
samp_site_desc	Alternate designation for investigation area
samp_num	Unique sample identification
Sample Type	General sample description
Species	Vertebrate species
Gender	Male or female
Reproductive status	Scrotal vs non-scrotal for males, lactating vs non-lactating for females or unknown
Age class	Juvenile vs adult
Media Group	Asphalt, soil, or tissue

Data_all_w_RCBRA.xls. (2 Pages)

Excel Column Header	Definition
Related sample ID	Alternate sample identification
y	Variable created for plotting data
Rows O through GR	COPEC concentrations (μg/kg or pCi/g) for soil or biotic tissues and COPEC data coding for detection (1) or non-detection (-1) status

Data are arranged in multiple tabbed spreadsheets and data arranged in pivot tables. Data codes are provided in the following table.

HEIS 200 Area Ecology_rtr_Corrected_rev.xls. (4 Pages)

Excel Column Header	Definition
Units tab	
samp_site_name	Name of sample site
samp_site_desc	Description of sample site
media	Biological tissues (Bl), multi-media (MM), quality control (QC), soil (SO)
anal_units	Analytical units
Code export tab (data coded on detection status of maximum COPEC result; columns D-DP)	
samp_site_name	Name of sample site
samp_site_desc	Description of sample site
samp_num	Unique sample identification
method_name	Analytical method
con_long_name	Contaminant long name
Data export tab (data exported for maximum COPEC result; columns D-DP)	
samp_site_name	Name of sample site
samp_site_desc	Description of sample site
samp_num	Unique sample identification
method_name	Analytical method
con_long_name	Contaminant long name
Results Summary tab (COPEC based on comparisons to background and reference site results)	
Suite	Contaminant suite
COPEC	Contaminant name
Soil Ref	Comparison of waste site soil concentrations to reference site soil concentrations
Soil Bkg	Comparison of waste site soil concentrations to soil background concentrations for the Hanford Site

HEIS 200 Area Ecology_rtr_Corrected_rev.xls. (4 Pages)

Excel Column Header	Definition
Insects Ref	Comparison of insect concentrations on waste sites to insect concentrations on reference site
Lizards Ref	Comparison of lizard concentrations on waste sites to lizard concentrations on reference site
Mice Ref	Comparison of mouse concentrations on waste sites to mouse concentrations on reference site
Detection limit requirements tab (Columns A-L represent Table 2-2 in Phase I Sampling and Analysis Plan [DOE/RL-2004-42, Rev 0])	
Soil Detects min	Minimum of soil detection
Soil Detects max	Maximum of soil detection
Soil non-detects min	Minimum of soil non-detection
Soil non-detects max	Maximum of soil non-detection
Tissues detects min	Minimum of tissue detection in insects, lizards, and mammals combined
Tissues detects max	Maximum of tissue detection in insects, lizards, and mammals combined
Tissues non-detects min	Minimum of tissue non-detections in insects, lizards, and mammals combined
Tissues non-detects max	Maximum of tissue non-detections in insects, lizards, and mammals combined
Soil DL	Status of soil detection limit
Tissue DL	Status of tissue detection limit
Soil detect	Status of soil detection limit
Tissue detect	Status of tissue detection limit
Data summary tab	
method_name	Analytical method
con_long_name	Contaminant name
sap name	Alternate contaminant name
Soil Detects Count	Number of detections in soil
Min	Minimum of soil detection
Max	Maximum of soil detection
Non-detects Count	Number of non-detections in soil
Min	Minimum of soil non-detection
Max	Maximum of soil non-detection
Tissues (all) Detects Count	Number of detections in insects, lizards and mammals combined
Min	Minimum of tissue detection
Max	Maximum of tissue detection
Tissues (all) Non-detects Count	Number of non-detections in insects, lizards and mammals combined
Min	Minimum of tissue non-detection
Max	Maximum of tissue non-detection

HEIS 200 Area Ecology_rtr_Corrected_rev.xls. (4 Pages)

Excel Column Header	Definition
Asphalt Non-detects Count	Number of non-detections in asphalt samples
Min	Minimum of asphalt non-detection
Max	Maximum of asphalt non-detection
Total Count	Total of detected and non-detected results
detects in soil or tissue	Total detections in soil or tissue
Detect frequency in tissue	Frequency of detection in tissue
Summary pivot tab (data summarized for COPEC result; columns D-DP)	
media	Biological tissues (BI), multi-media (MM), quality control (QC), soil (SO)
Detect?	Detection status
Data	Count of value reported, minimum of value reported and maximum of value reported
method_name	Analytical method
con_long_name	Contaminant unabbreviated name
Sample analysis summary tab (Analytical methods summary for COPECs in all matrices; columns D – BQ)	
samp_site_name	Name of sample site
samp_site_desc	Description of sample site
samp_num	Unique sample identification
media	Biological tissues (BI), multi-media (MM), quality control (QC), soil (SO)
samp_from	Soil depth sampled
method_name	Analytical method
Max detect by matrix & site tab (data summarized for maximum COPEC result by matrix and site; columns D-EH)	
samp_site_name	Name of sample site
samp_site_desc	Description of sample site
Detect?	Detection status
media	Biological tissues (BI), multi-media (MM), quality control (QC), soil (SO)
samp_from	Soil depth sampled
method_category	General COPEC class (e.g., inorganics)
con_long_name	Contaminant unabbreviated name
Get_UNnorm_results tab	
samp_site_name	Name of sample site
samp_site_desc	Description of sample site
OWNER_ID	Surface Environmental Surveillance Program
SAF_num	General sample identification code
samp_num	Unique sample identification

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HEIS 200 Area Ecology_rtr_Corrected_rev.xls. (4 Pages)

Excel Column Header	Definition
media	Biological tissues (BI), multi-media (MM), quality control (QC), soil (SO)
SAMP_DATE_TIME	Sample date and time
SAMP_FROM	Description of sample matrix
samp_item	Specific description of sample matrix
dilut_factor	Dilution factor
lab_code	Analytical laboratory
sdg_num	Analytical laboratory code
method_name	Analytical method
method_category	General analytical category
con_id	Contaminant identification (Chemical Abstracts Service No.)
con_long_name	Contaminant unabbreviated name
value_rptd	Analytical result
COUNTING_ERROR	Analytical error
MDA	Analytical error – radionuclide specific
total_er	Total analytical error
anal_units	Analytical units
Detect?	Detection status
Detect code	Detection code
lab_q	Laboratory qualification
valid_q	Validation qualification
rev_q	Review qualification

DOE/RL-2004-42, 2005, *Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase 1*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

IA Averages.xls.

Excel Column Header	Definition
Site	Investigation area
Columns B through EQ	COPEC concentrations in soil, invertebrates, lizards, and mice.

The following table provides a key for laboratory codes.

Key for Laboratory Codes. (2 Pages)

Qualifier	Applicable Areas and Definition
*	Inorganics - Duplicate analysis not within control limits.
+	Inorganics - Correlation coefficient for Method of Standard Additions is < 0.995.
>	Wet chem - Result greater than quantifiable range or greater than upper limit of the analysis range.
A	Organics - Valid for TICs only: The TIC is a suspected aldol-condensation product.
B	Inorganics and Wet chem - The analyte was detected at a value less than the contract required detection limit, but greater than or equal to the IDL/MDL (as appropriate).
B	Organics - The analyte was detected in the associated QC blank and in the sample.
B	Radionuclides (including total U) - The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample.
C	Inorganics and Wet chem - The analyte was detected in the associated QC blank above the IDL/MDL.
C	Organics - The identification of a pesticide confirmed by gas chromatograph/mass spectrometer.
D	Organics and Wet chem - Analyte was identified in an analysis at a secondary dilution factor (i.e., dilution factor different than 1.0).
E	Inorganics - Reported value is estimated because of interference. See comment on cover page, hardcopy case narrative, or specific FORM I.
E	Organics - Concentration exceeds the calibration range of the gas chromatograph/mass spectrometer. Not applicable to pesticides/ polychlorinated biphenyls.
J	All - The reported value is an estimate. Analyte was analyzed for and detected but has potentially larger associated error factors in the result. If this qualifier is applied for any reason other than results reported close to the analytical detection limit, an explanation must be provided in the associated hardcopy Sample Data Summary Package and/or case narrative.
M	Inorganics – Duplicate precision criteria not met.
N	All - Spike sample recovery is outside control limits.
P	Organics (polychlorinated biphenyl only) - Aroclor target analyte with greater than 25% difference between column analyses.
Q	Organics (Dioxins only) - Estimated maximum concentration. Used if one of the qualitative identification criterion is not met (e.g., Cl isotopic rations outside theoretical range.)
R	All (qualifier added only as a result of validation activities) – Validation activities identified major problems or deficiencies associated with sampling, preservation, handling, or analysis for this result. Result must be considered to be unusable.

Key for Laboratory Codes. (2 Pages)

Qualifier	Applicable Areas and Definition
S	Inorganics - Reported value determined by the Method of Standard Additions.
U	All - Analyzed for but not detected above limiting criteria. NOTE: Limiting criteria may be any of the following: value reported < 0; value reported < counting error; value reported < total analytical error; value reported <= MDL/IDL/MDA/PQL.
W	Inorganics - Post-digestion spike recovery for graphite-furnace atomic absorption out-of-control limit. Sample absorbency < 50% of spike absorbency.
X	All - Other specific flags and notes required to properly qualify the result are described in the hardcopy Sample Data Summary Package and/or case narrative.
Y	Same as X, if more than one flag is required.
Z	Same as X and Y if more than two flags are required.

Aroclor is an expired trademark.

IDL = instrument detection limit.
MDA = minimum detectable activity.
MDL = minimum detection level.
PQL = practical quantitation limit.
QC = quality control.
TIC = total inorganic carbon.

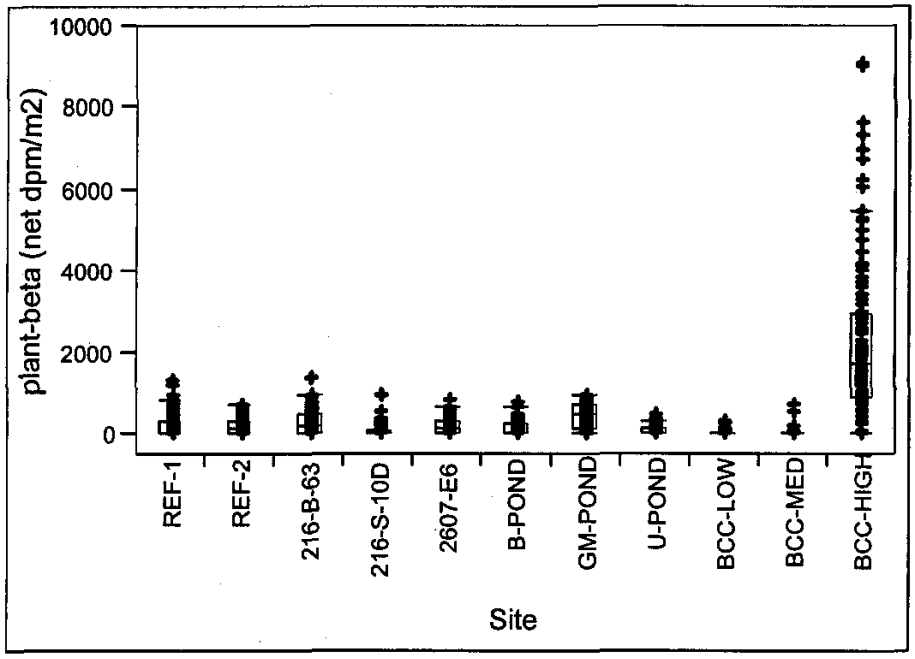


Figure B-1. Box Plots of Plant-Beta (net dpm/m^2) by Site.

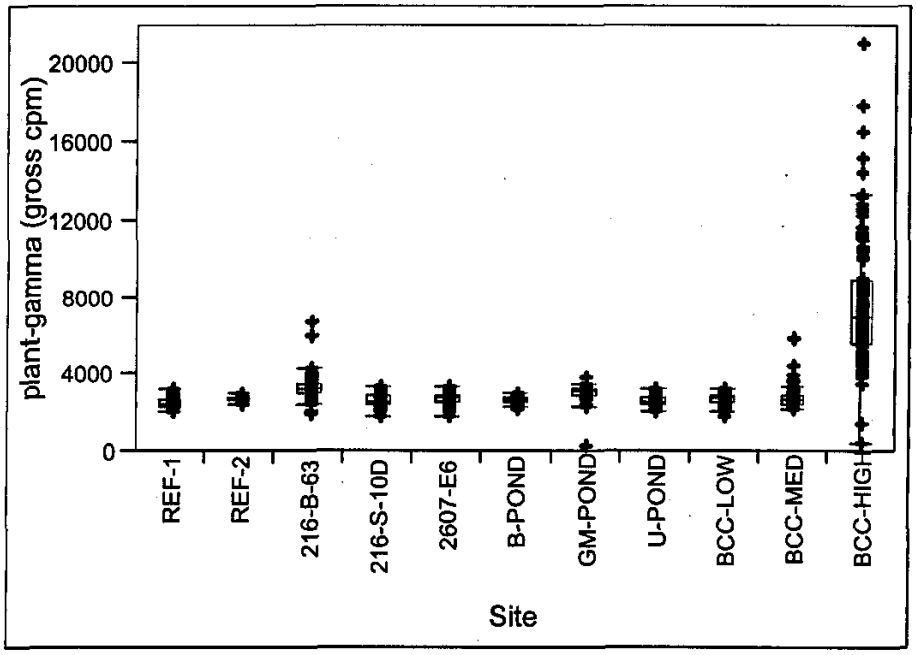


Figure B-2. Box Plots of Plant-Gamma (gross cpm) by Site.

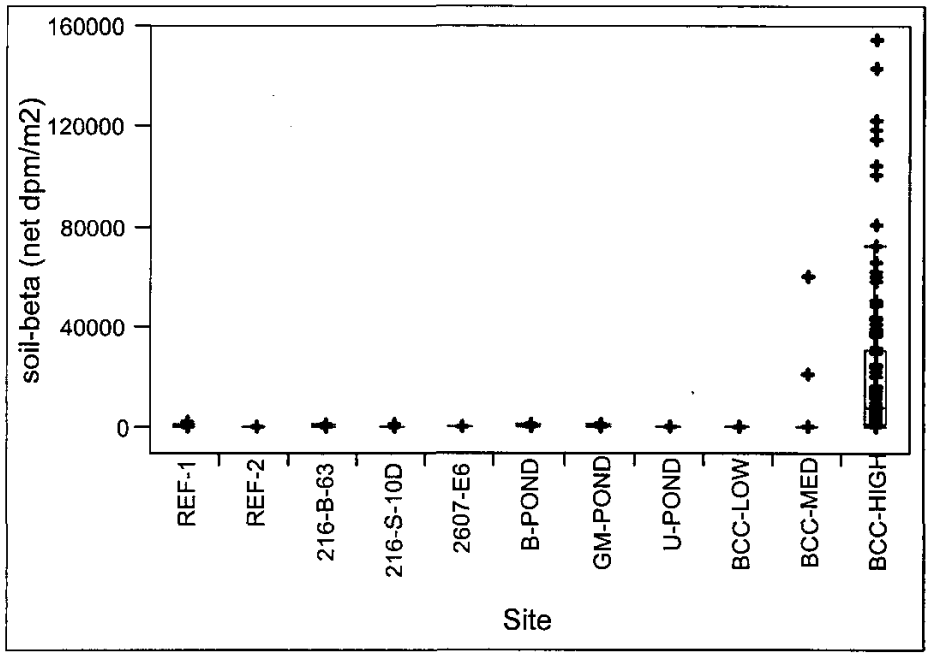


Figure B-3. Box Plots of Soil-Beta (net dpm/m^2) by Site.

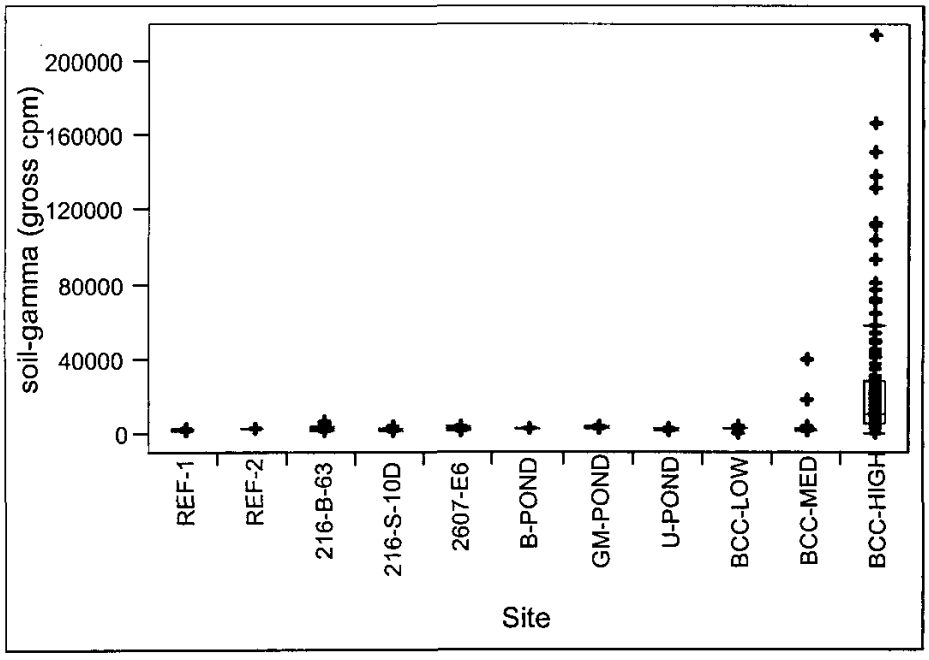


Figure B-4. Box Plots of Soil-Gamma (gross cpm) by Site.

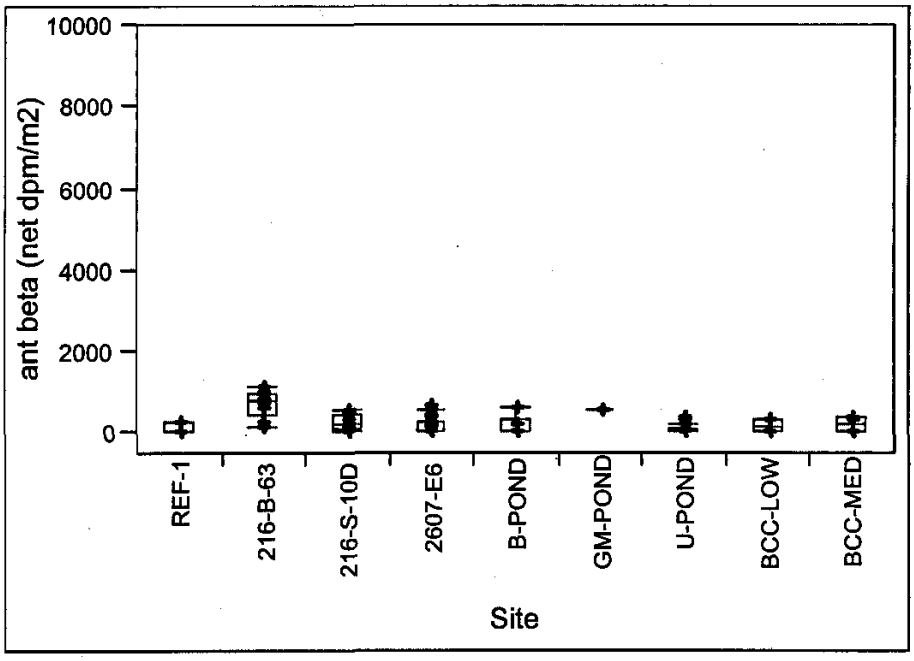


Figure B-5. Box Plots of Ant Beta (net dpm/m^2) by Site.

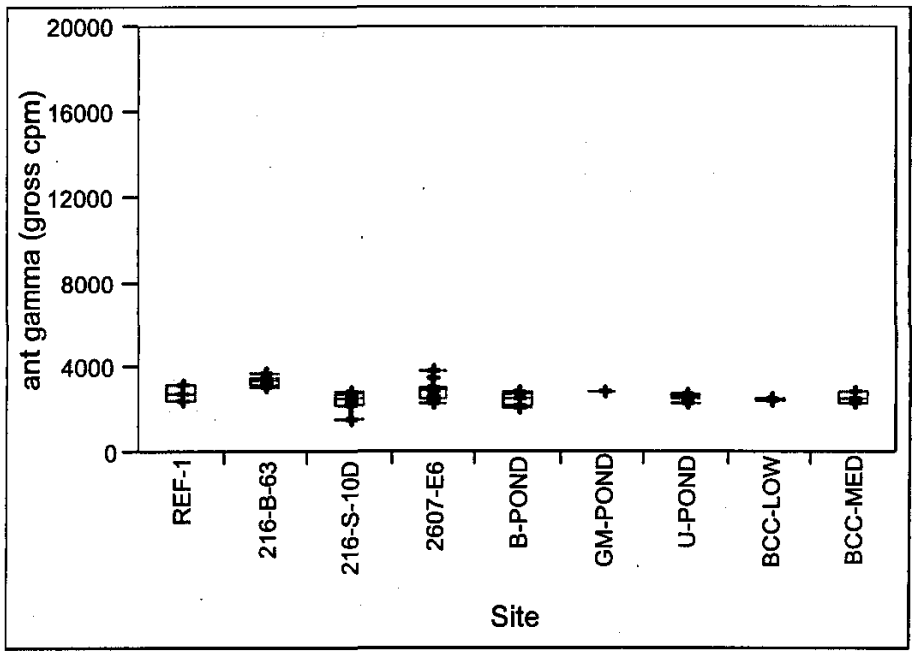


Figure B-6. Box Plots of Ant Gamma (gross cpm) by Site.

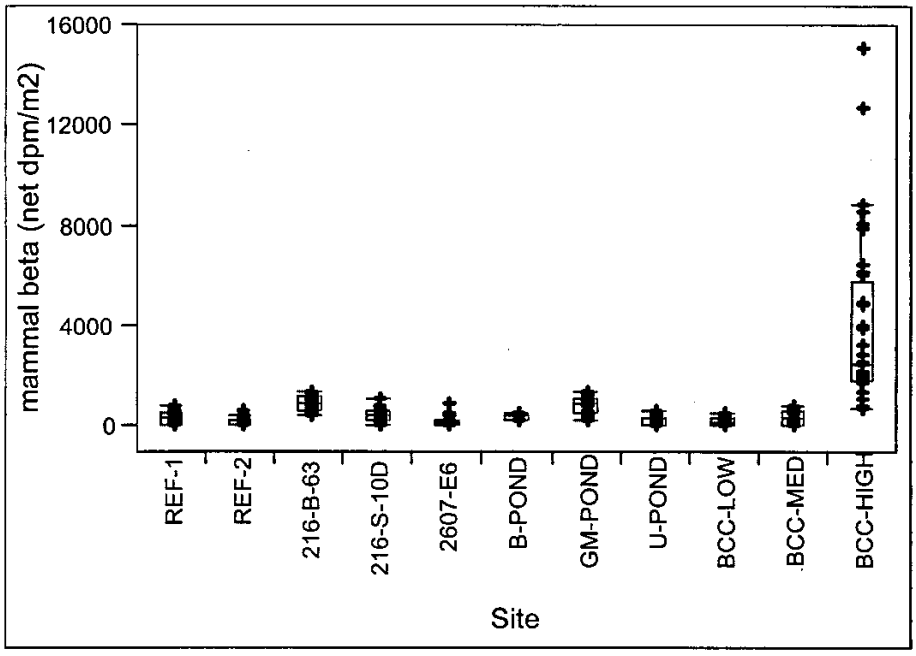


Figure B-7. Box Plots of Mammal Beta (net dpm/m^2) by Site.

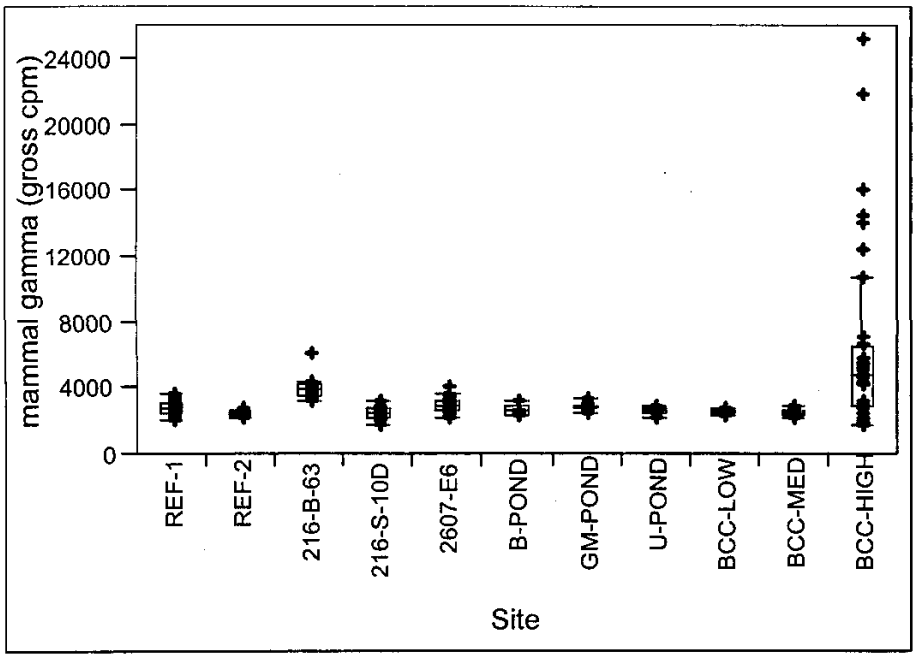


Figure B-8. Box Plots of Mammal Gamma (gross cpm) by Site.

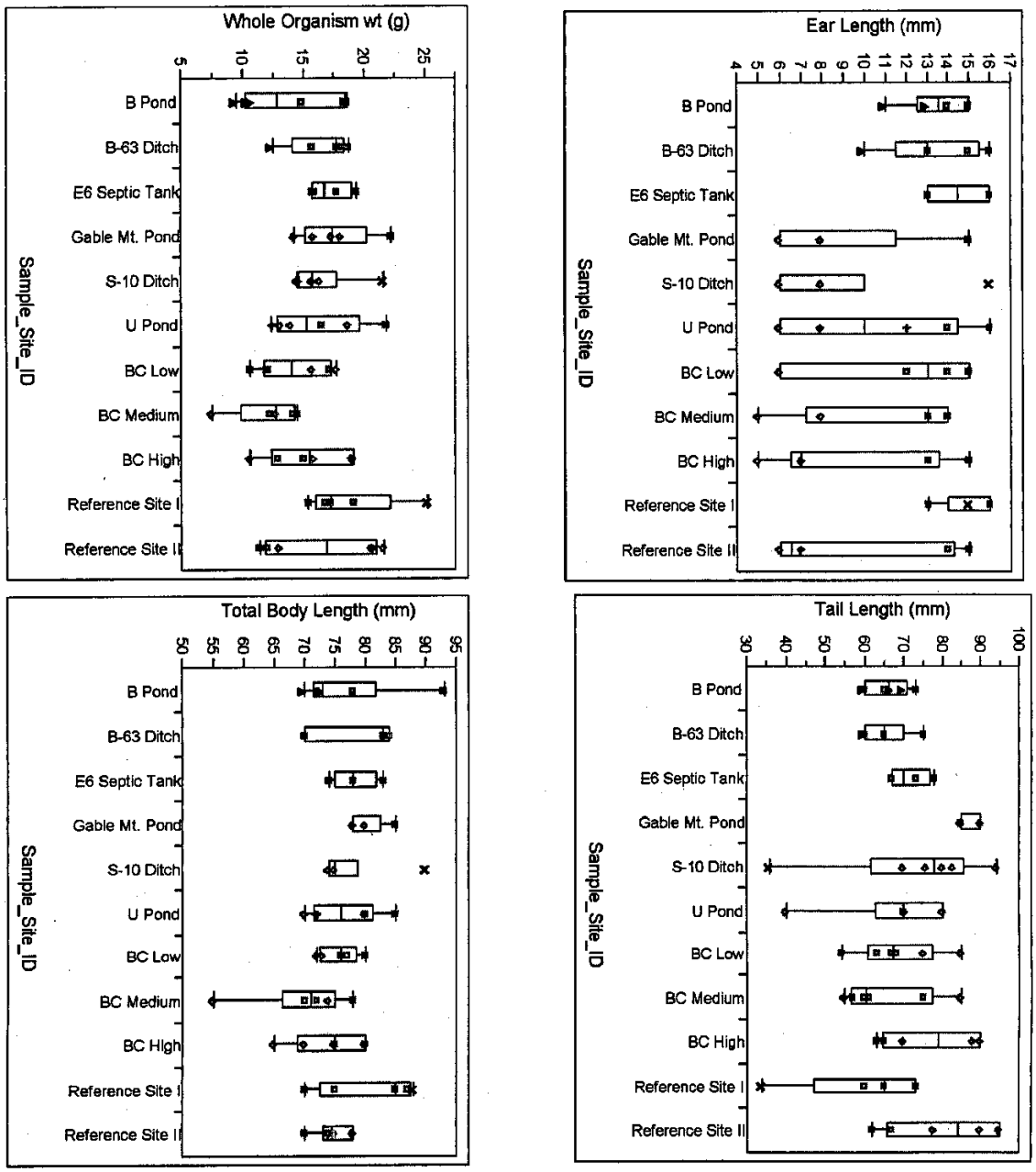


Figure B-9. Box Plots by Site ID for Small-Mammal Metrics for Animals Captured at Phase I and II Waste Sites. Symbols vary by species

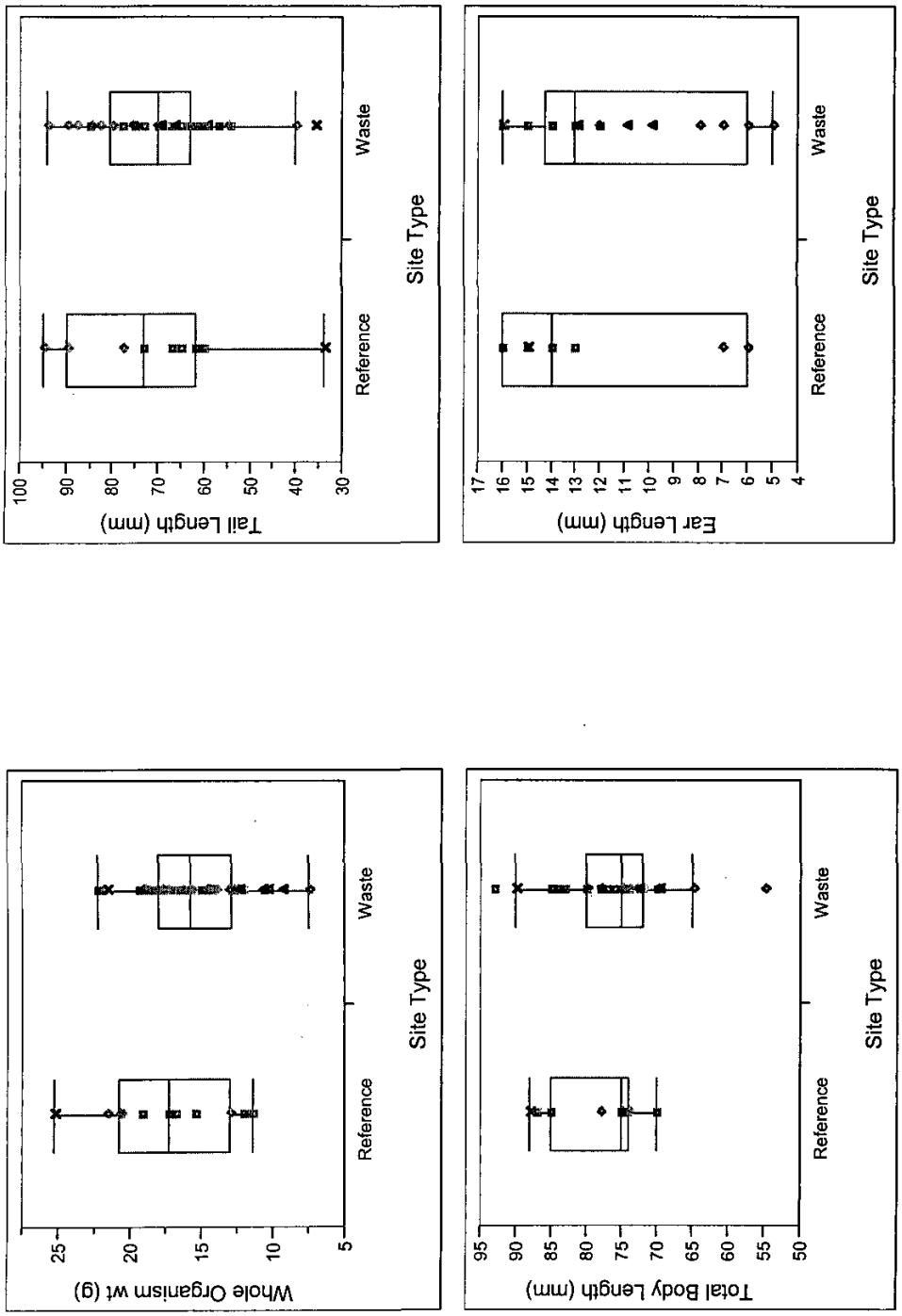


Figure B-10. Box Plots by Site Type for Small-Mammal Metrics for Animals Captured at Phase I and II Waste Sites. Symbols vary by species.

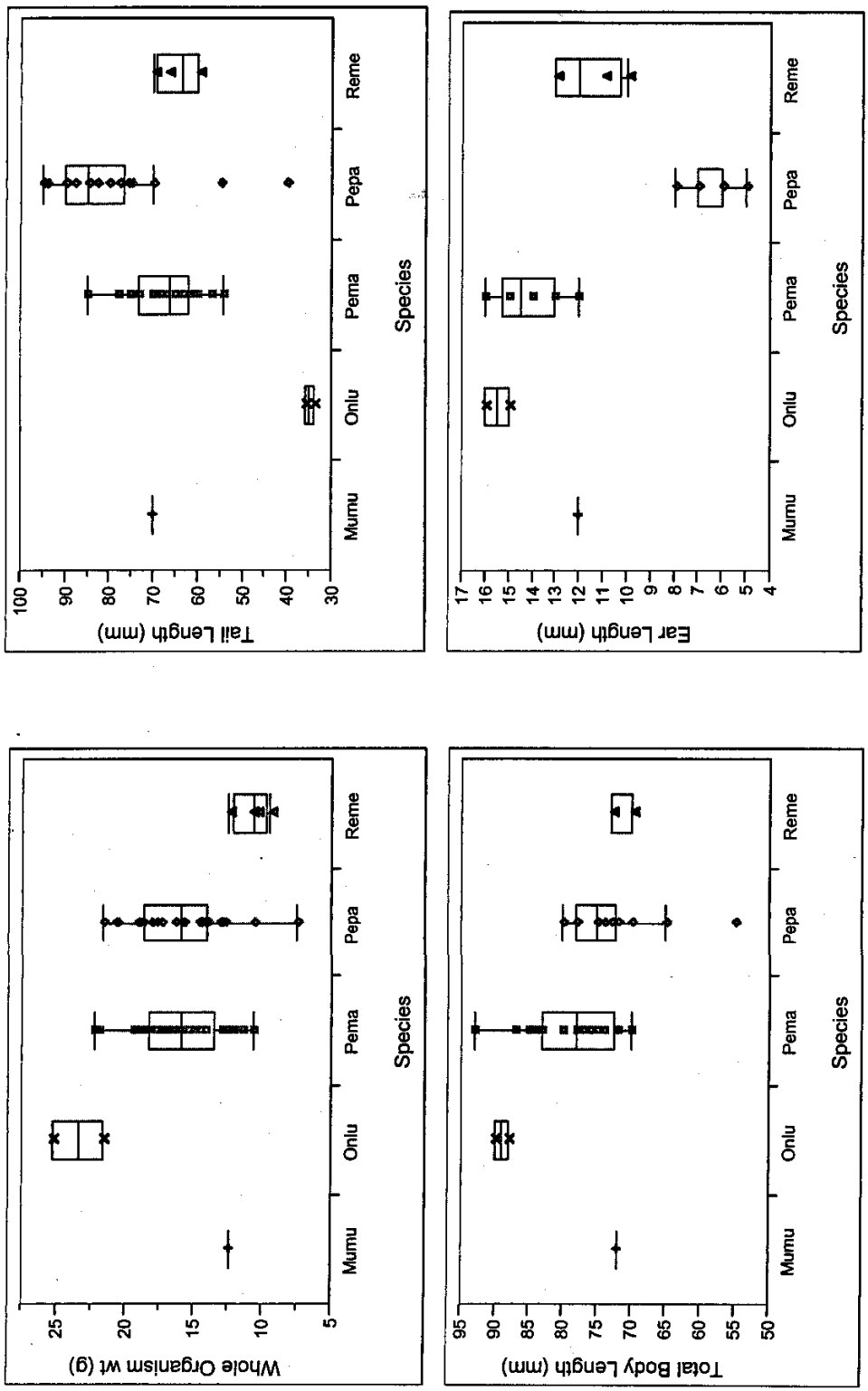


Figure B-11. Box Plots by Species for Small-Mammal Metrics for Animals Captured at Phase I and II Waste Sites. Symbols vary by species.

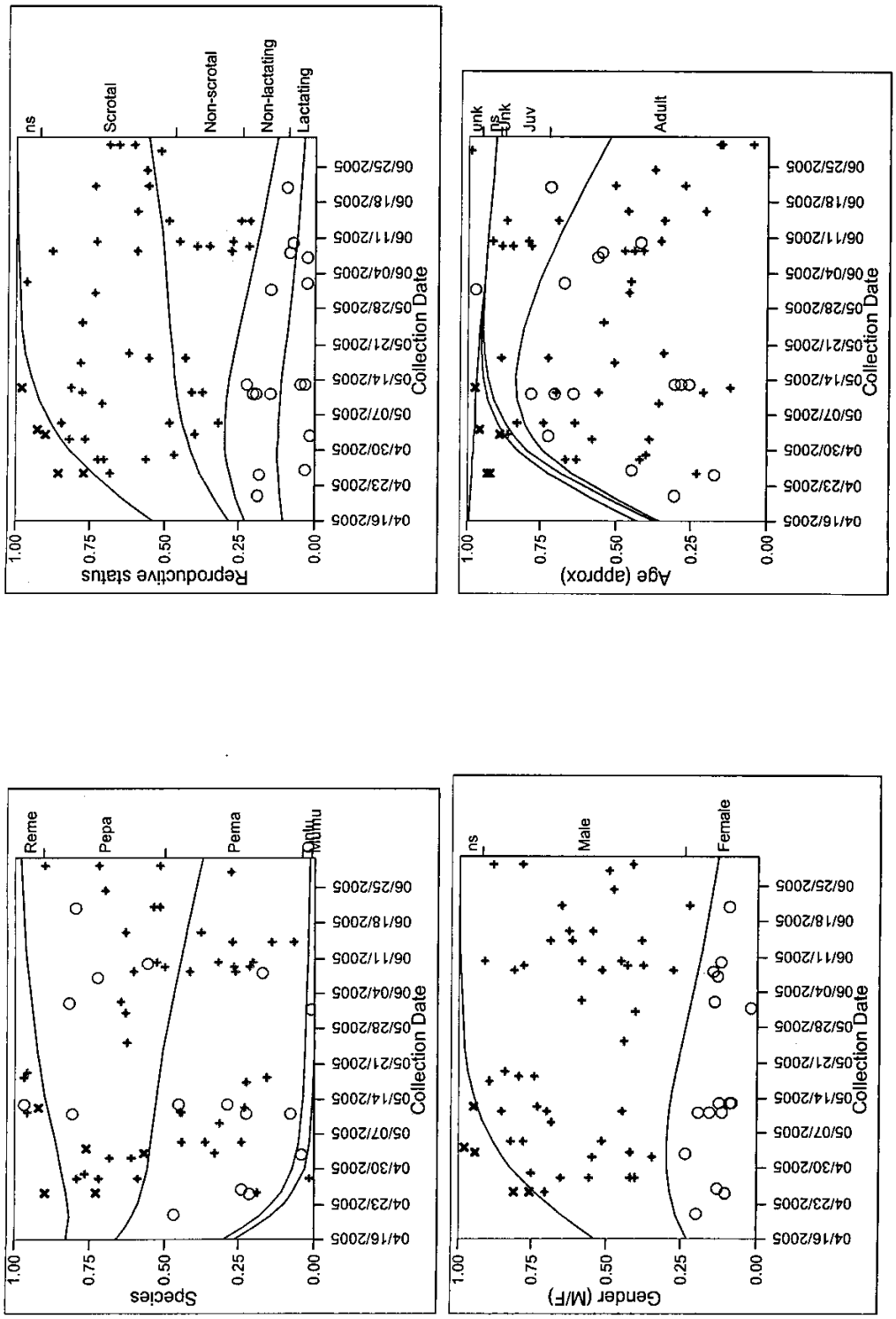
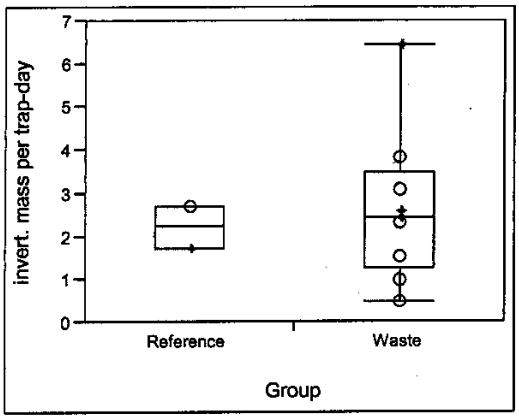
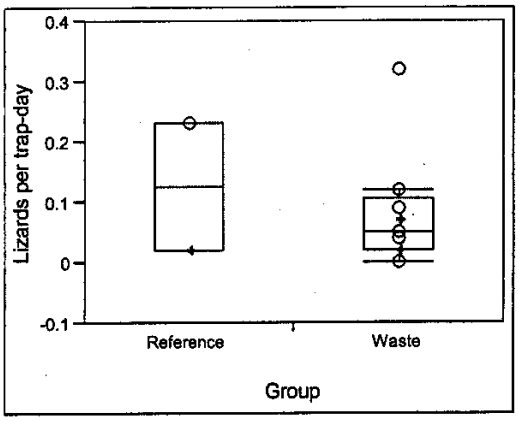


Figure B-12 Time Series Plots for Small-Mammals Captured at Phase I and II Waste Sites. Symbols vary by gender.





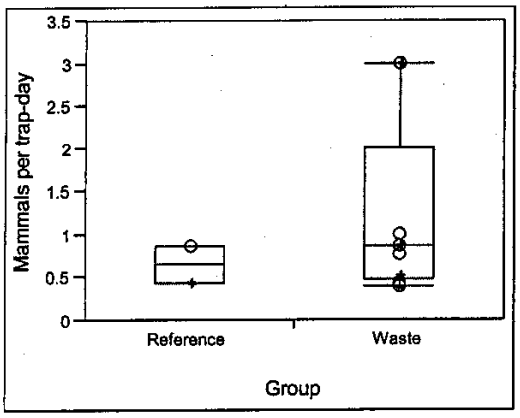
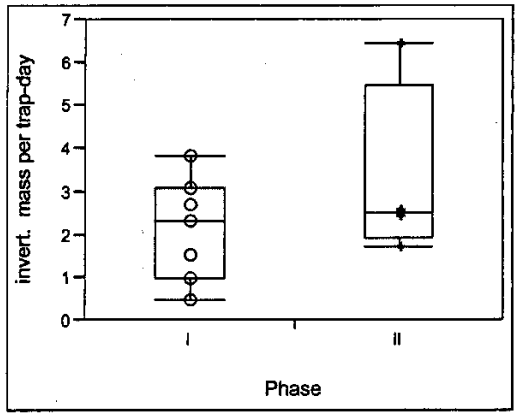
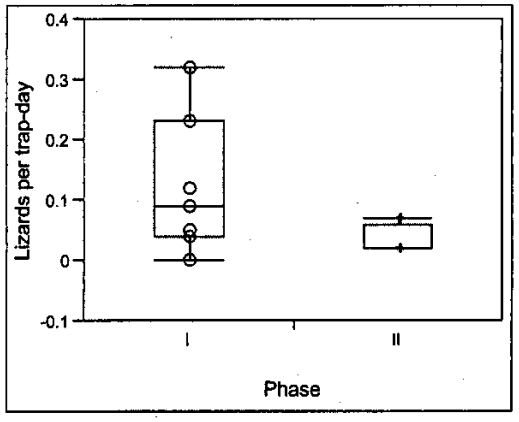


Figure B-13. Relative Animal Density for Site Types. Symbols vary by phase.





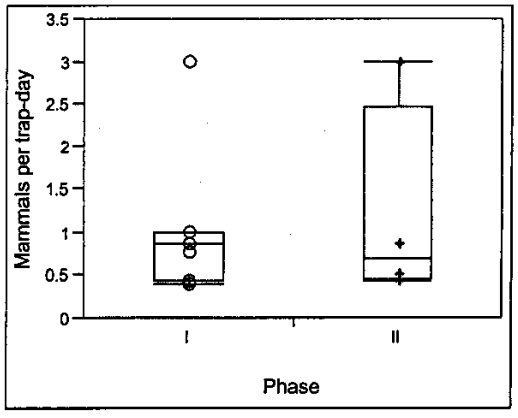


Figure B-14. Relative Animal Density by Phase. Symbols vary by phase.

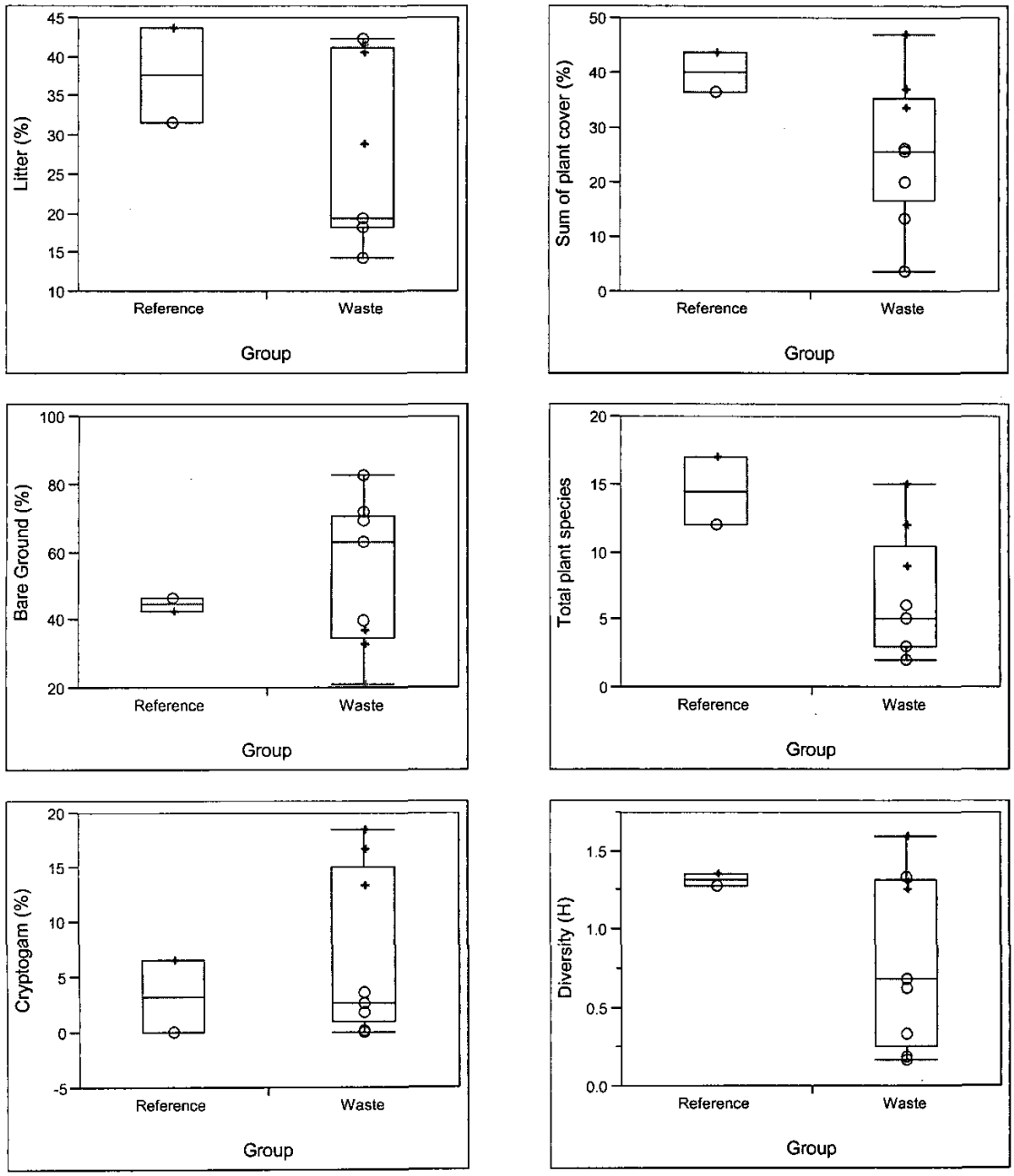


Figure B-15. Measures of Plant Cover and Density for Site Types. Symbols vary by phase.

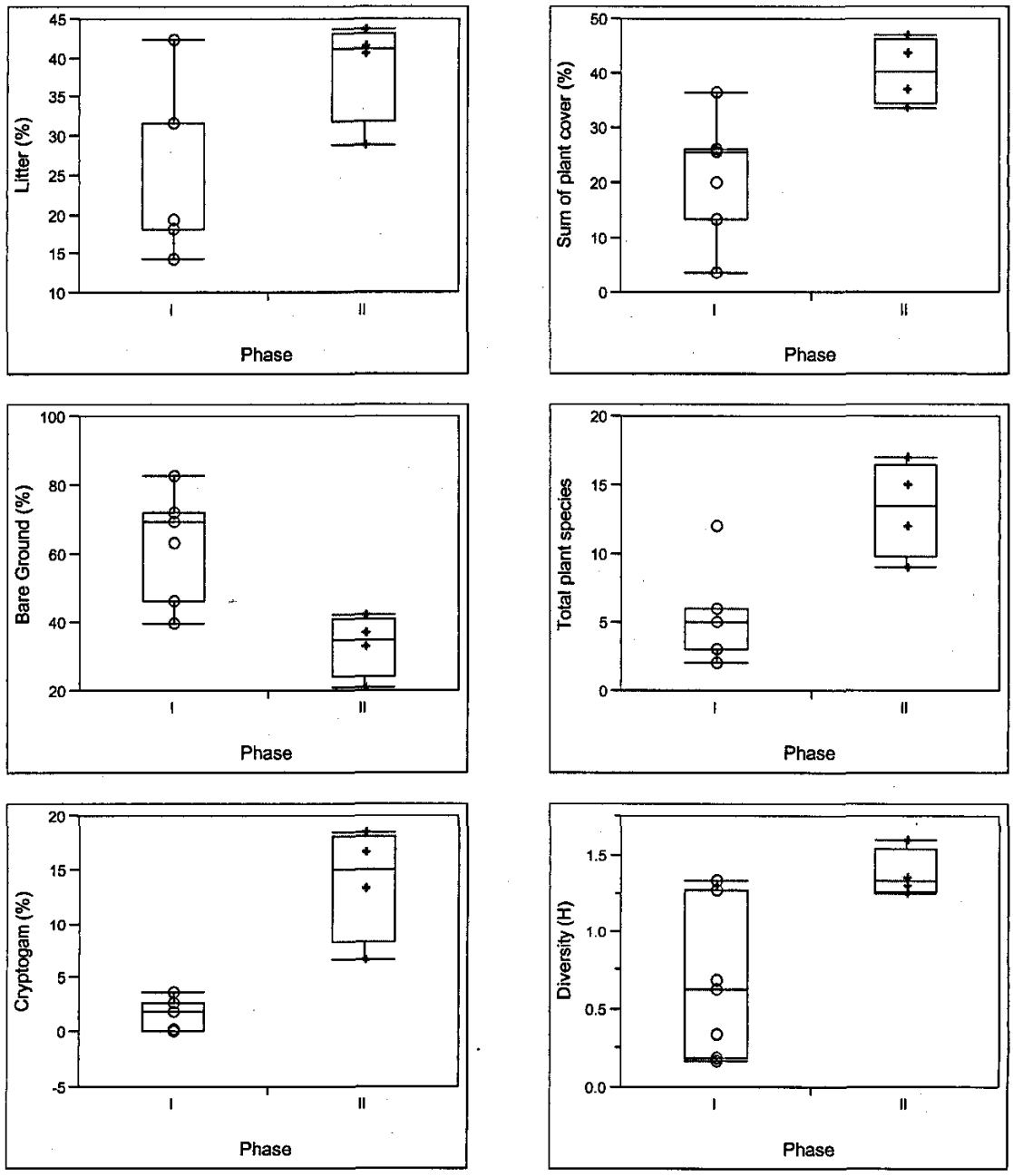


Figure B-16. Measures of Plant Cover and Density by Phase. Symbols vary by phase.

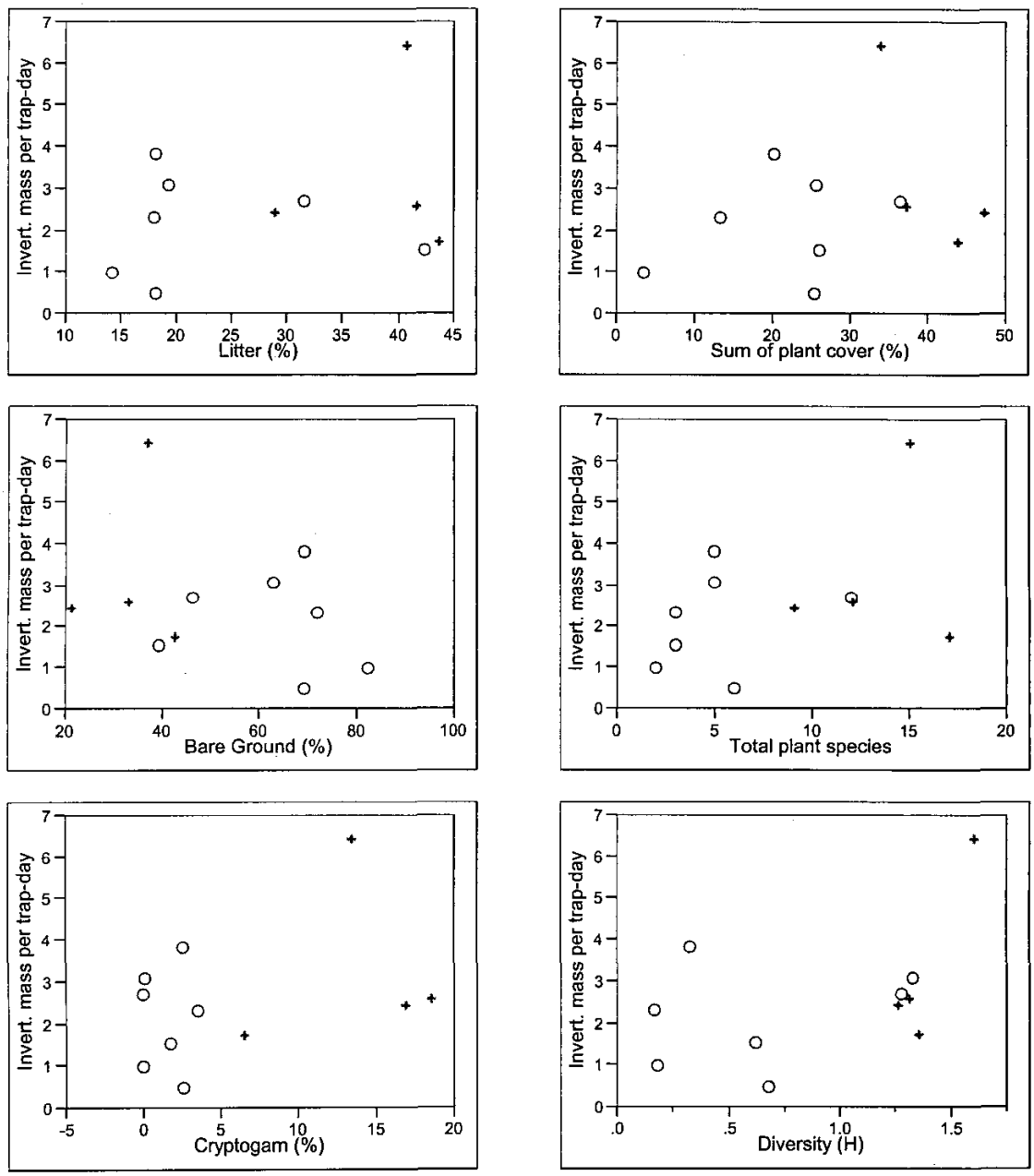


Figure B-17. Scatter Plots of Invertebrate Relative Density vs Measures of Plant Cover and Density. Symbols vary by phase.

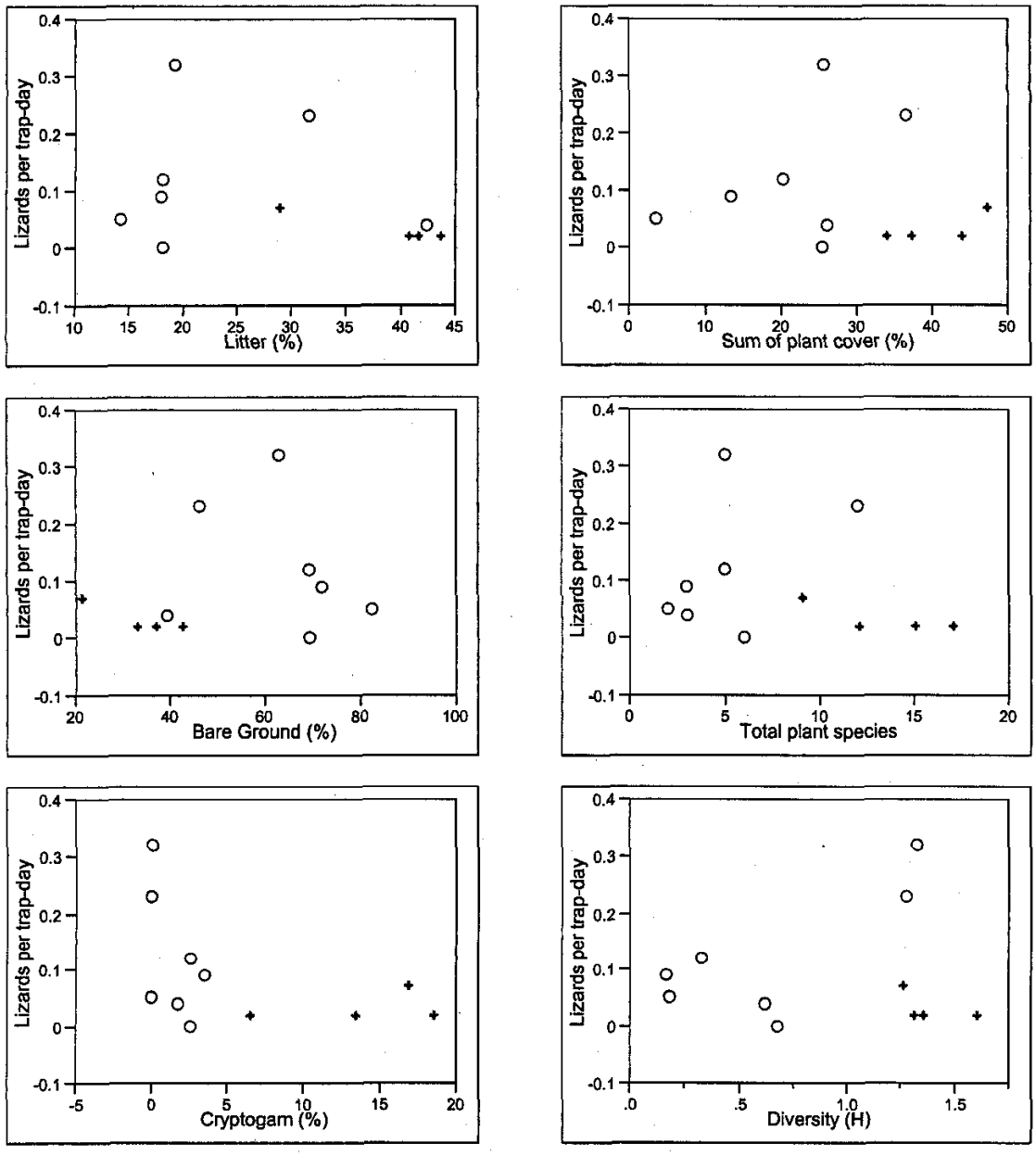


Figure B-18. Scatter Plots of Lizard Relative Density vs Measures of Plant Cover and Density. Symbols vary by phase.

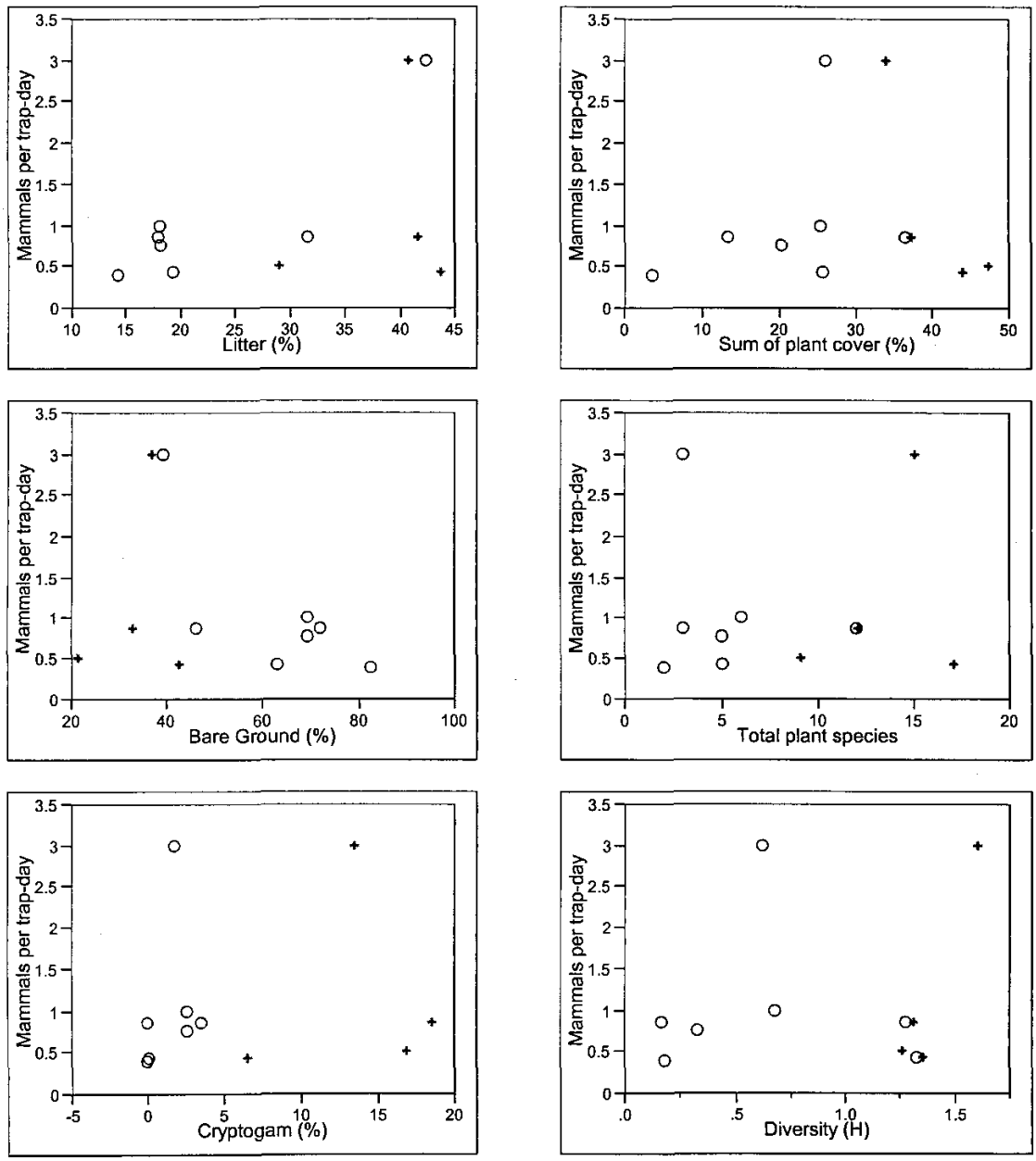
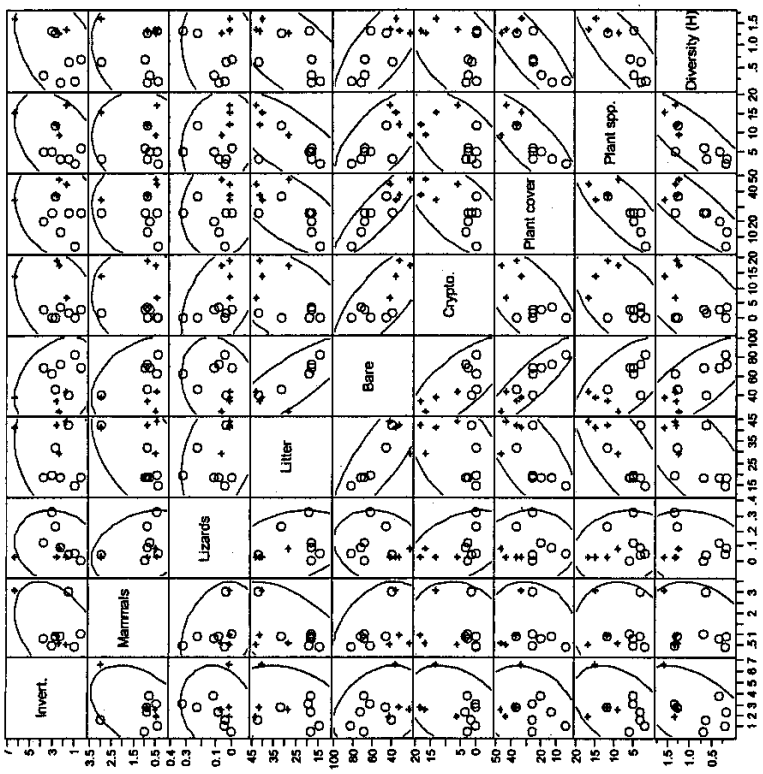


Figure B-19. Scatter Plots of Mammal Relative Density vs Measures of Plant Cover and Density. Symbols vary by phase.



Correlation matrix

	Invertebrate mass per trap-day	Mammals per trap-day	Lizards per trap-day	Litter (%)	Bare Ground (%)	Crypto-gam (%)	Sum of plant cover (%)	Total plant species	Diversity (H)
Invertebrate mass per trap-day	1.0000	0.4242	0.1684	0.2630	-0.3055	0.3641	0.2235	0.4179	0.4599
Mammals per trap-day	0.4242	1.0000	-0.3231	0.5227	-0.3335	0.1201	0.0537	0.0803	0.1392
Lizards per trap-day	0.1684	-0.3231	1.0000	-0.3401	0.1932	-0.4591	-0.0634	-0.1855	0.1525
Litter (%)	0.2630	0.5227	-0.3401	1.0000	-0.8207	0.5209	0.7011	0.7137	0.6483
Bare Ground (%)	-0.3055	-0.3335	0.1932	-0.8207	1.0000	-0.7440	-0.8876	-0.6472	-0.7448
Cryptogam (%)	0.3641	0.1201	-0.4591	0.5209	-0.7440	1.0000	0.6203	0.5448	0.5271
Sum of plant cover (%)	0.2235	0.0537	-0.0634	0.7011	-0.8876	0.6203	1.0000	0.7937	0.8362
Total plant species	0.4179	0.0803	-0.1855	0.7137	-0.6472	0.5448	0.7937	1.0000	0.8214
Diversity (H)	0.4599	0.1392	0.1525	0.6483	-0.7448	0.5271	0.8362	0.8214	1.0000

Figure B-20. Scatterplot Matrix of Relative Animal Density and Plant Measures. Symbols vary by phase.

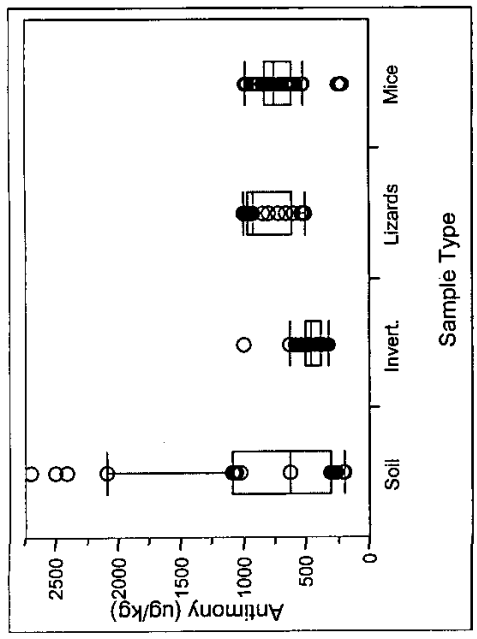


Figure B-21. Box Plots of Antimony by Sample Type.
Open circles are non-detects and filled circles are detects.

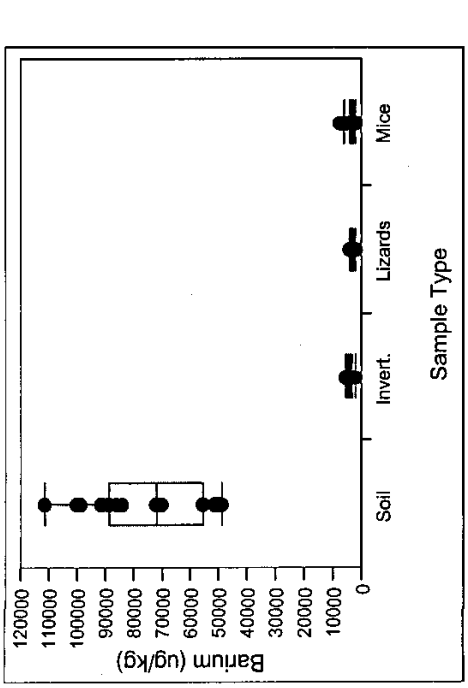


Figure B-23. Box Plots of Barium by Sample Type.
Open circles are non-detects and filled circles are detects.

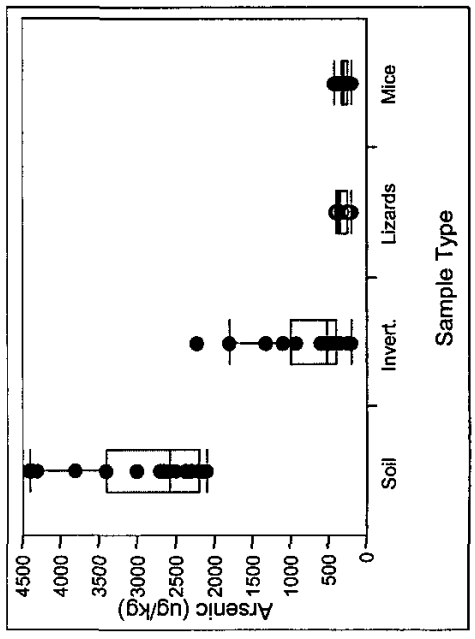


Figure B-22. Box Plots of Arsenic by Sample Type.
Open circles are non-detects and filled circles are detects.

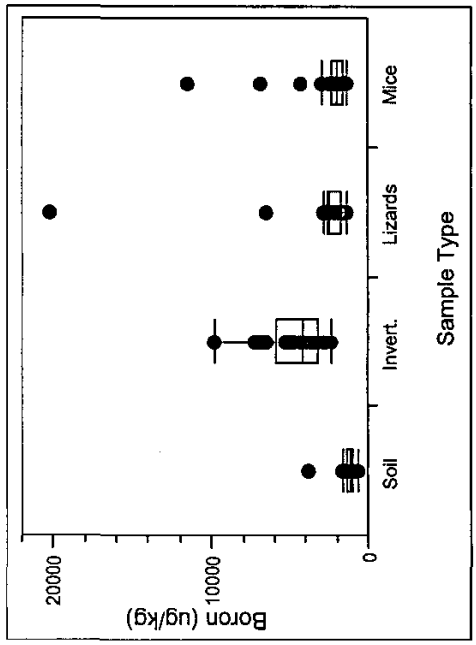


Figure B-24. Box Plots of Boron by Sample Type.
Open circles are non-detects and filled circles are detects.

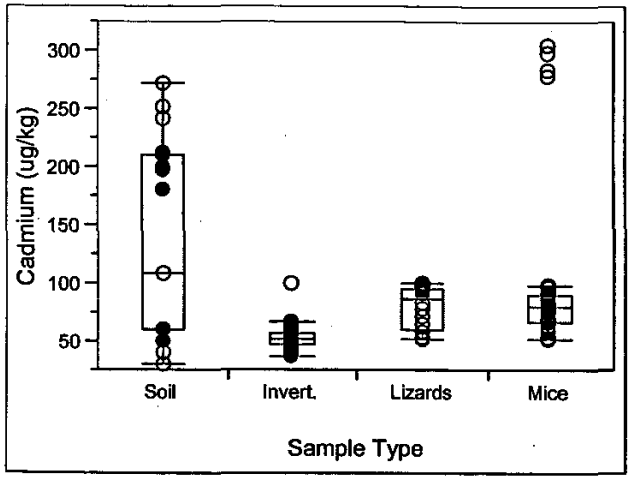


Figure B-25. Box Plots of Cadmium by Sample Type. Open circles are non-detects and filled circles are detects.

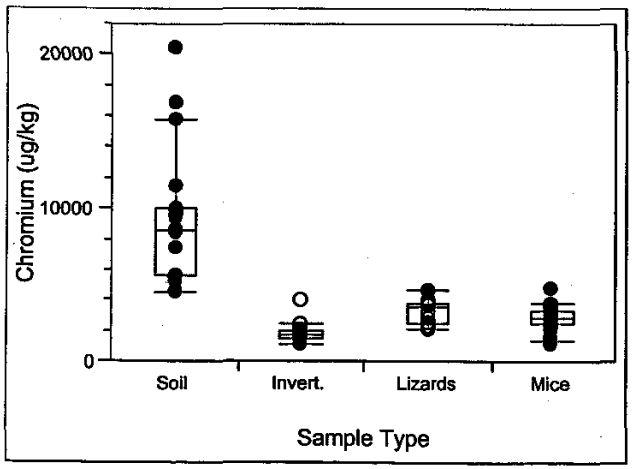


Figure B-26. Box Plots of Chromium by Sample Type. Open circles are non-detects and filled circles are detects.

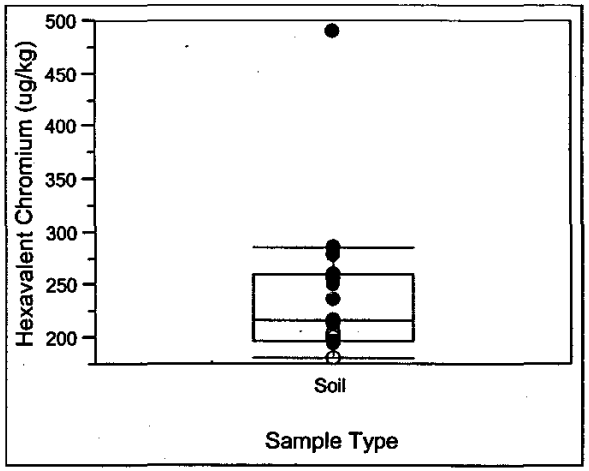


Figure B-27. Box Plots of Hexavalent Chromium by Sample Type. Open circles are non-detects and filled circles are detects.

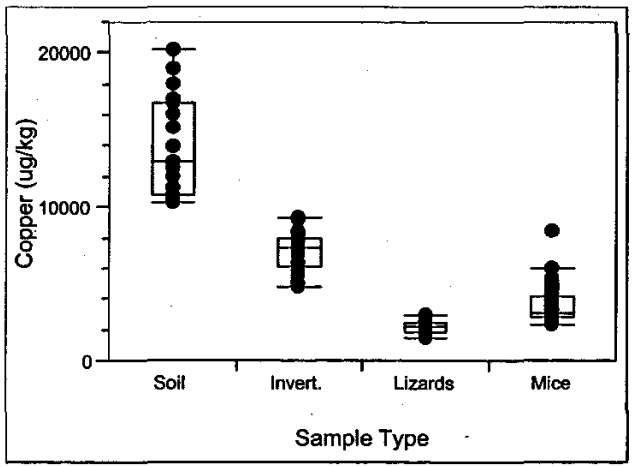


Figure B-28. Box Plots of Copper by Sample Type. Open circles are non-detects and filled circles are detects.

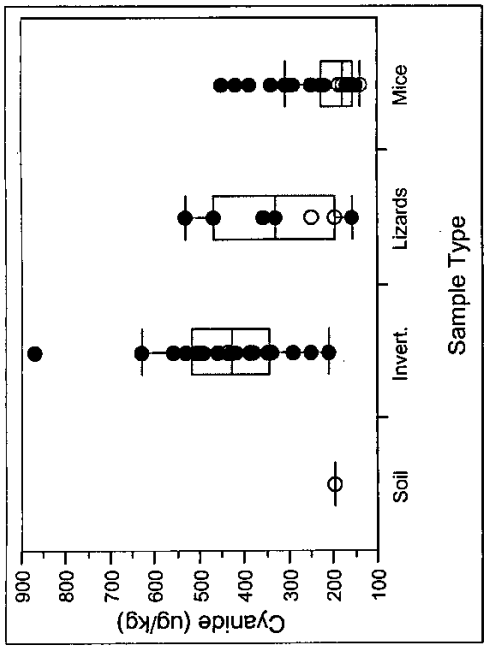


Figure B-29. Box Plots of Cyanide by Sample Type. Open circles are non-detects and filled circles are detects.

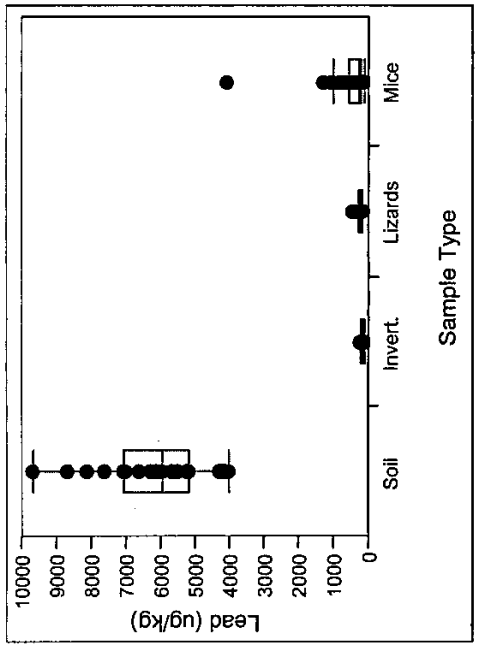


Figure B-30. Box Plots of Lead by Sample Type. Open circles are non-detects and filled circles are detects.

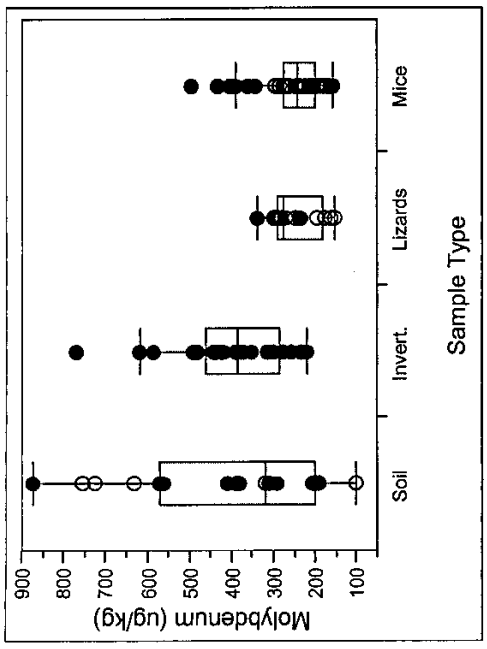


Figure B-31. Box Plots of Molybdenum by Sample Type. Open circles are non-detects and filled circles are detects.

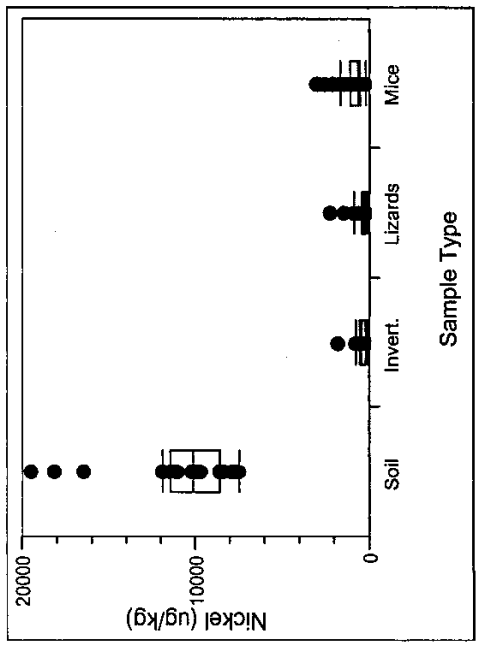


Figure B-32. Box Plots of Nickel by Sample Type. Open circles are non-detects and filled circles are detects.

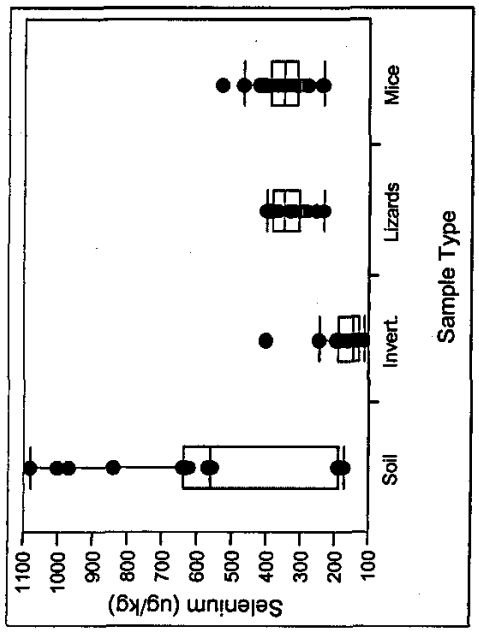


Figure B-33. Box Plots of Selenium by Sample Type.
Open circles are non-detects and filled circles are detects.

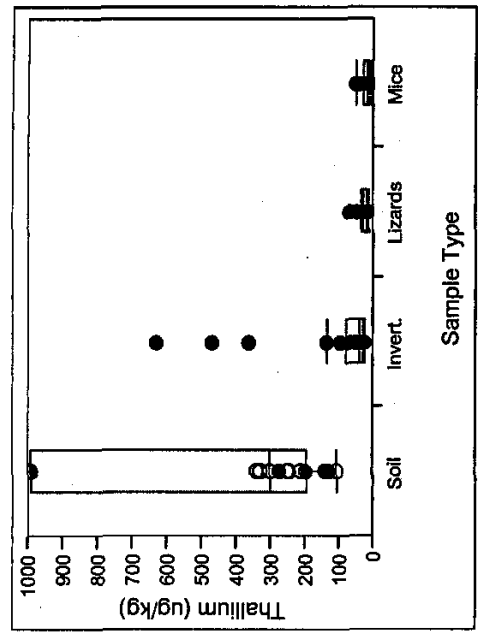


Figure B-35. Box Plots of Thallium by Sample Type.
Open circles are non-detects and filled circles are detects.

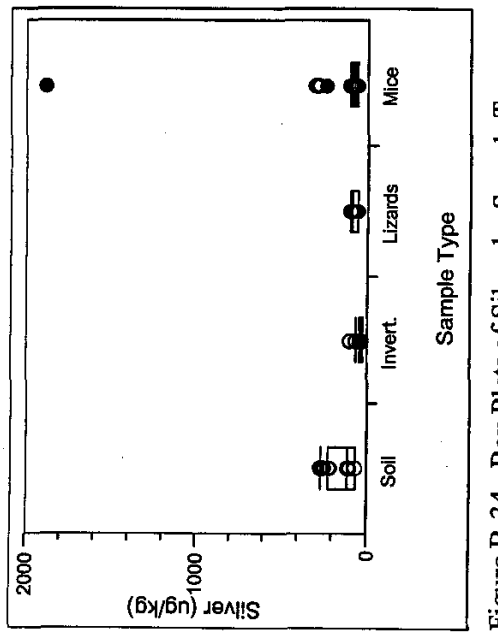


Figure B-34. Box Plots of Silver by Sample Type.
Open circles are non-detects and filled circles are detects.

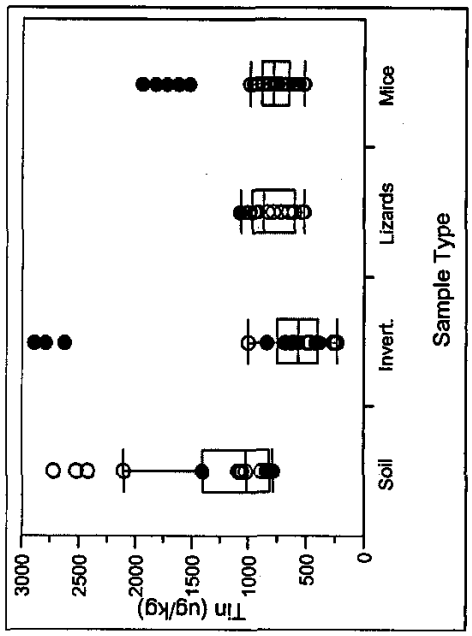


Figure B-36. Box Plots of Tin by Sample Type.
Open circles are non-detects and filled circles are detects.

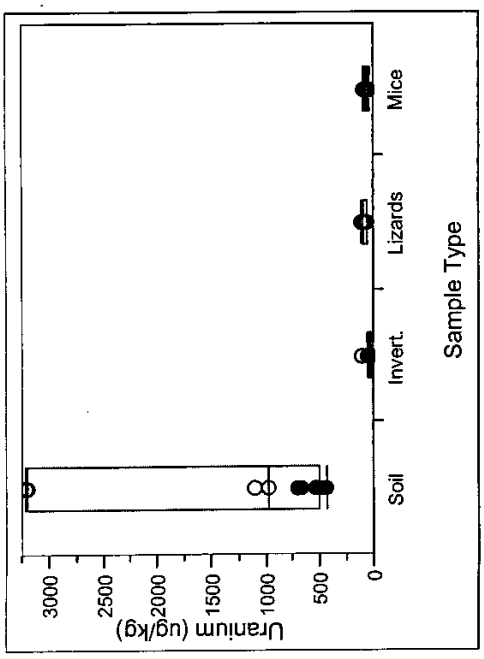


Figure B-37. Box Plots of Uranium by Sample Type. Open circles are non-detects and filled circles are detects.

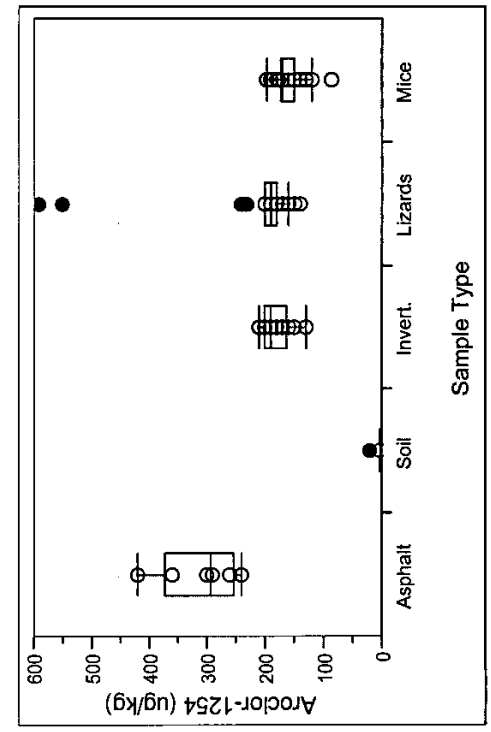


Figure B-39. Box Plots of Zinc by Sample Type. Open circles are non-detects and filled circles are detects.

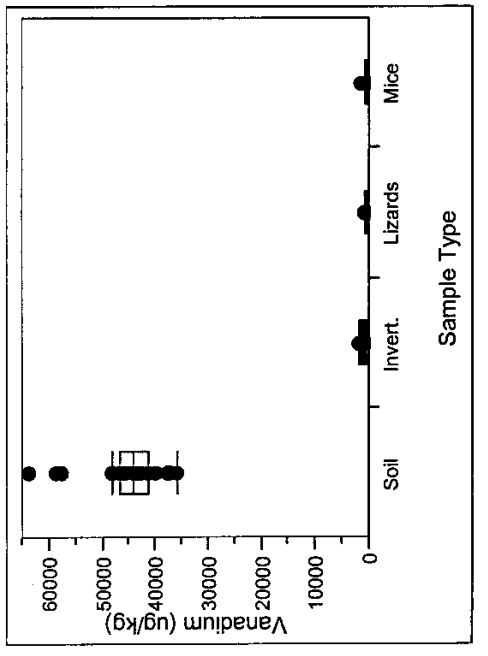


Figure B-38. Box Plots of Vanadium by Sample Type. Open circles are non-detects and filled circles are detects.

Figure B-40. Box Plots of Aroclor-1254 by Sample Type. Open circles are non-detects and filled circles are detects.

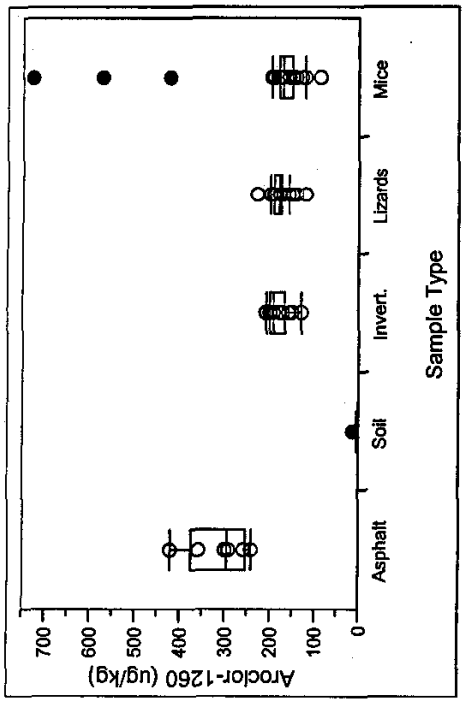


Figure B-41. Box Plots of Aroclor-1260 by Sample Type. Open circles are non-detects and filled circles are detects.

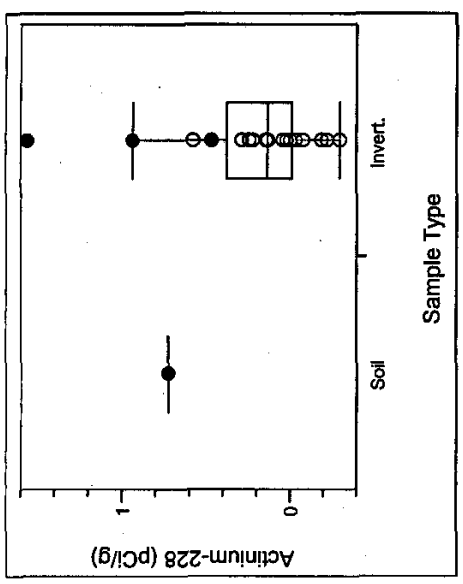


Figure B-43. Box Plots of Actinium-228 by Sample Type. Open circles are non-detects and filled circles are detects.

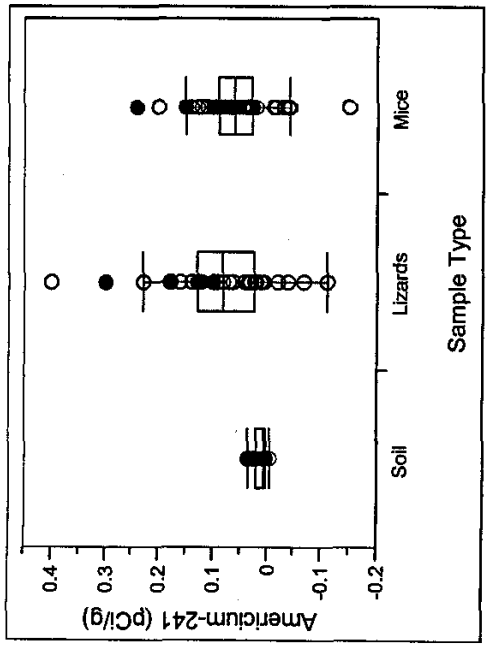


Figure B-42. Box Plots of Americium-241 by Sample Type. Open circles are non-detects and filled circles are detects.

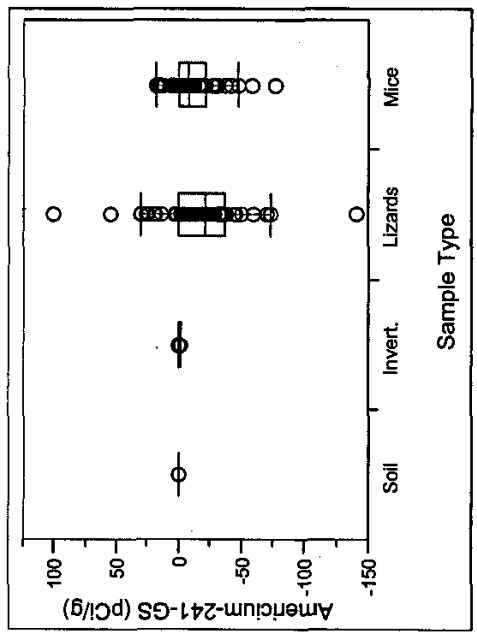


Figure B-44. Box Plots of Americium-241-GS by Sample Type. Open circles are non-detects and filled circles are detects.

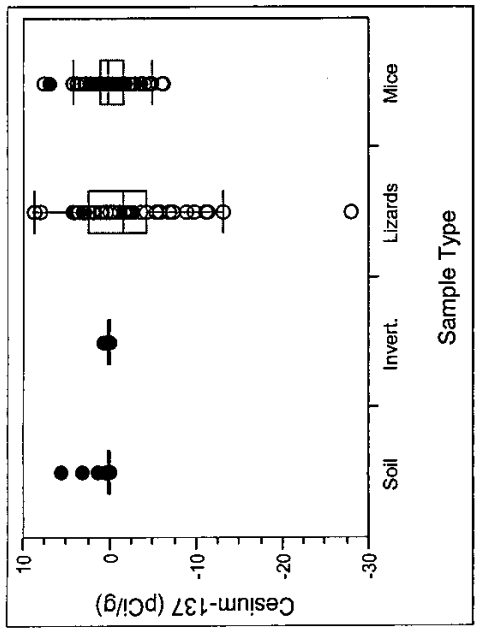


Figure B-47. Box Plots of Cesium-137 by Sample Type. Open circles are non-detects and filled circles are detects.

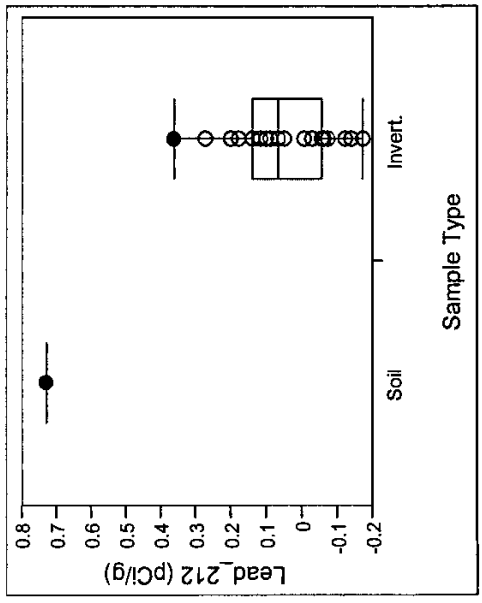


Figure B-48. Box Plots of Lead-212 by Sample Type. Open circles are non-detects and filled circles are detects.

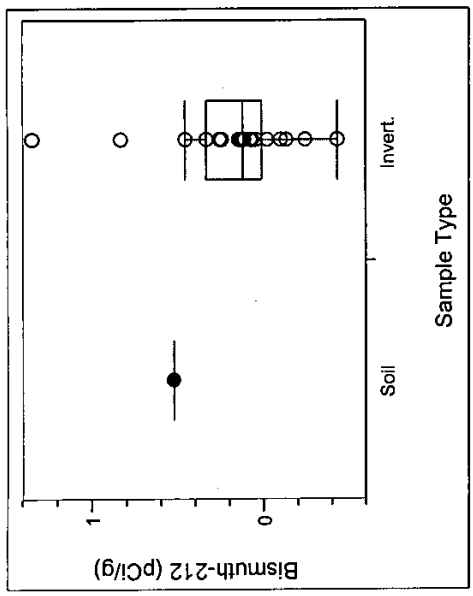


Figure B-45. Box Plots of Bismuth-212 by Sample Type. Open circles are non-detects and filled circles are detects.

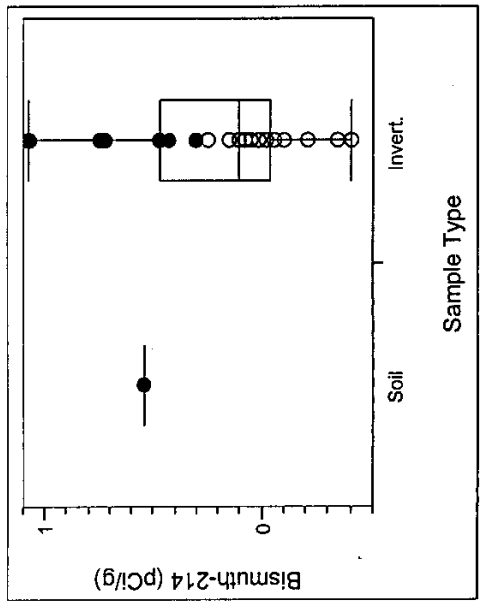


Figure B-46. Box Plots of Bismuth-214 by Sample Type. Open circles are non-detects and filled circles are detects.

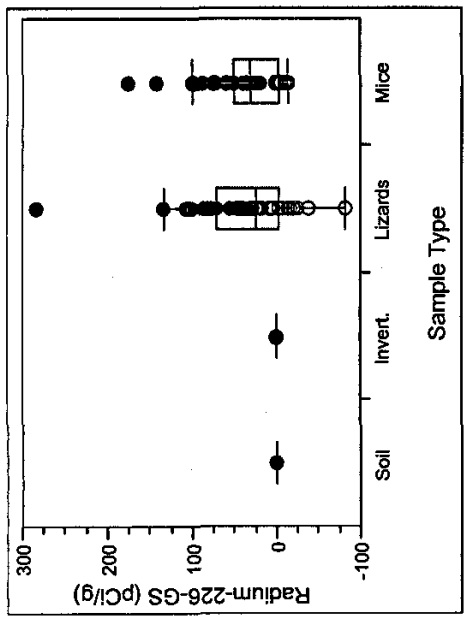


Figure B-51. Box Plots of Radium-226-GS by Sample Type. Open circles are non-detects and filled circles are detects.

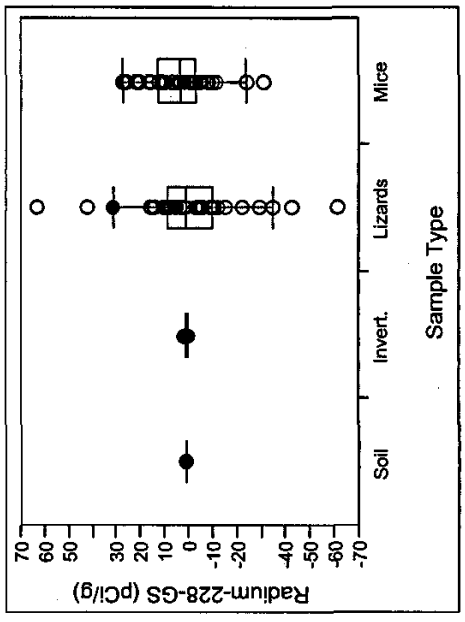


Figure B-52. Box Plots of Radium-228-GS by Sample Type. Open circles are non-detects and filled circles are detects.

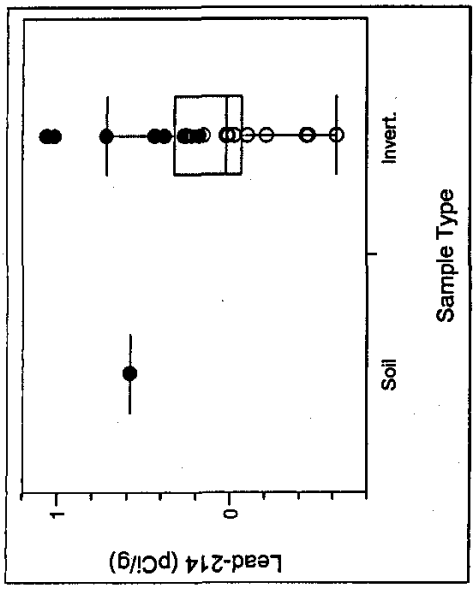


Figure B-49. Box Plots of Lead-214 by Sample Type. Open circles are non-detects and filled circles are detects.

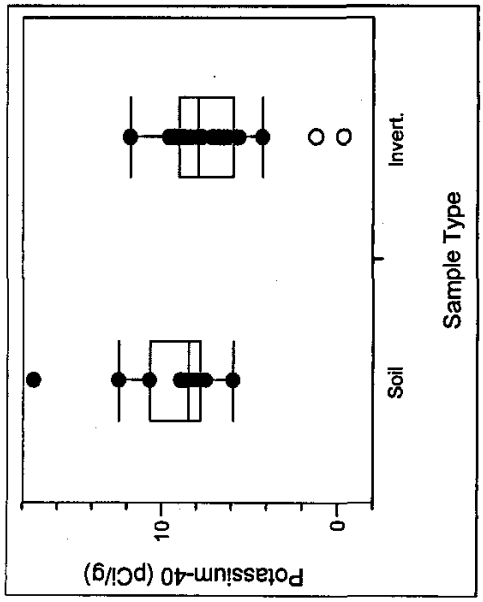


Figure B-50. Box Plots of Potassium-40 by Sample Type. Open circles are non-detects and filled circles are detects.

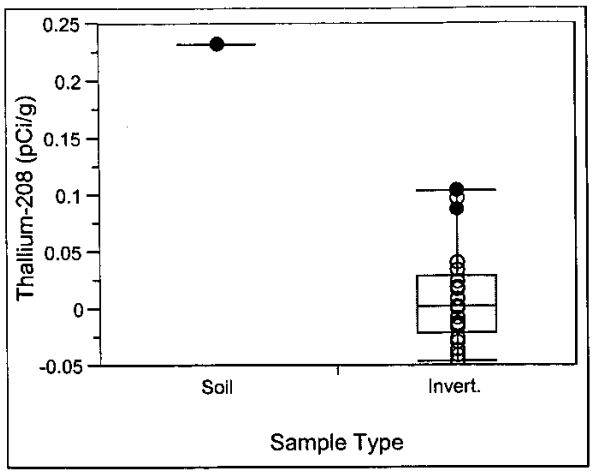


Figure B-53. Box Plots of Thallium-208 by Sample Type. Open circles are non-detects and filled circles are detects.

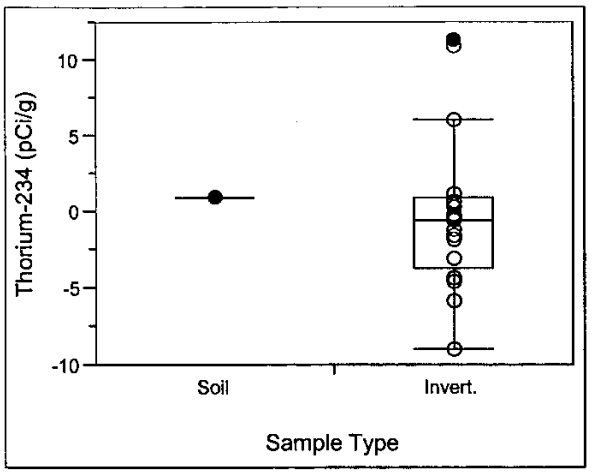


Figure B-54. Box Plots of Thorium-234 by Sample Type. Open circles are non-detects and filled circles are detects.

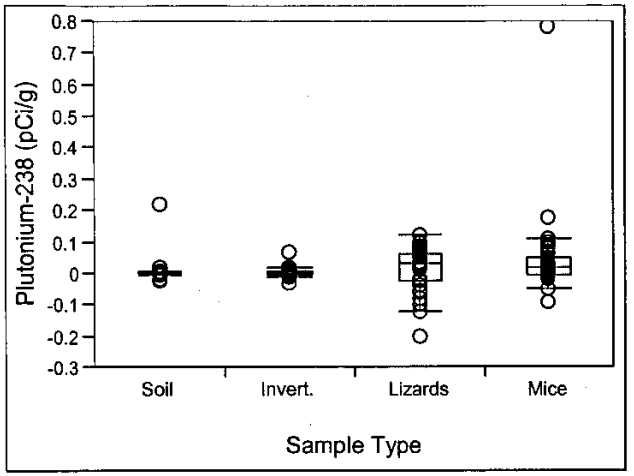


Figure B-55. Box Plots of Plutonium-238 by Sample Type. Open circles are non-detects and filled circles are detects.

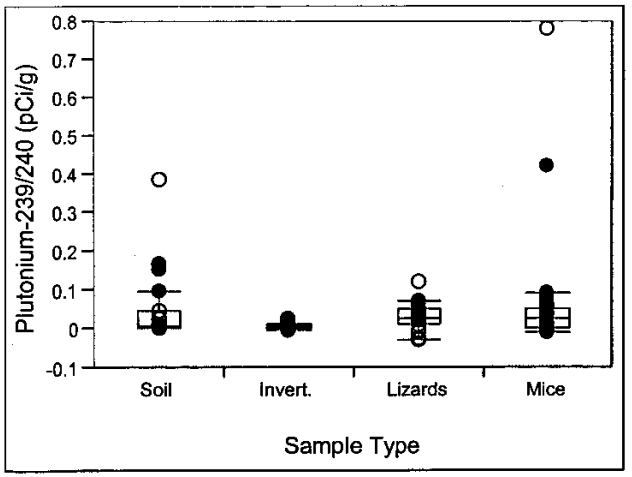


Figure B-56. Box Plots of Plutonium-239/240 by Sample Type. Open circles are non-detects and filled circles are detects.

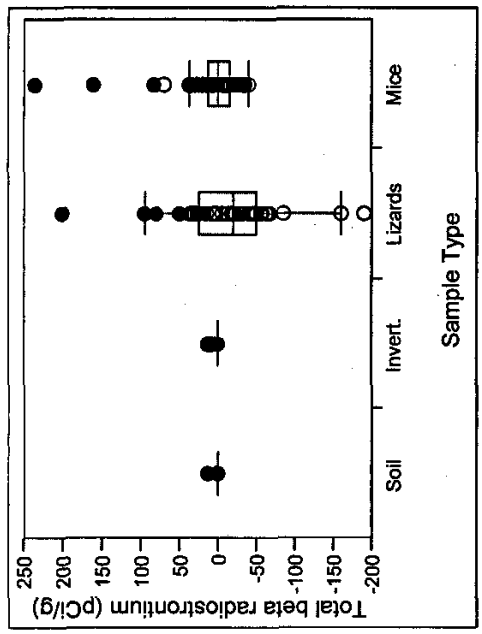


Figure B-59. Box Plots of Total Beta Radiostrontium by Sample Type. Open circles are non-detects and filled circles are detects.

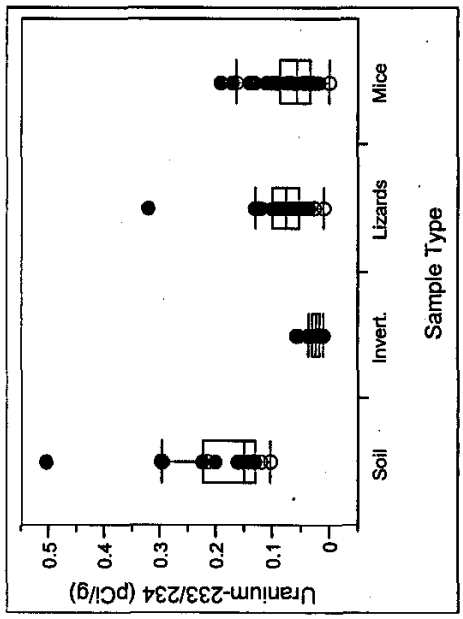


Figure B-60. Box Plots of Uranium-233/234 by Sample Type. Open circles are non-detects and filled circles are detects.

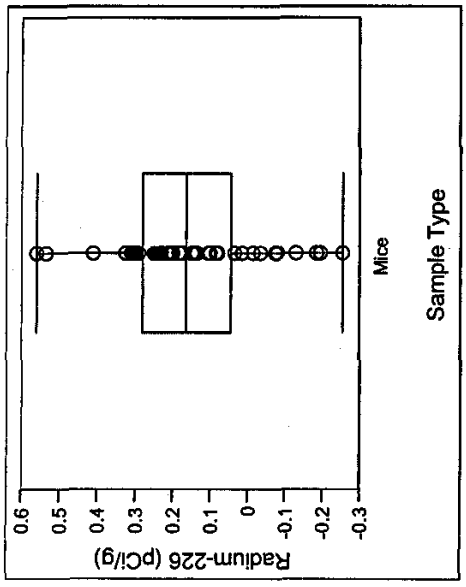


Figure B-57. Box Plots of Radium-226 by Sample Type. Open circles are non-detects and filled circles are detects.

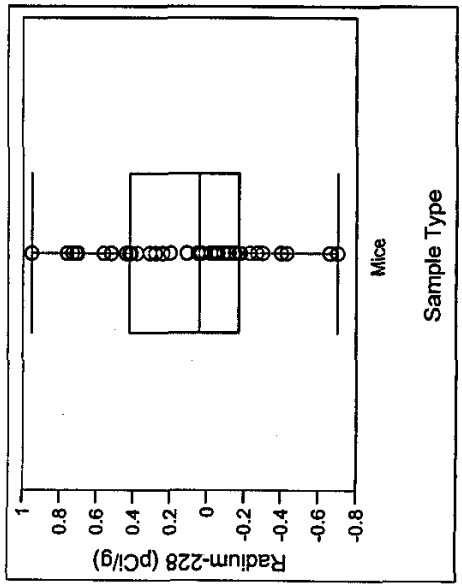


Figure B-58. Box Plots of Radium-228 by Sample Type. Open circles are non-detects and filled circles are detects.

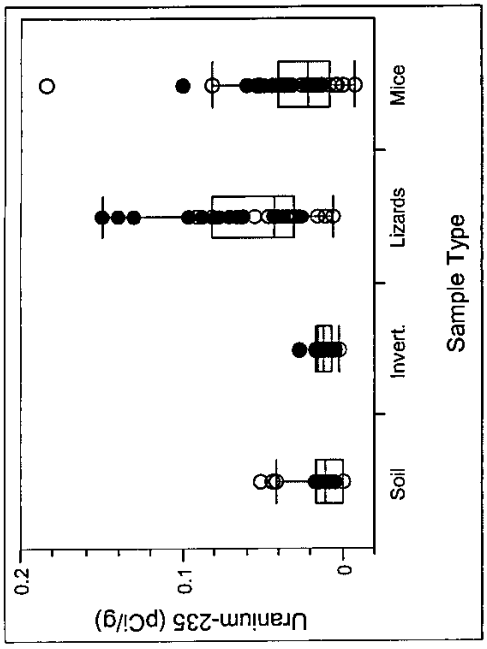


Figure B-61. Box Plots of Uranium-235 by Sample Type. Open circles are non-detects and filled circles are detects.

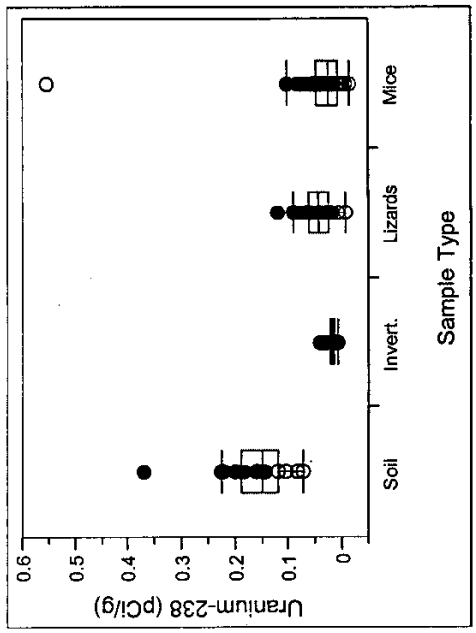


Figure B-62. Box Plots of Uranium-238 by Sample Type. Open circles are non-detects and filled circles are detects.

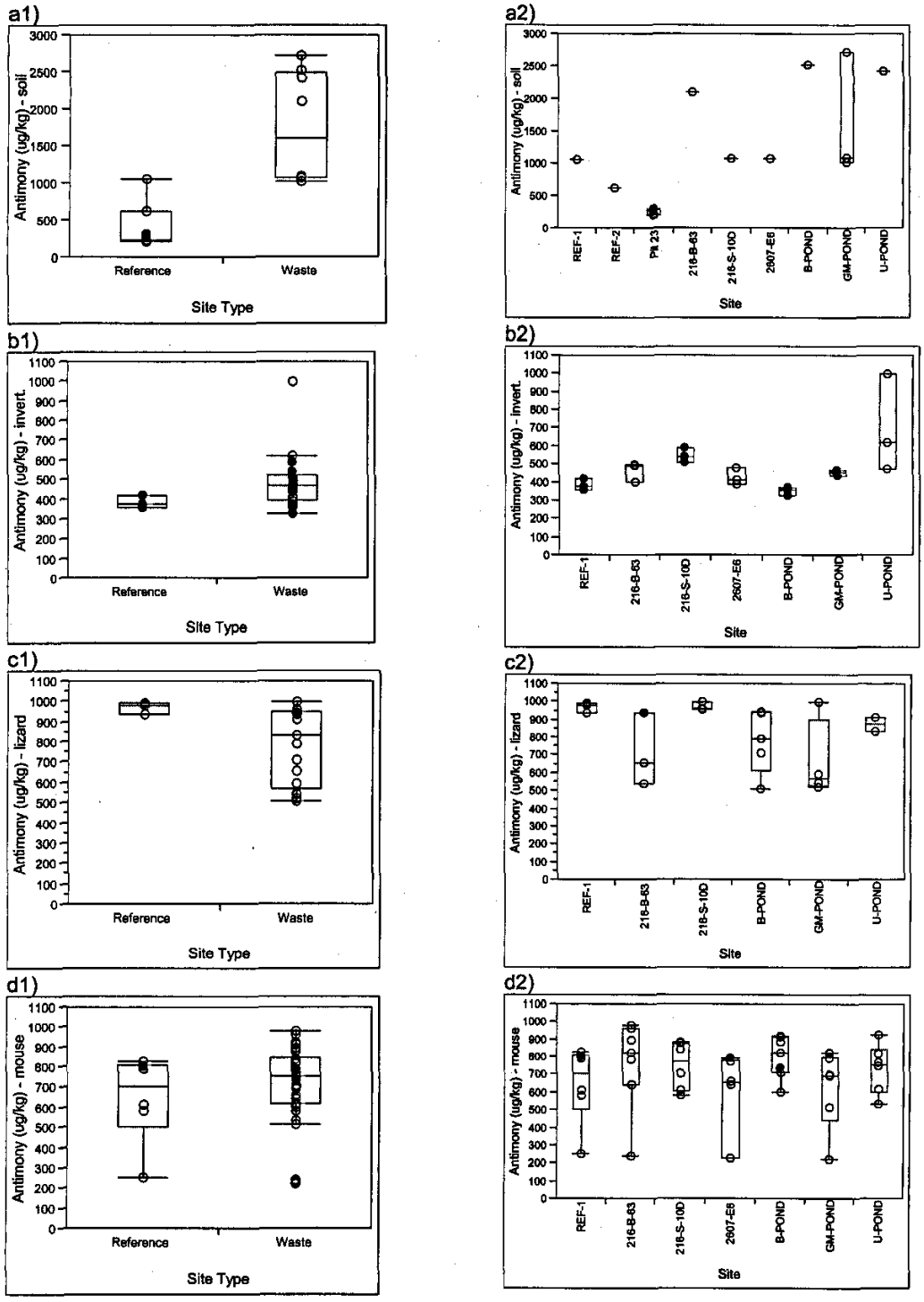


Figure B-63. Antimony Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

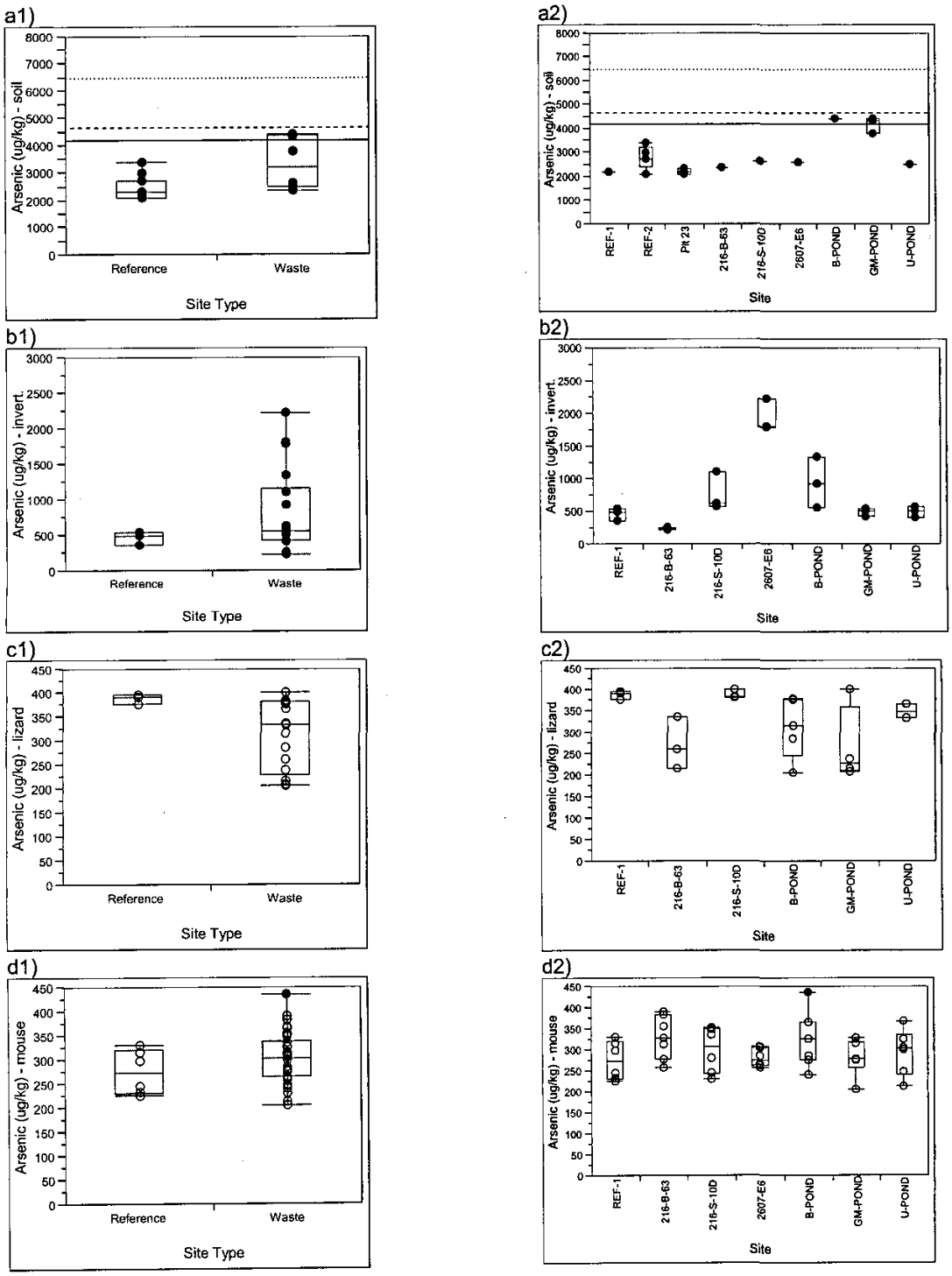


Figure B-64. Arsenic Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

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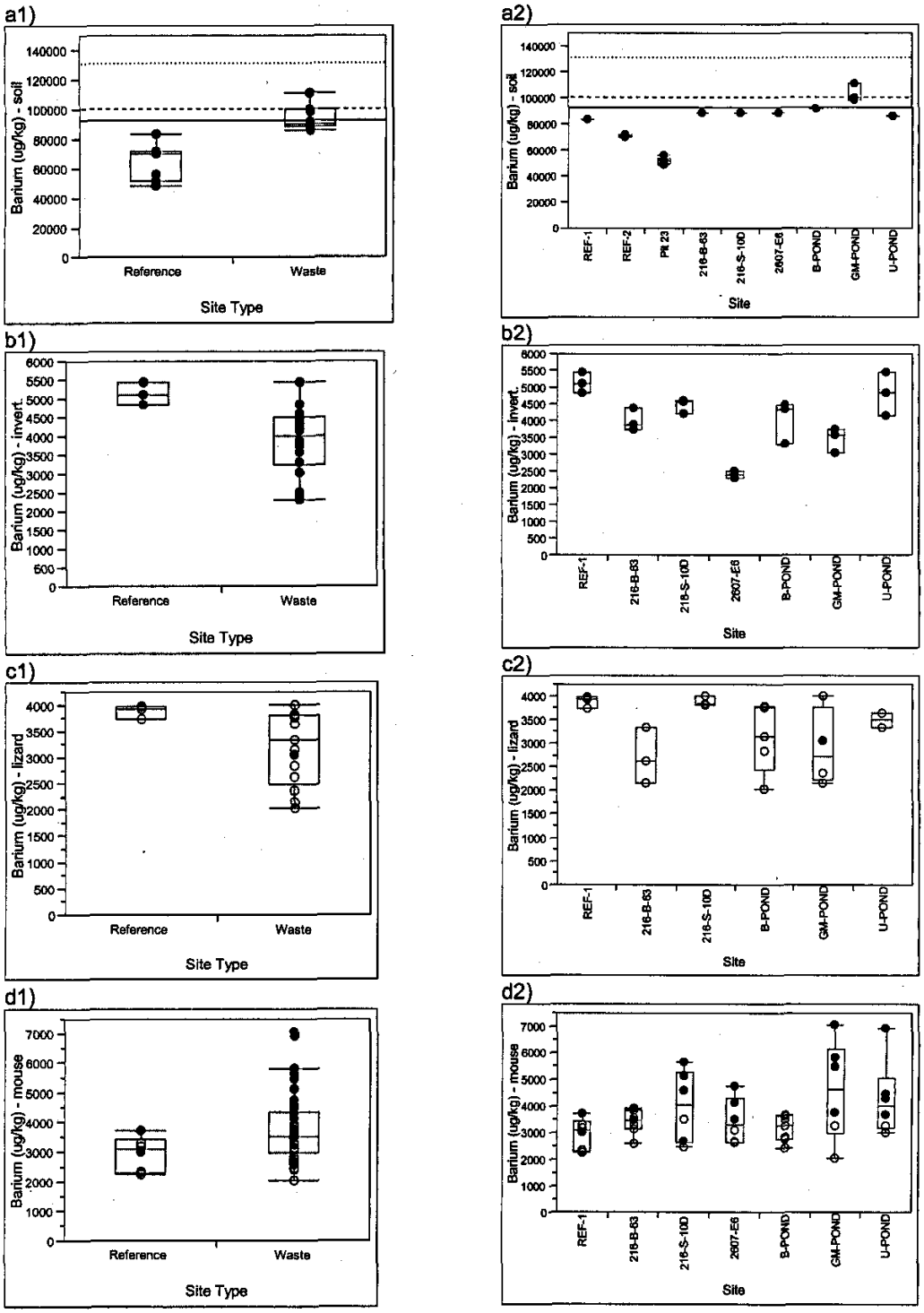


Figure B-65. Barium Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

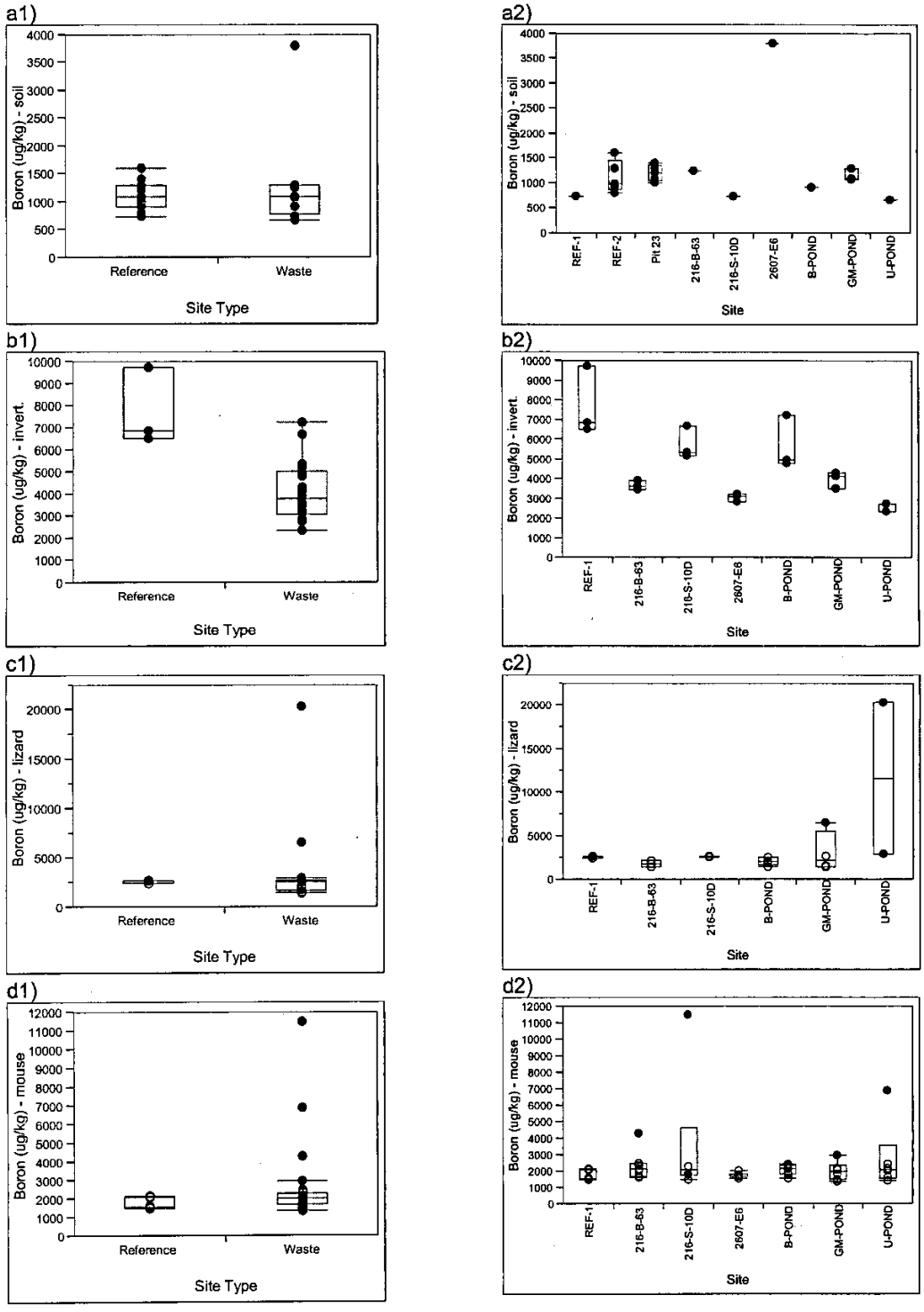


Figure B-66. Boron Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

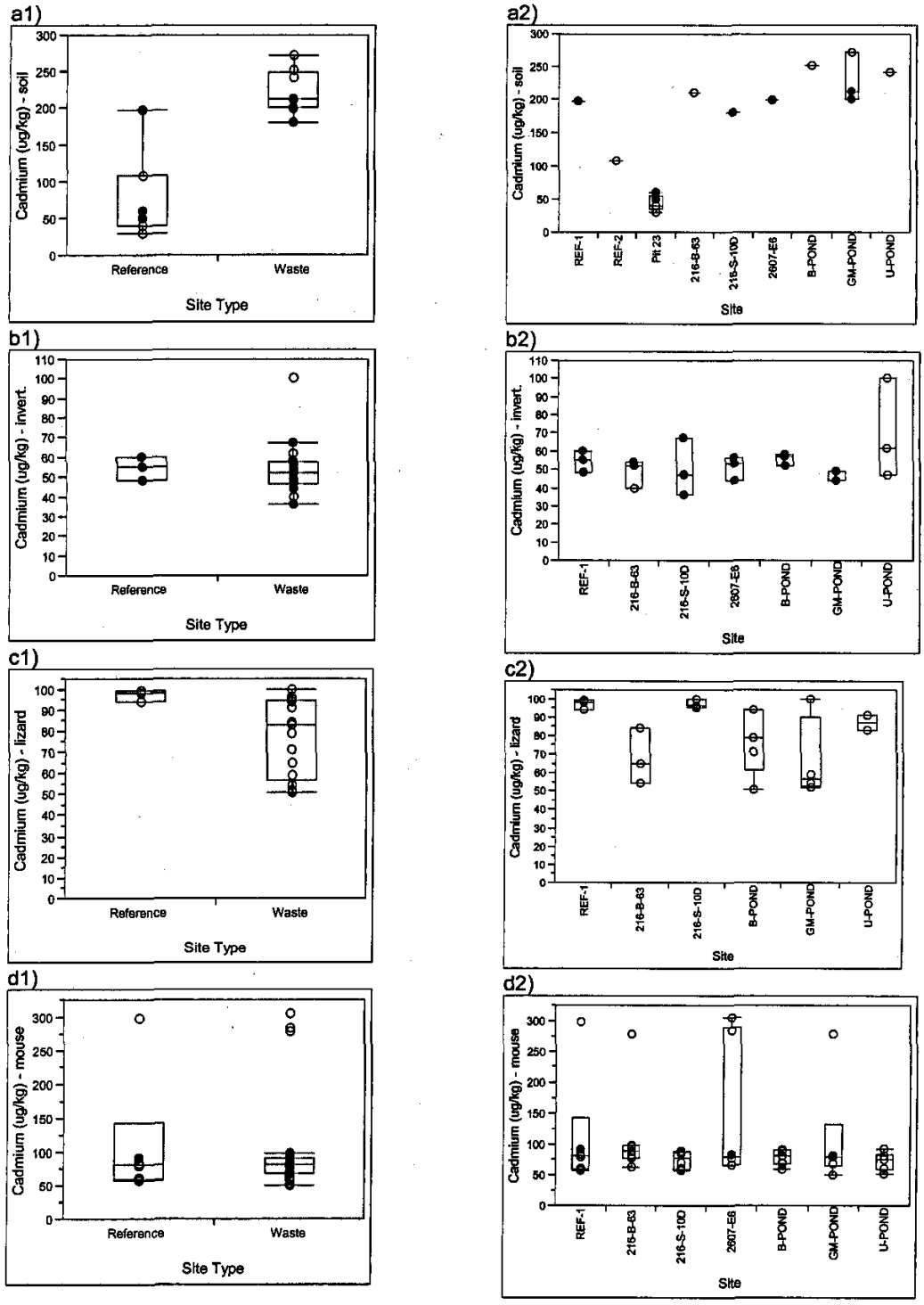


Figure B-67. Cadmium Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

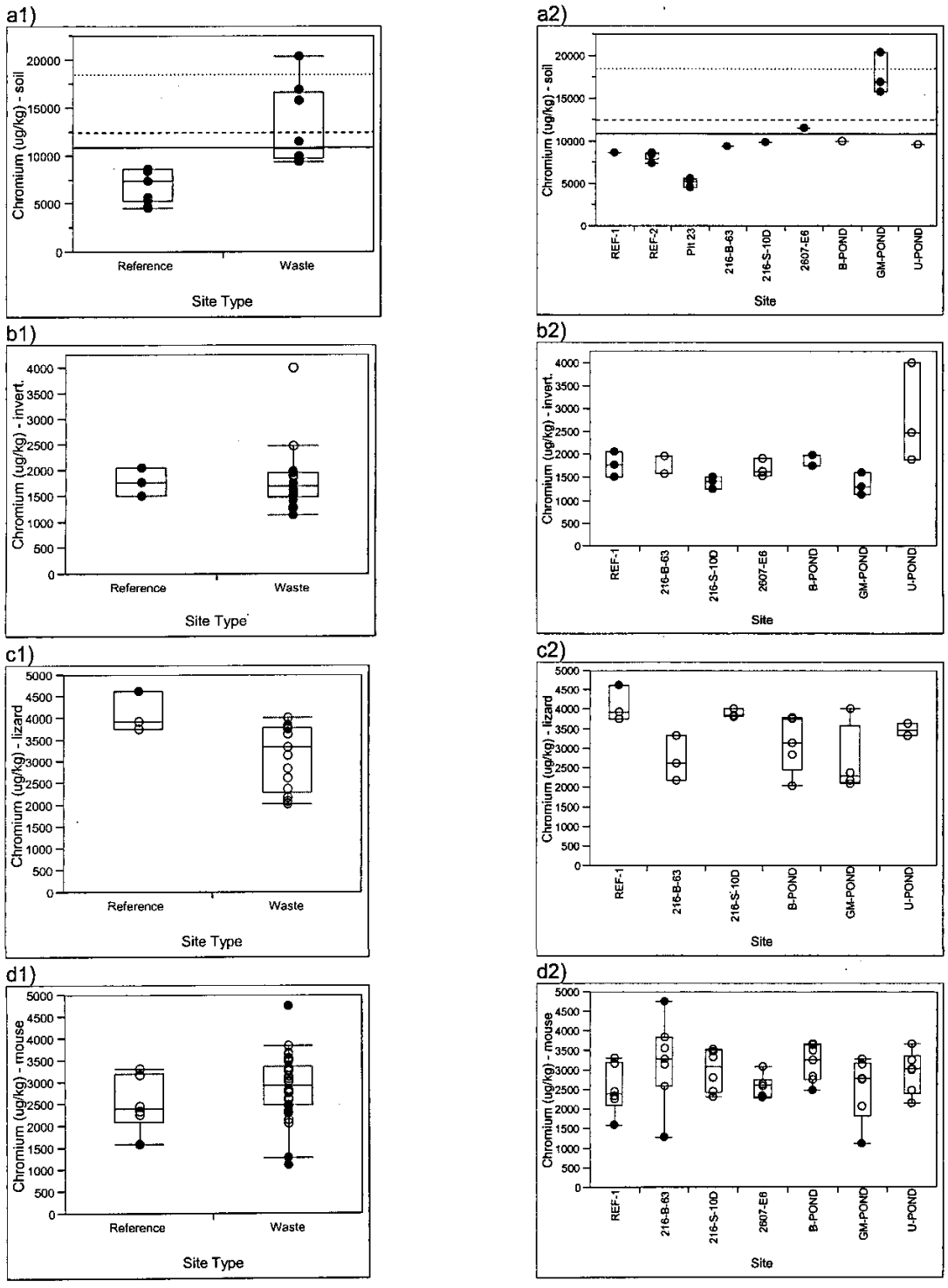


Figure B-68. Chromium Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

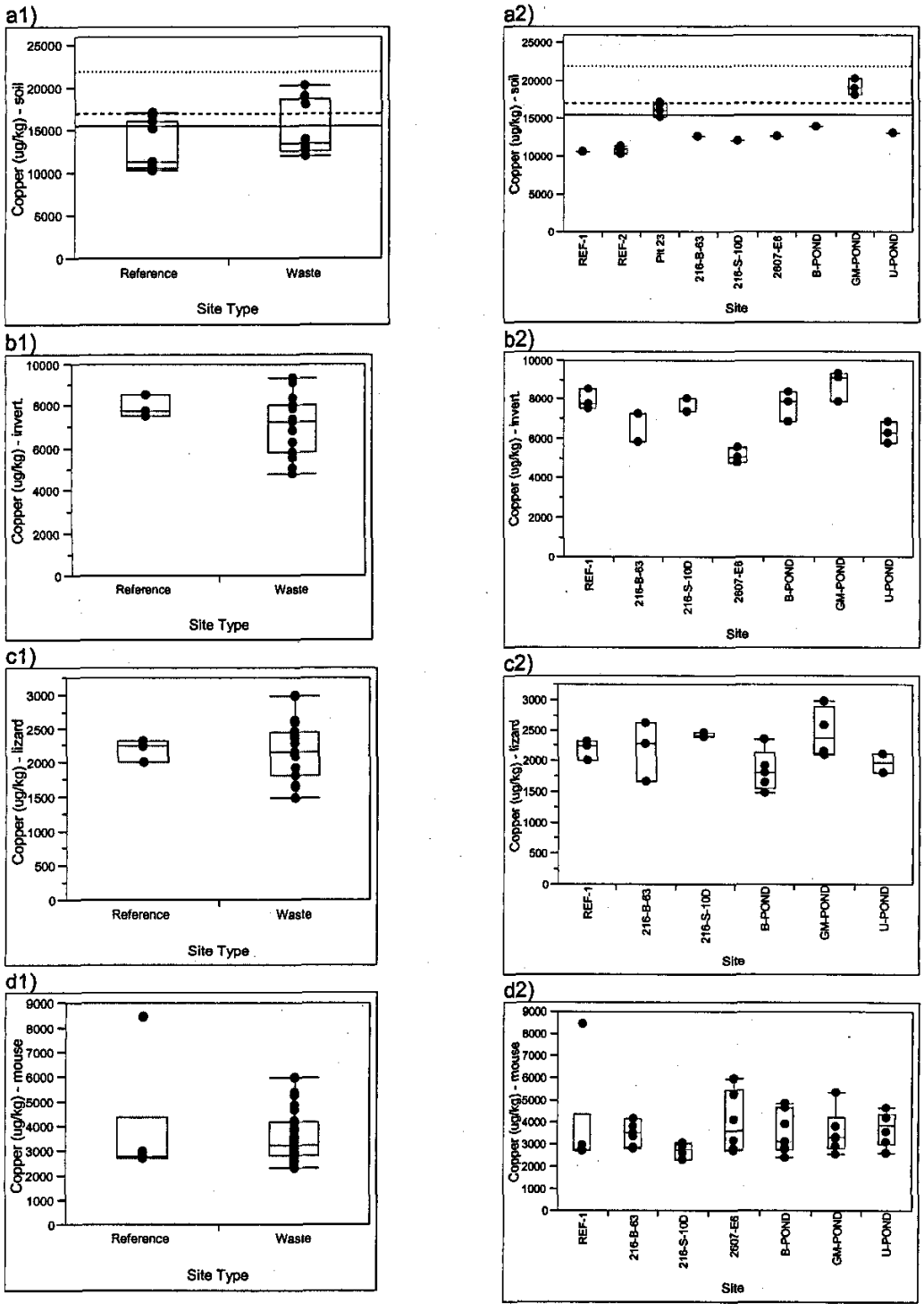


Figure B-69. Copper Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

WMP-29253 REV 0

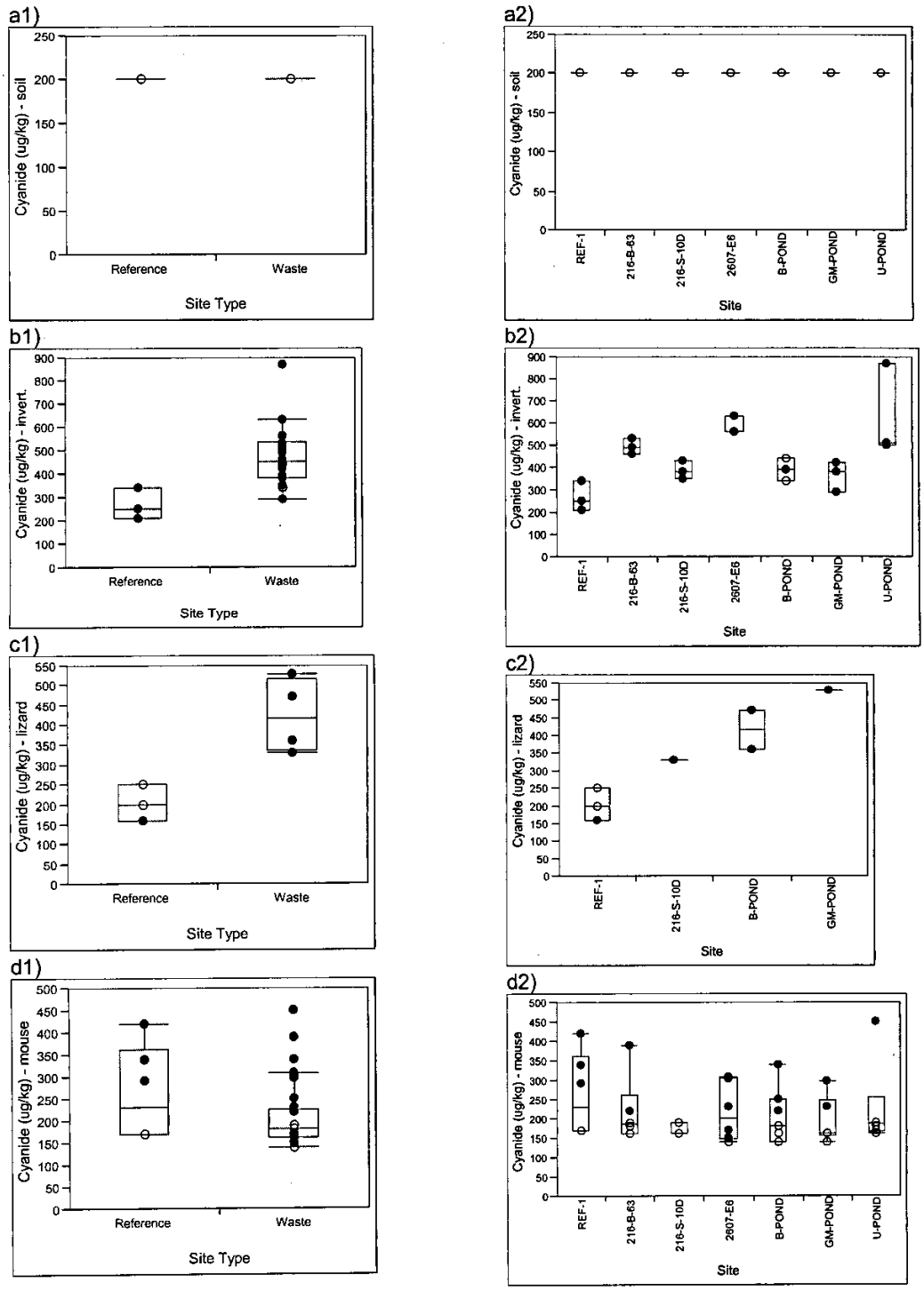


Figure B-70. Cyanide Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

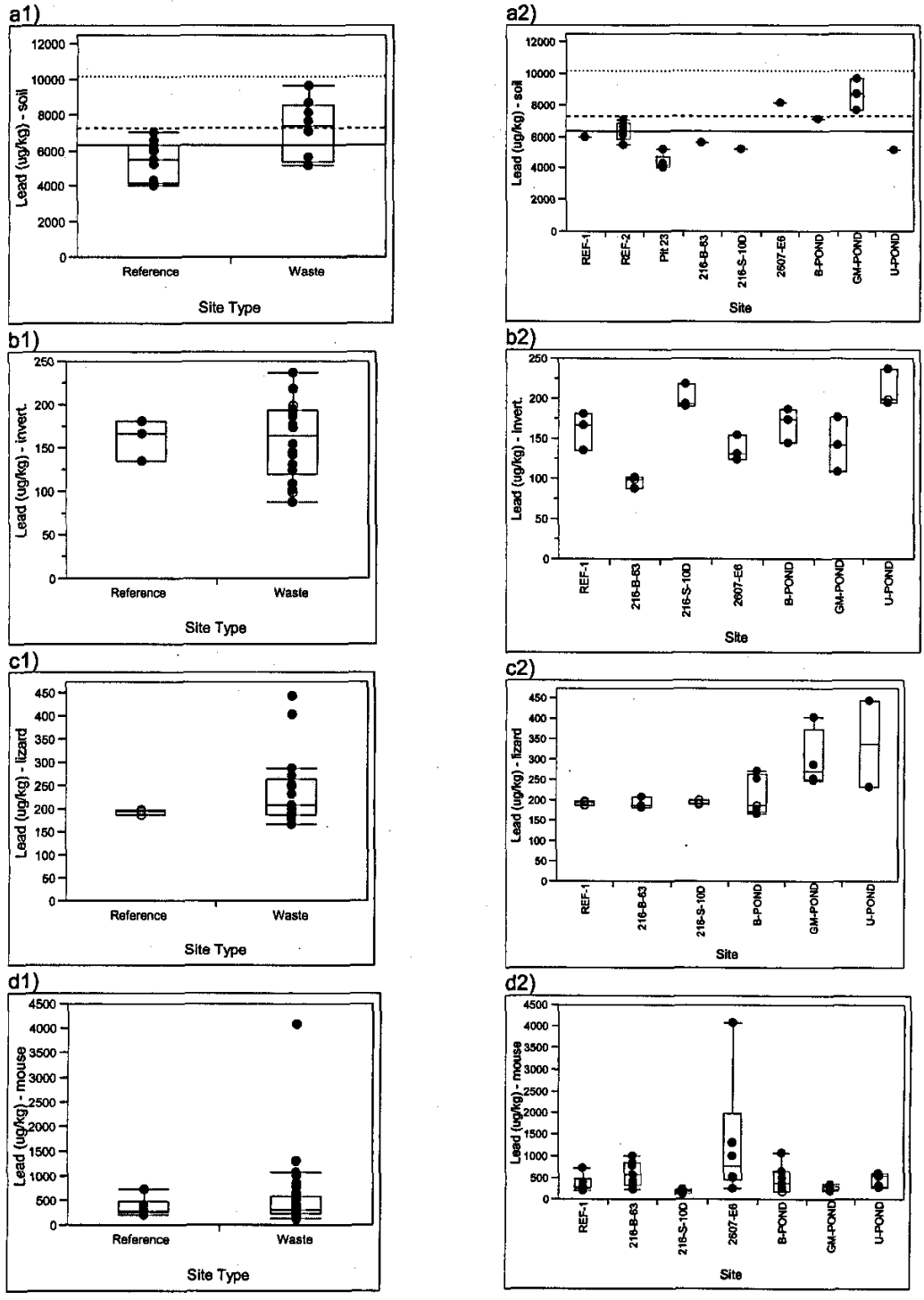


Figure B-71. Lead Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

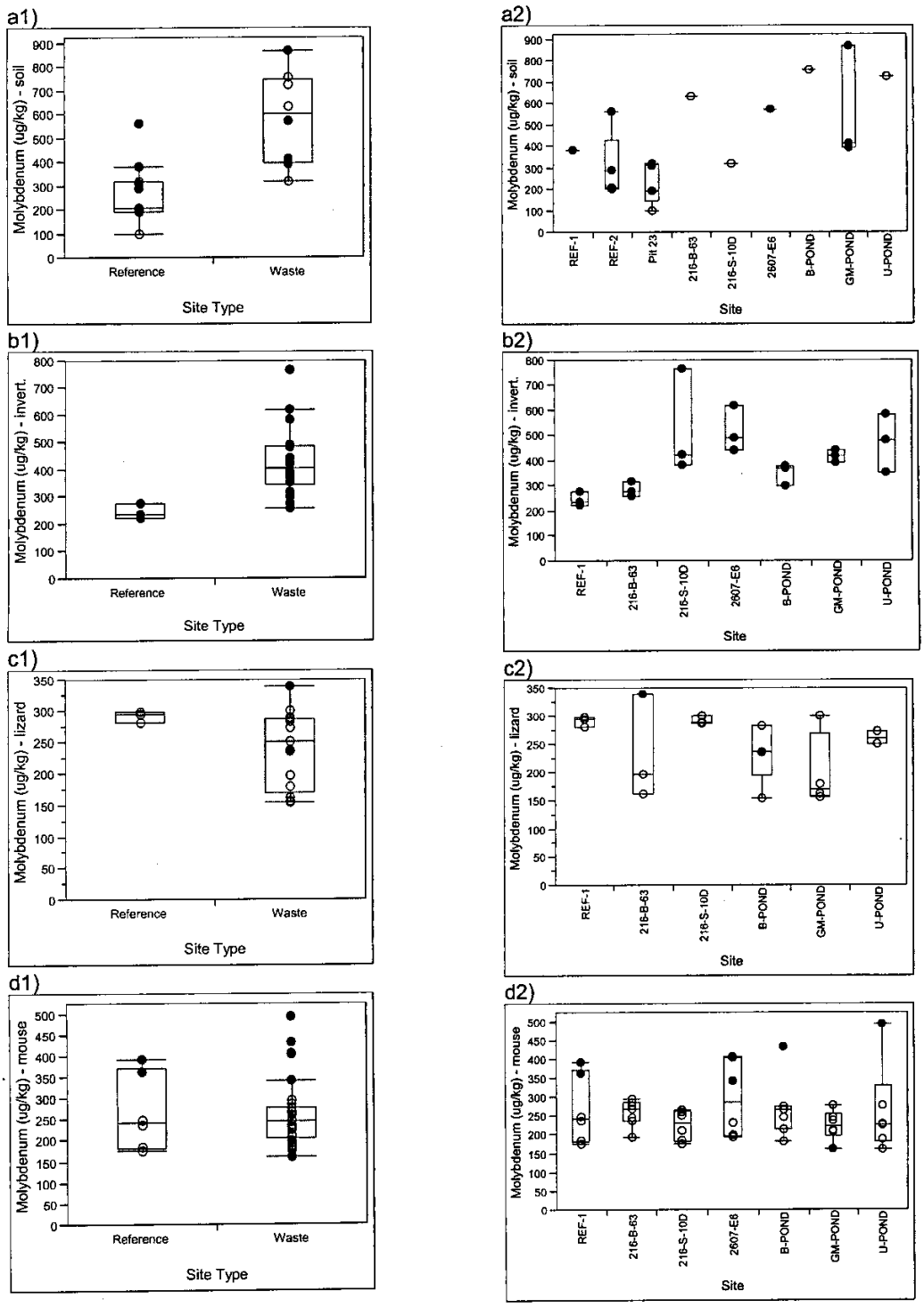


Figure B-72. Molybdenum Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

WMP-29253 REV 0

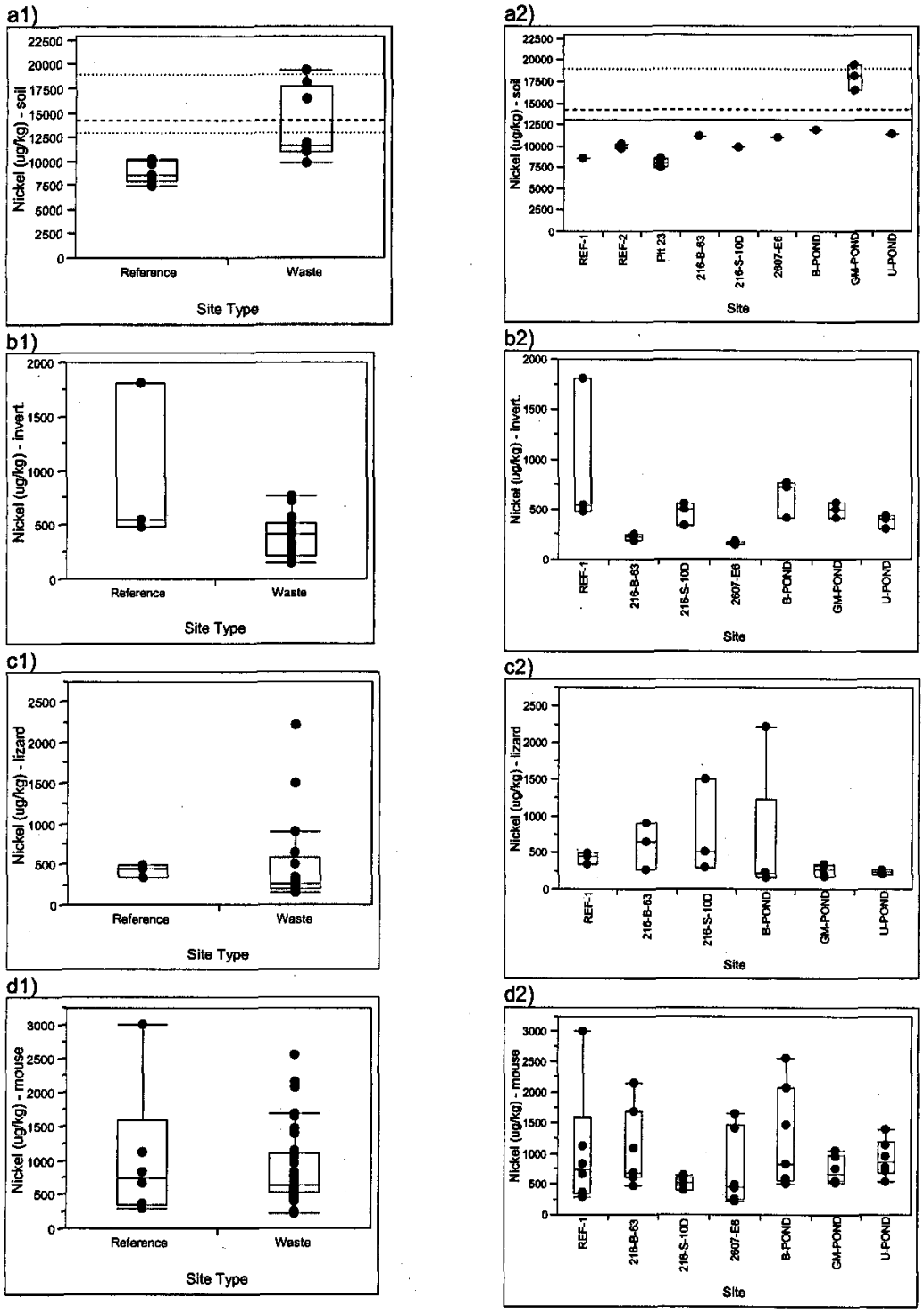


Figure B-73. Nickel Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

WMP-29253 REV 0

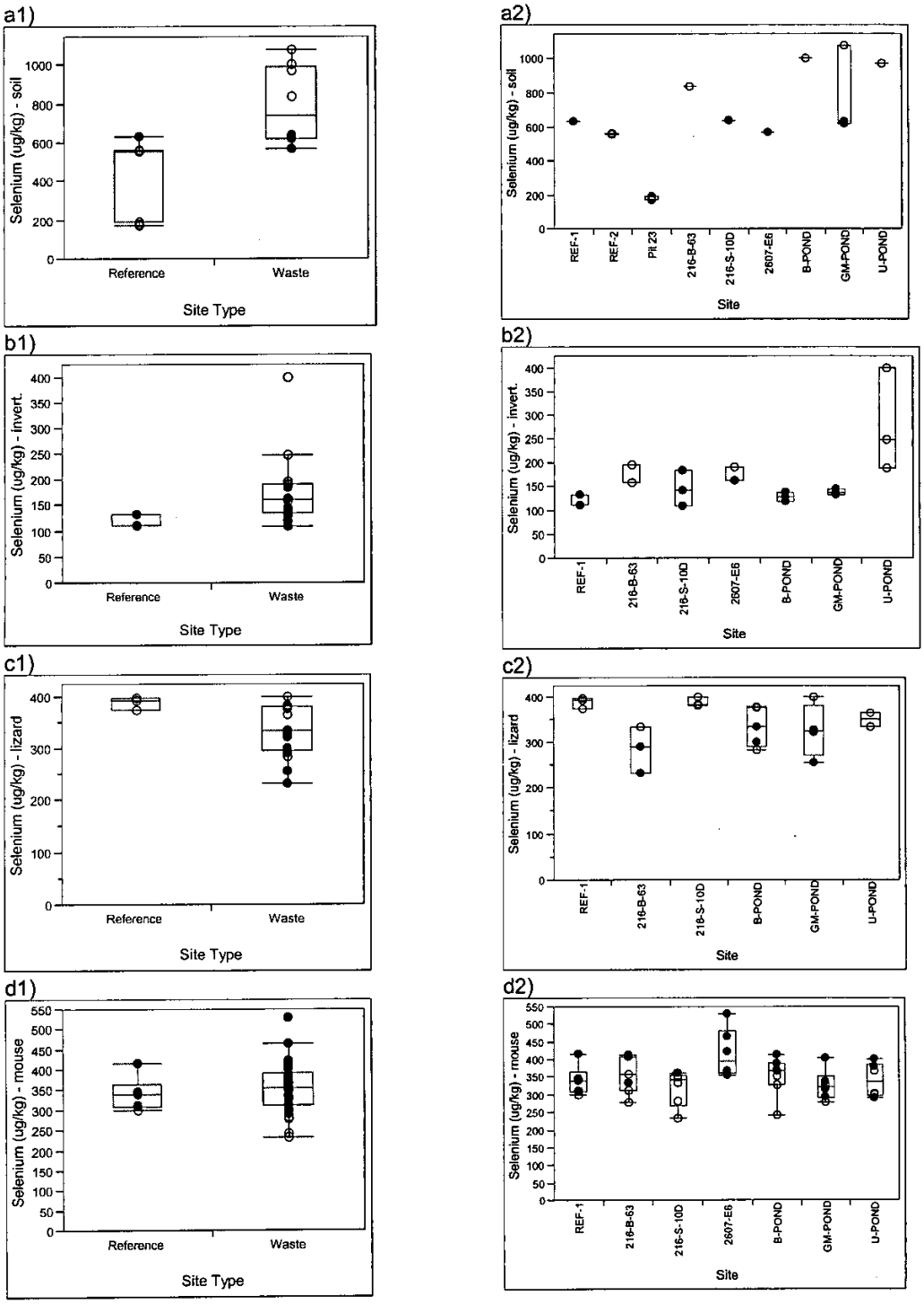


Figure B-74. Selenium Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

WMP-29253 REV 0

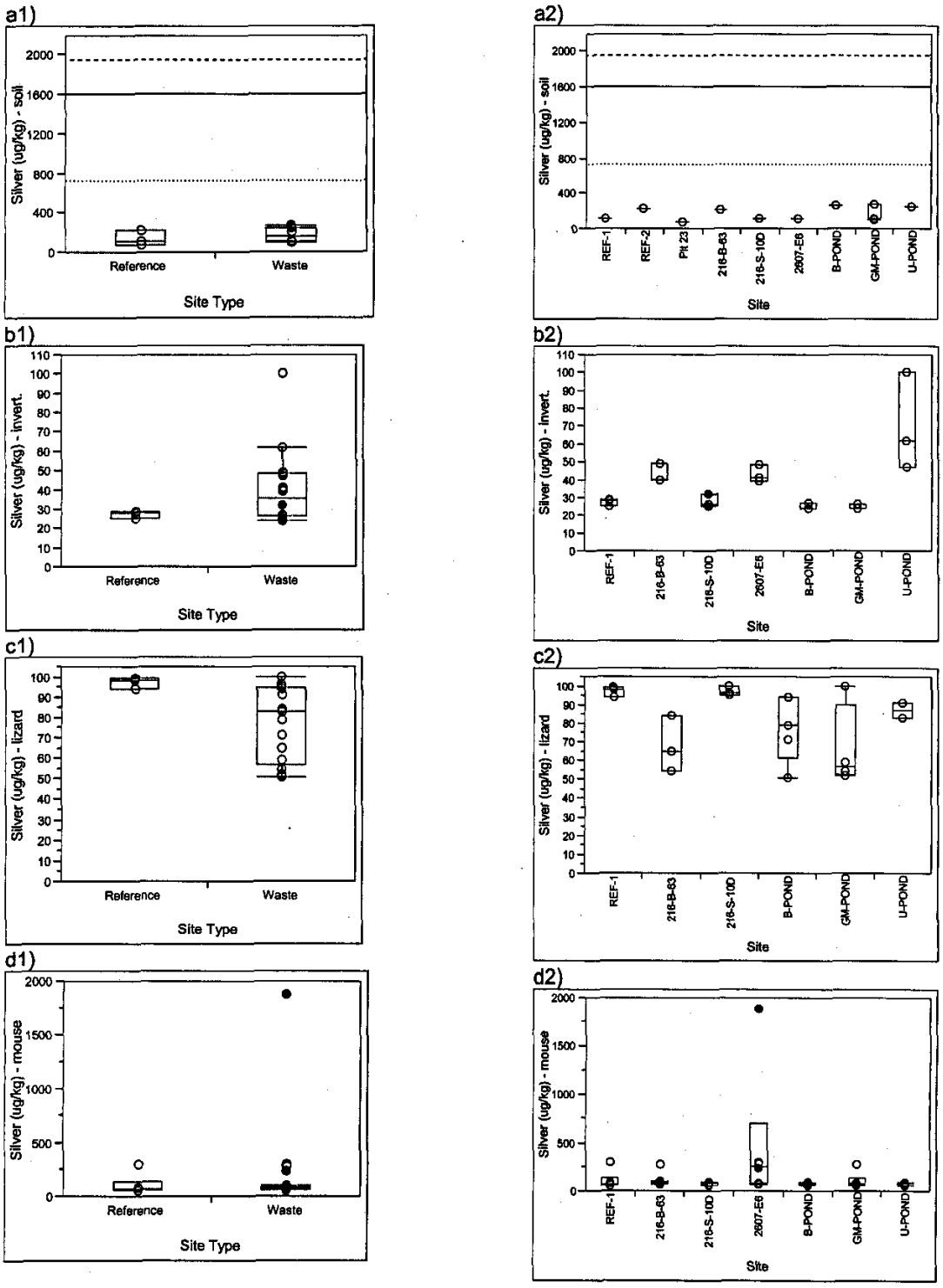


Figure B-75. Silver Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

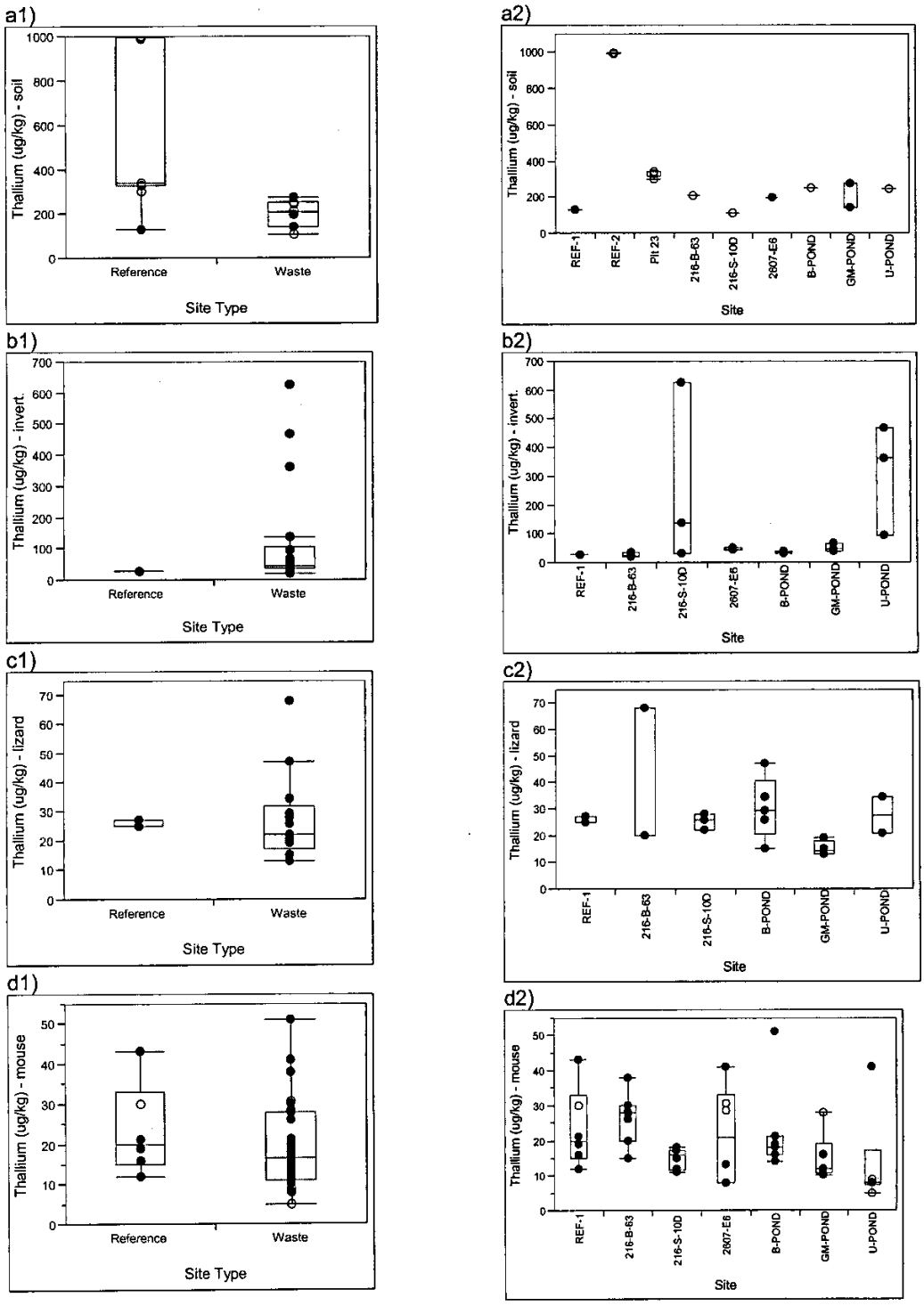


Figure B-76. Thallium Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

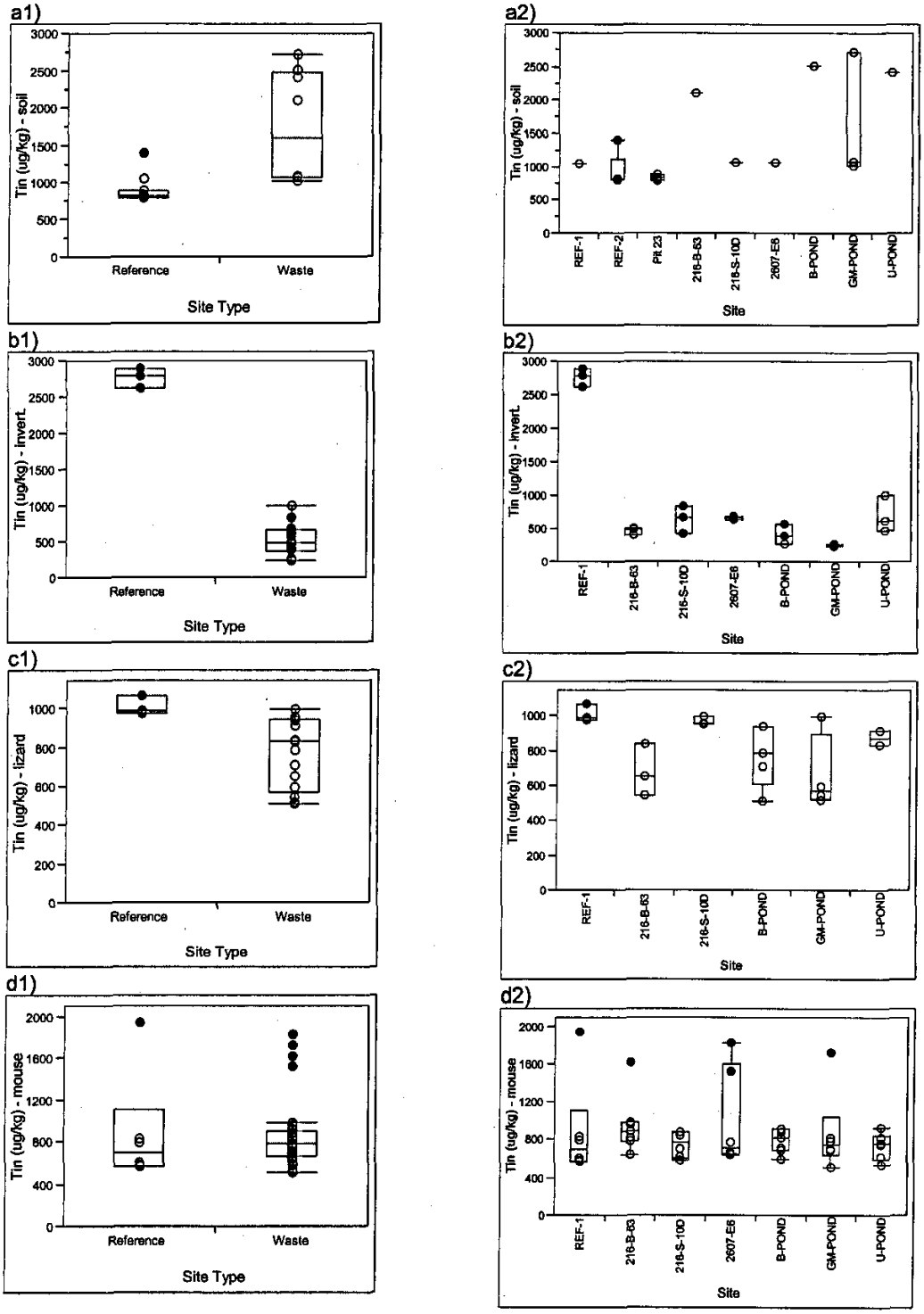


Figure B-77. Tin Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

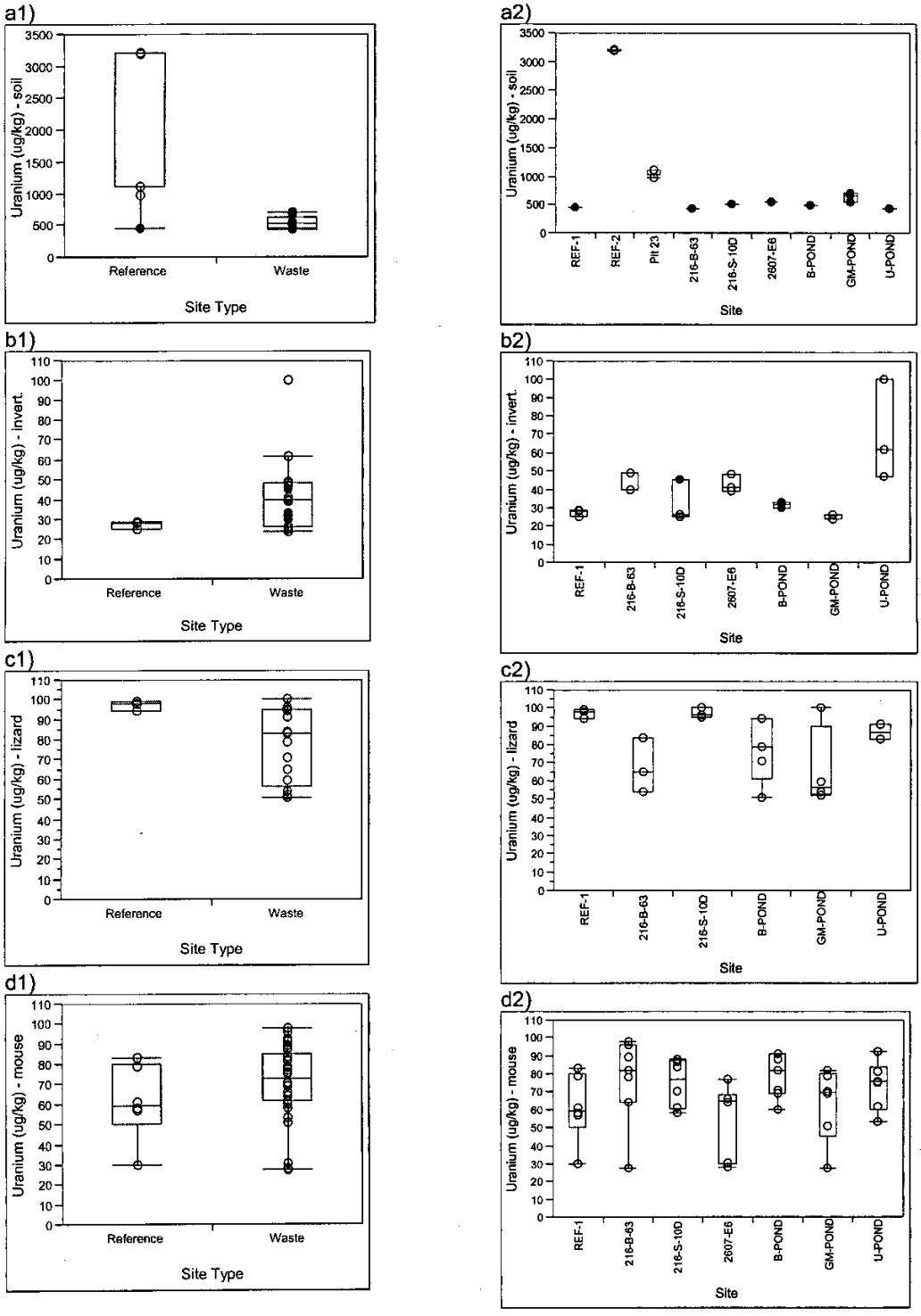


Figure B-78. Uranium Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

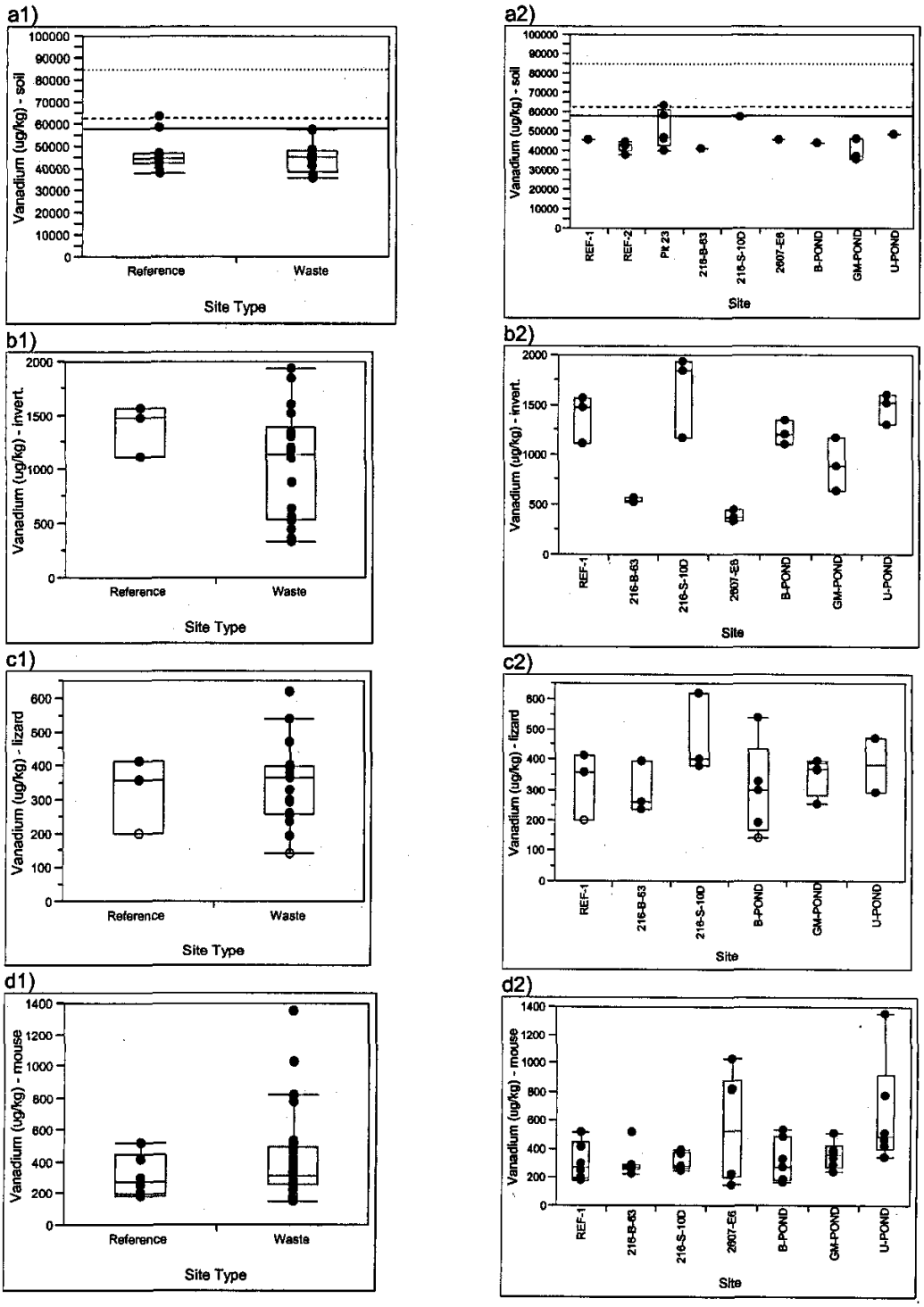


Figure B-79. Vanadium Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

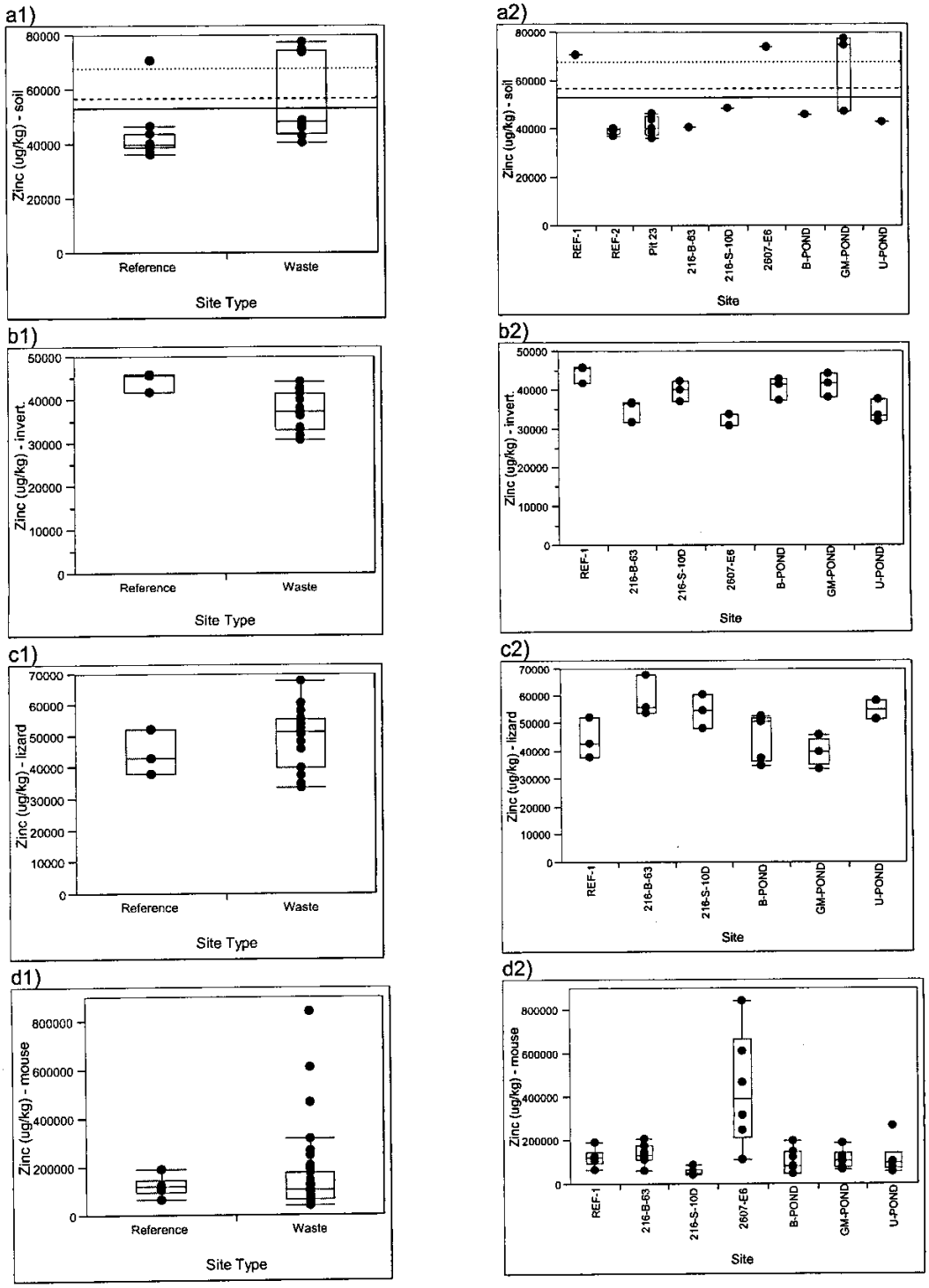


Figure B-80. Zinc Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

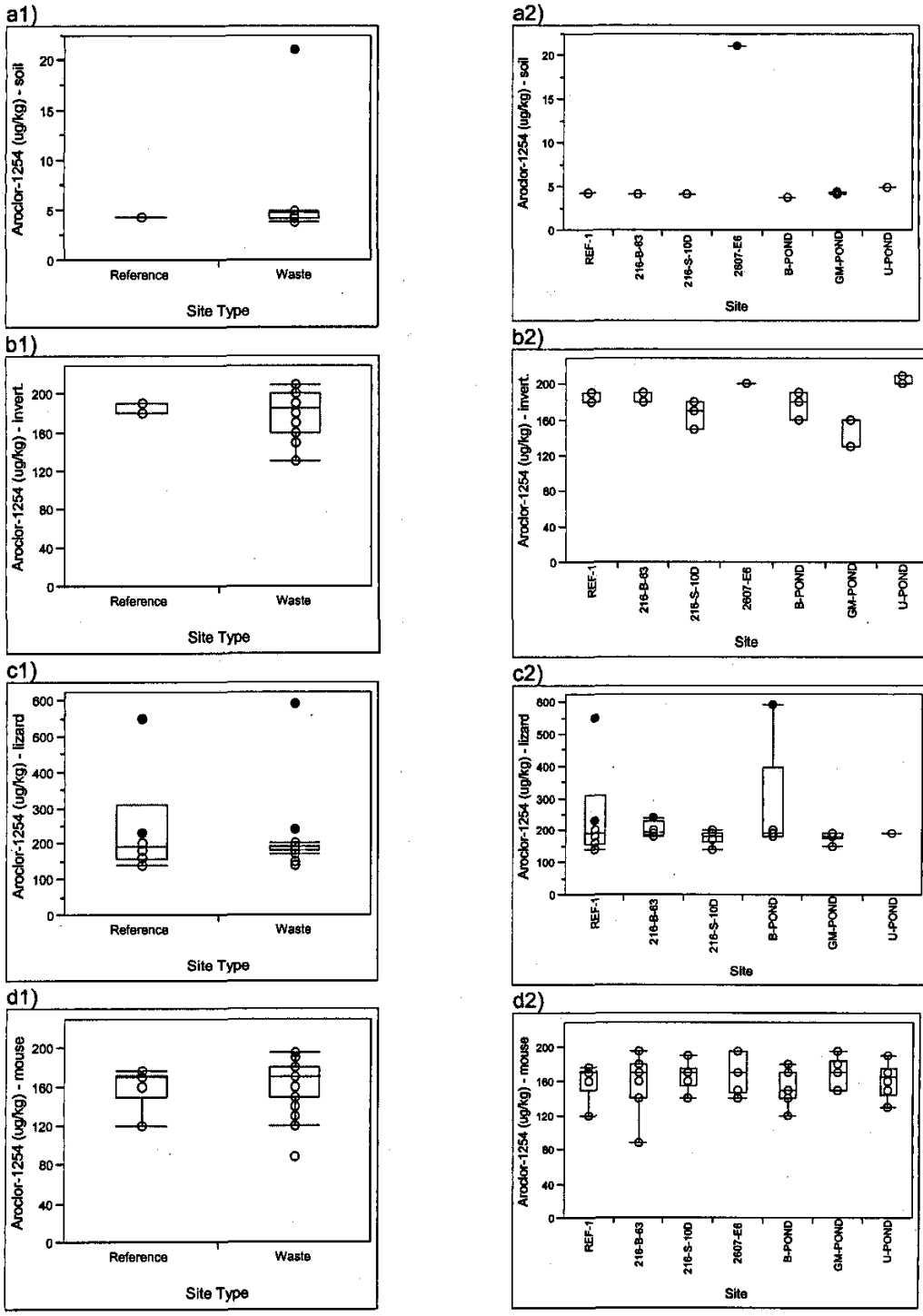


Figure B-81. Aroclor-1254 Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

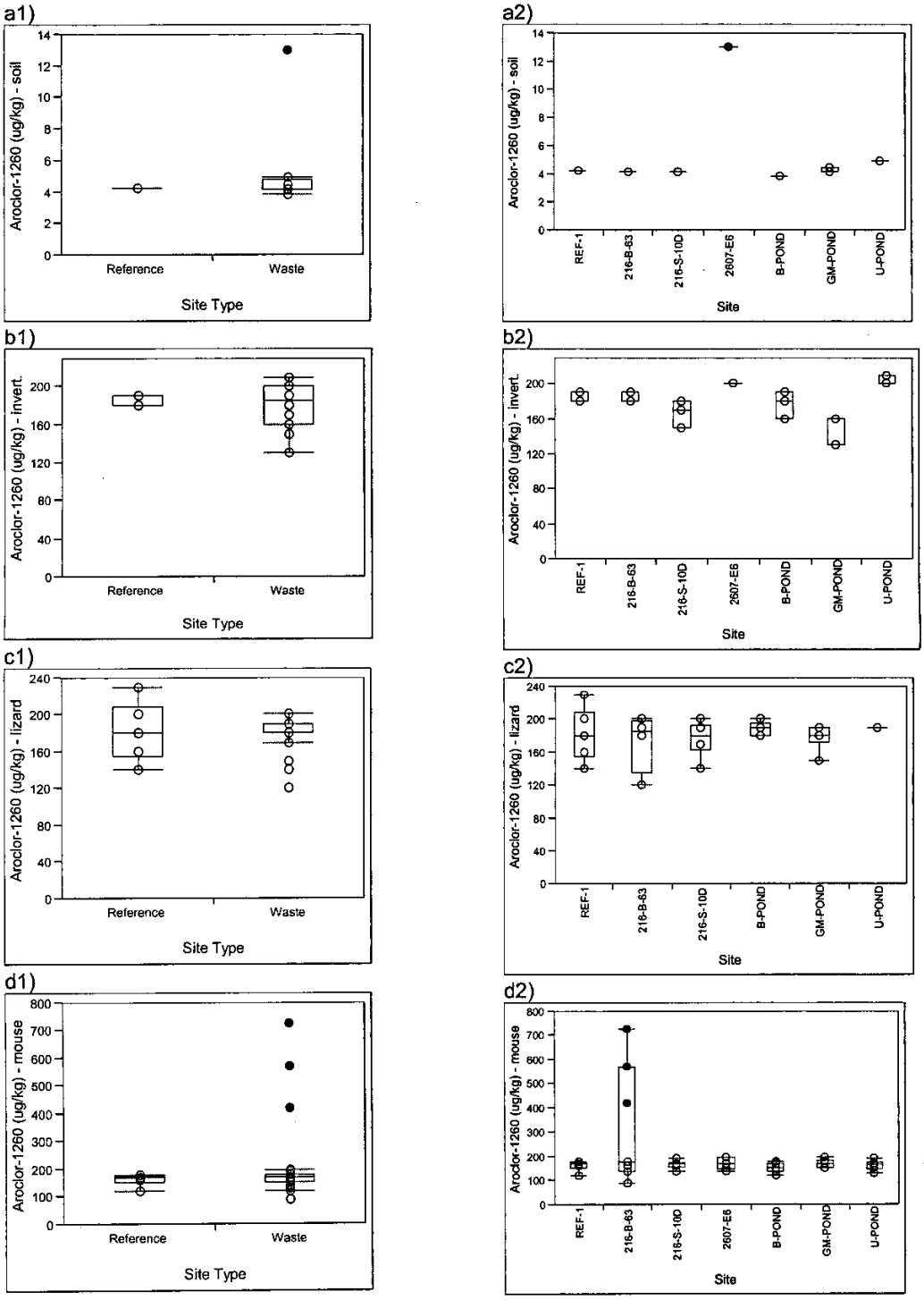


Figure B-82. Aroclor-1260 Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

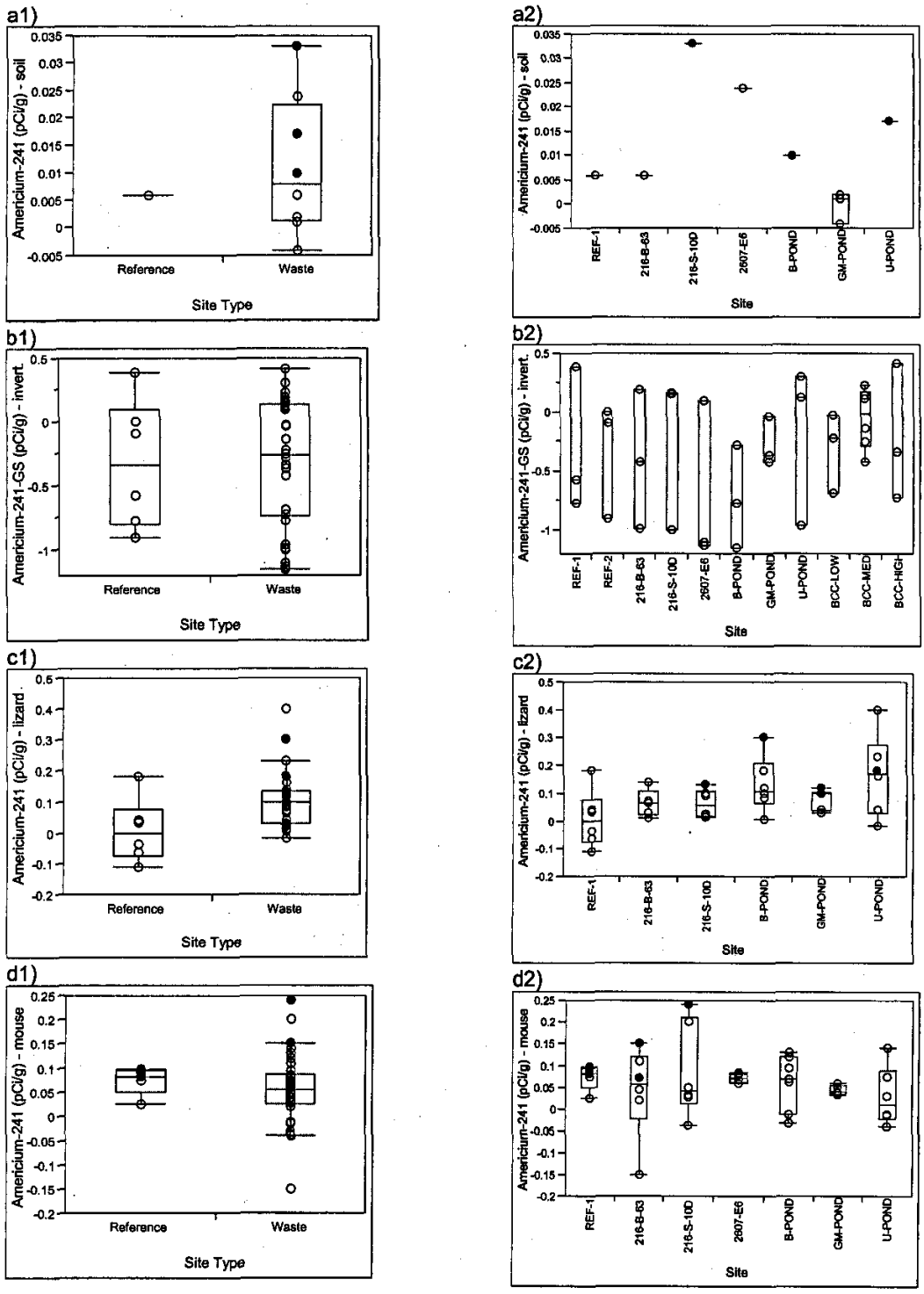


Figure B-83. Americium-241 Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

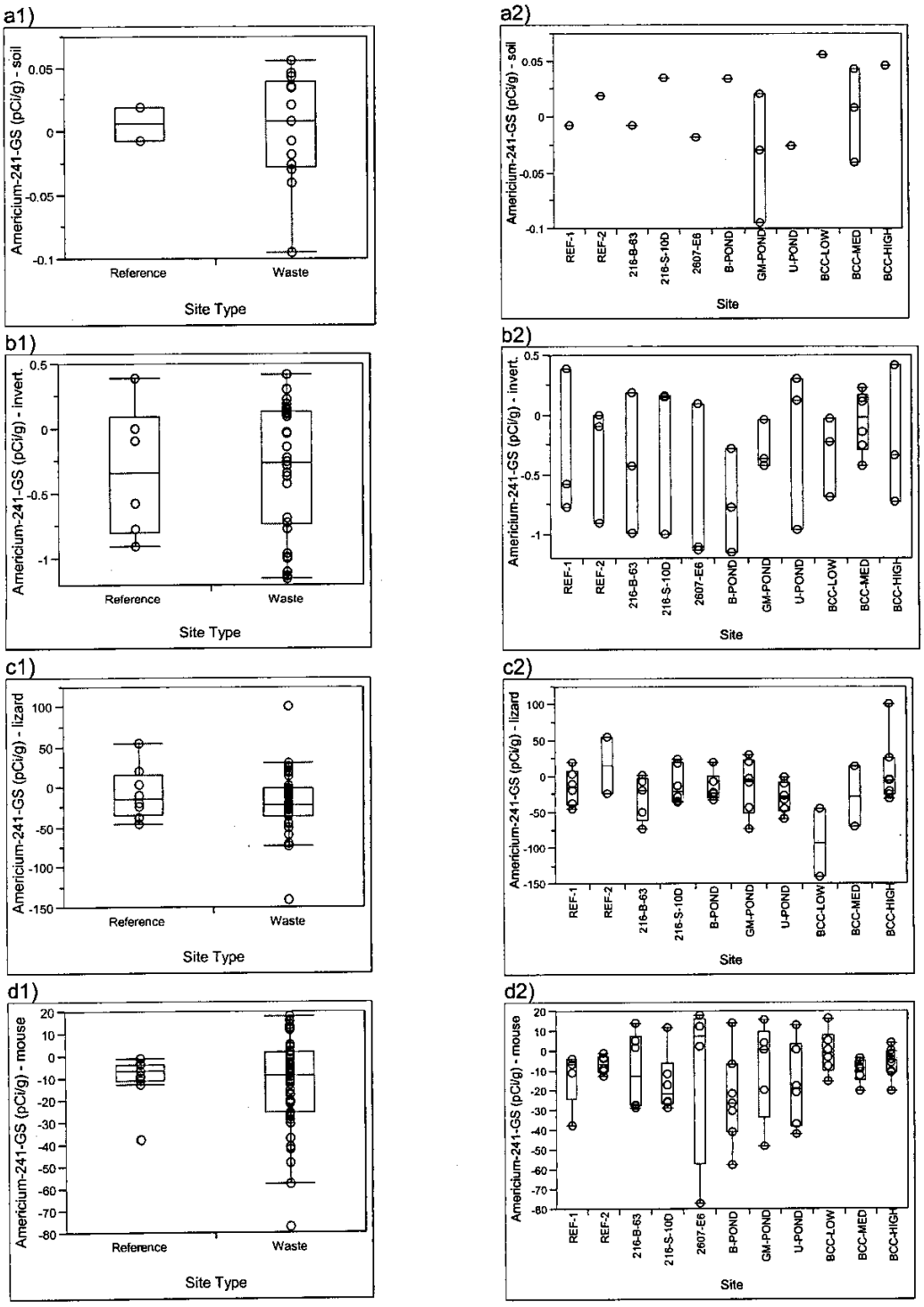


Figure B-84. Americium-241 GS Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

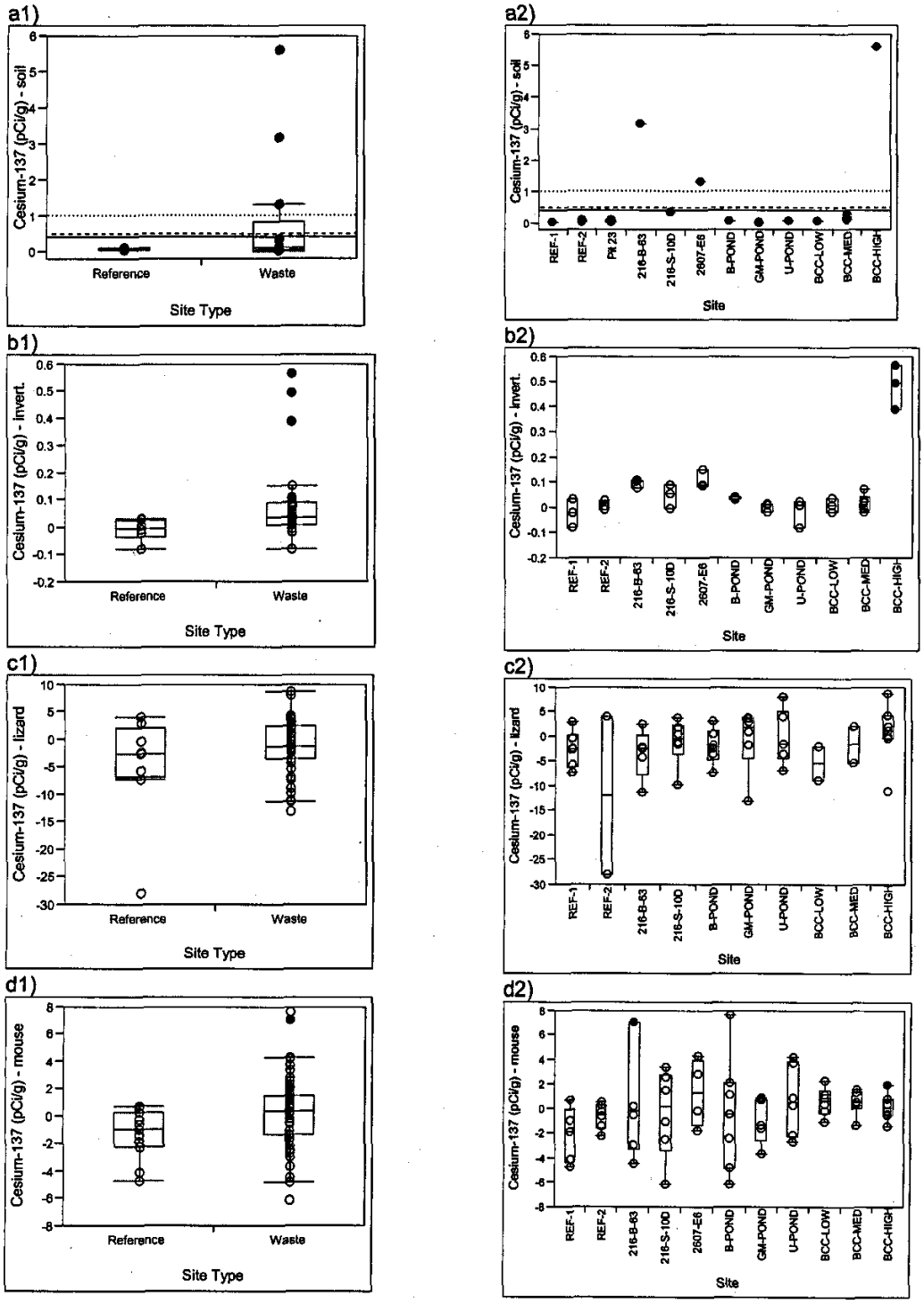


Figure B-85. Cesium-137 Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

WMP-29253 REV 0

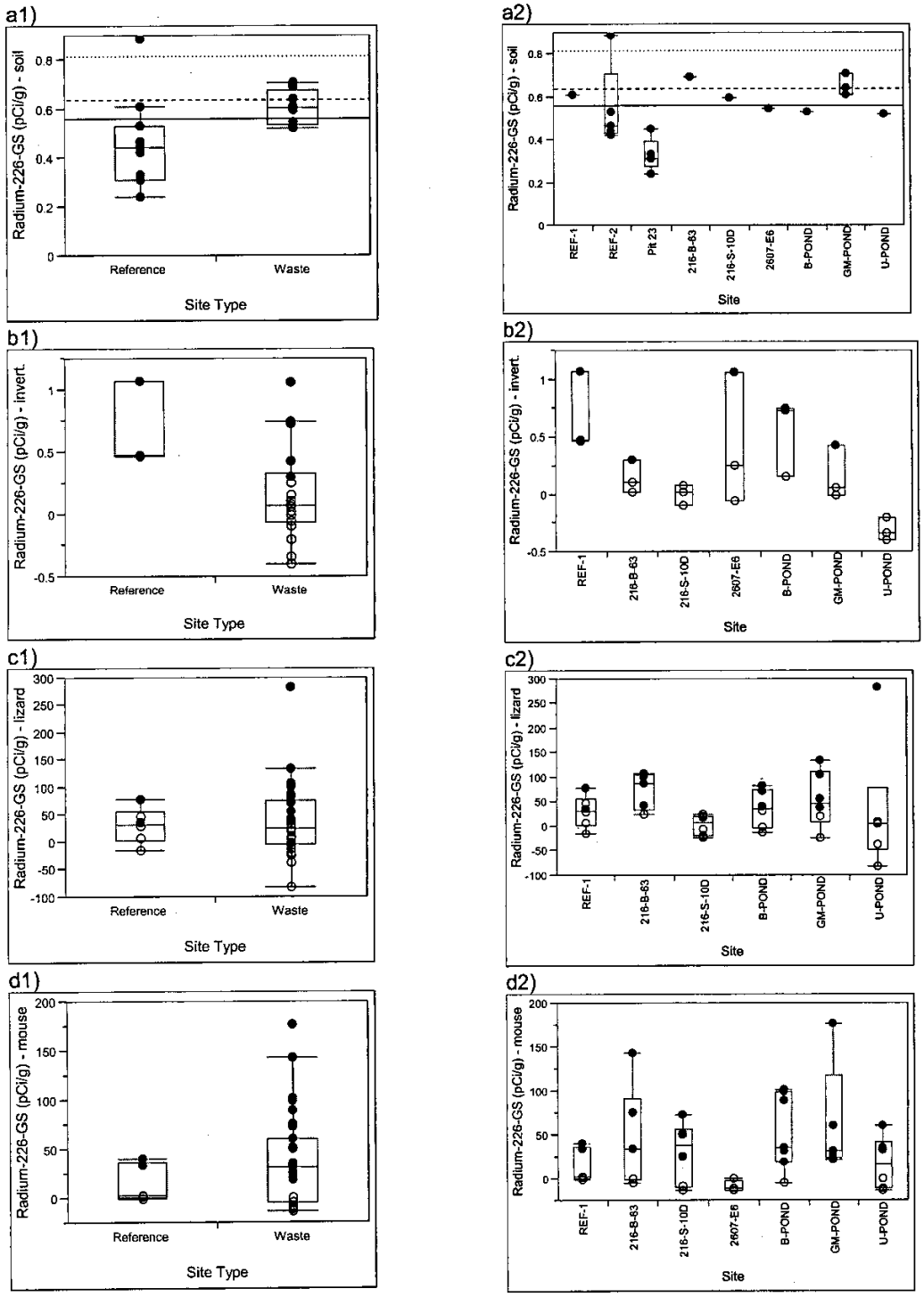


Figure B-86. Radium-226 GS Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

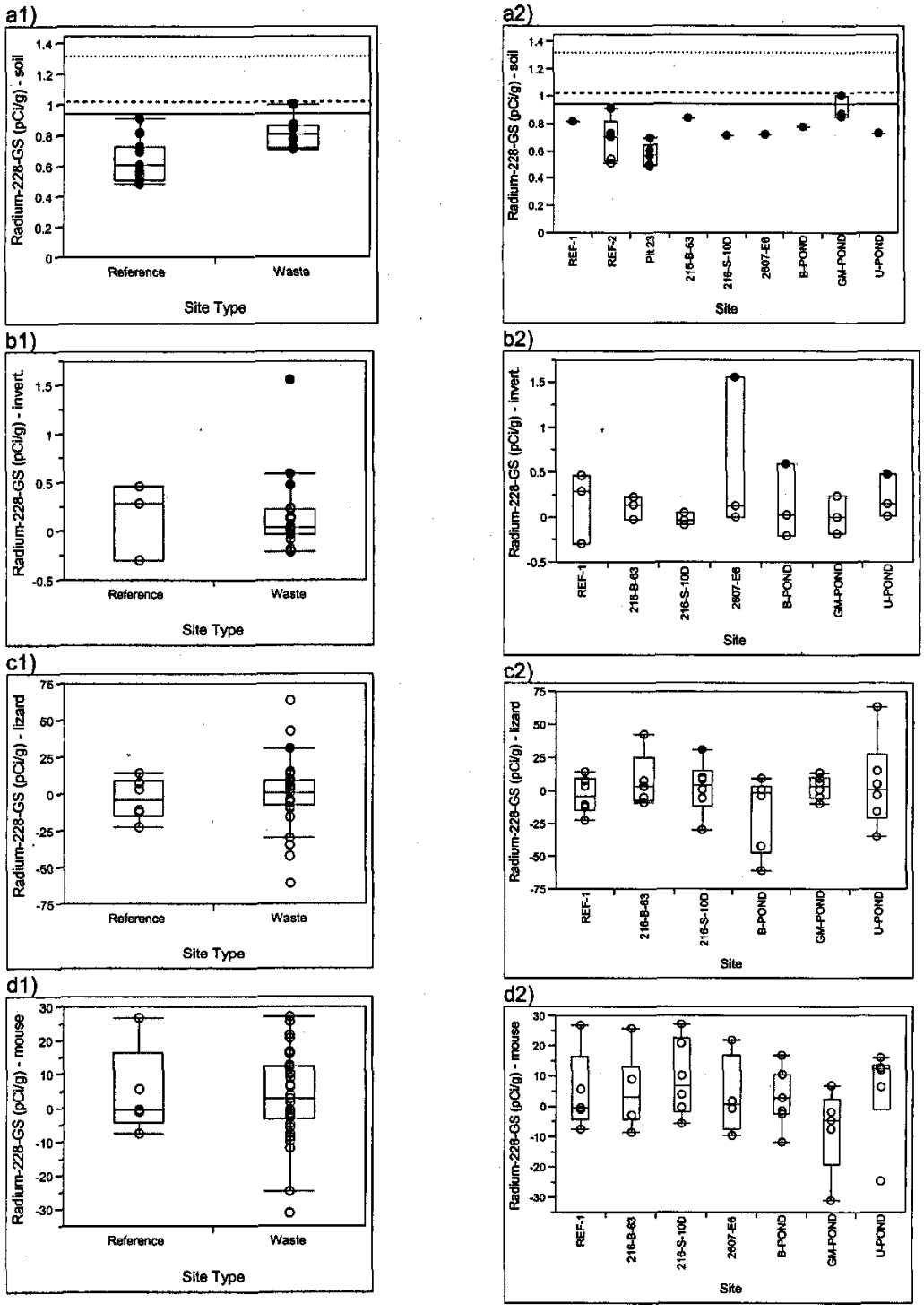


Figure B-87. Radium-228 GS Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

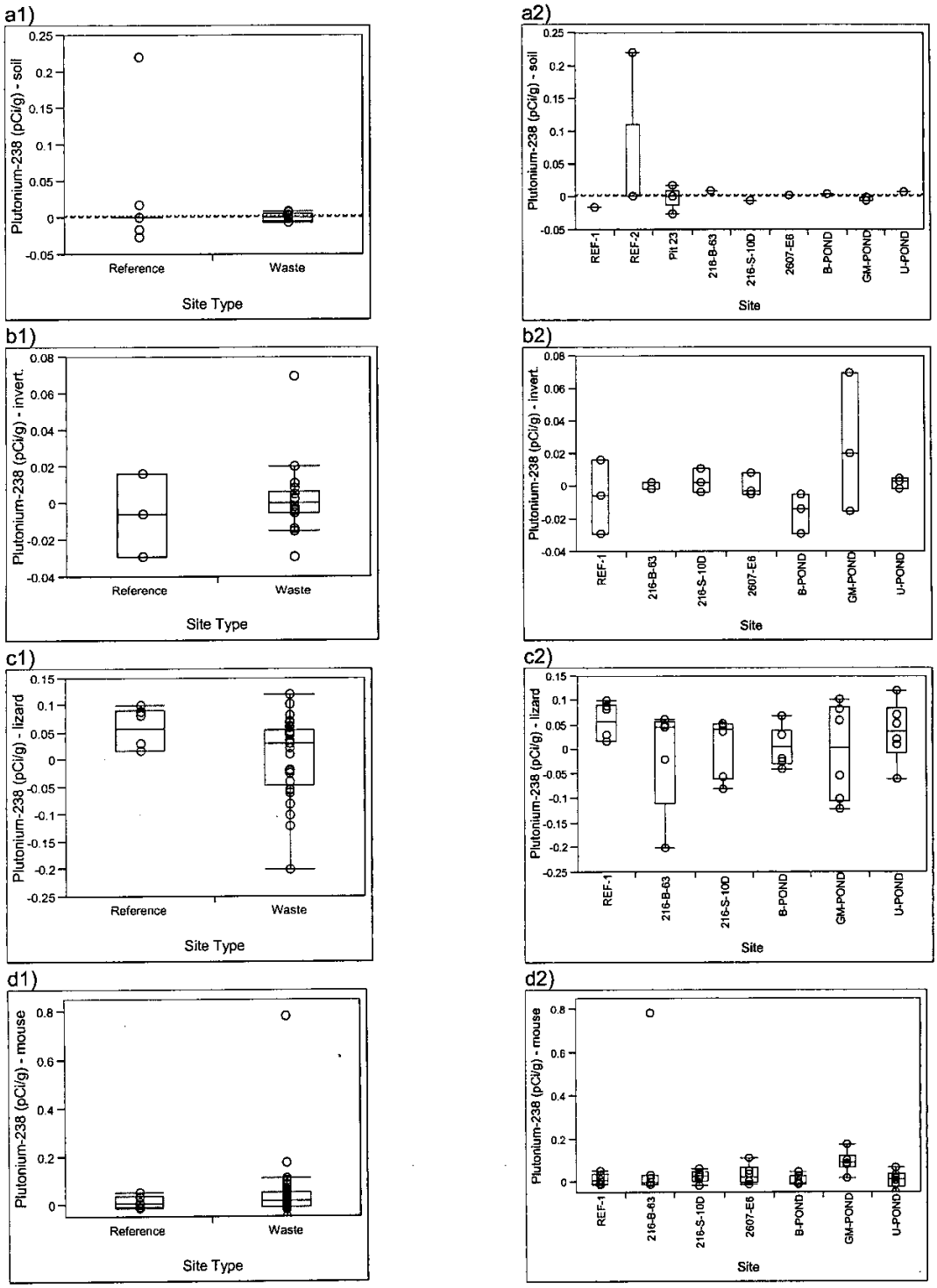


Figure B-88. Plutonium-238 Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

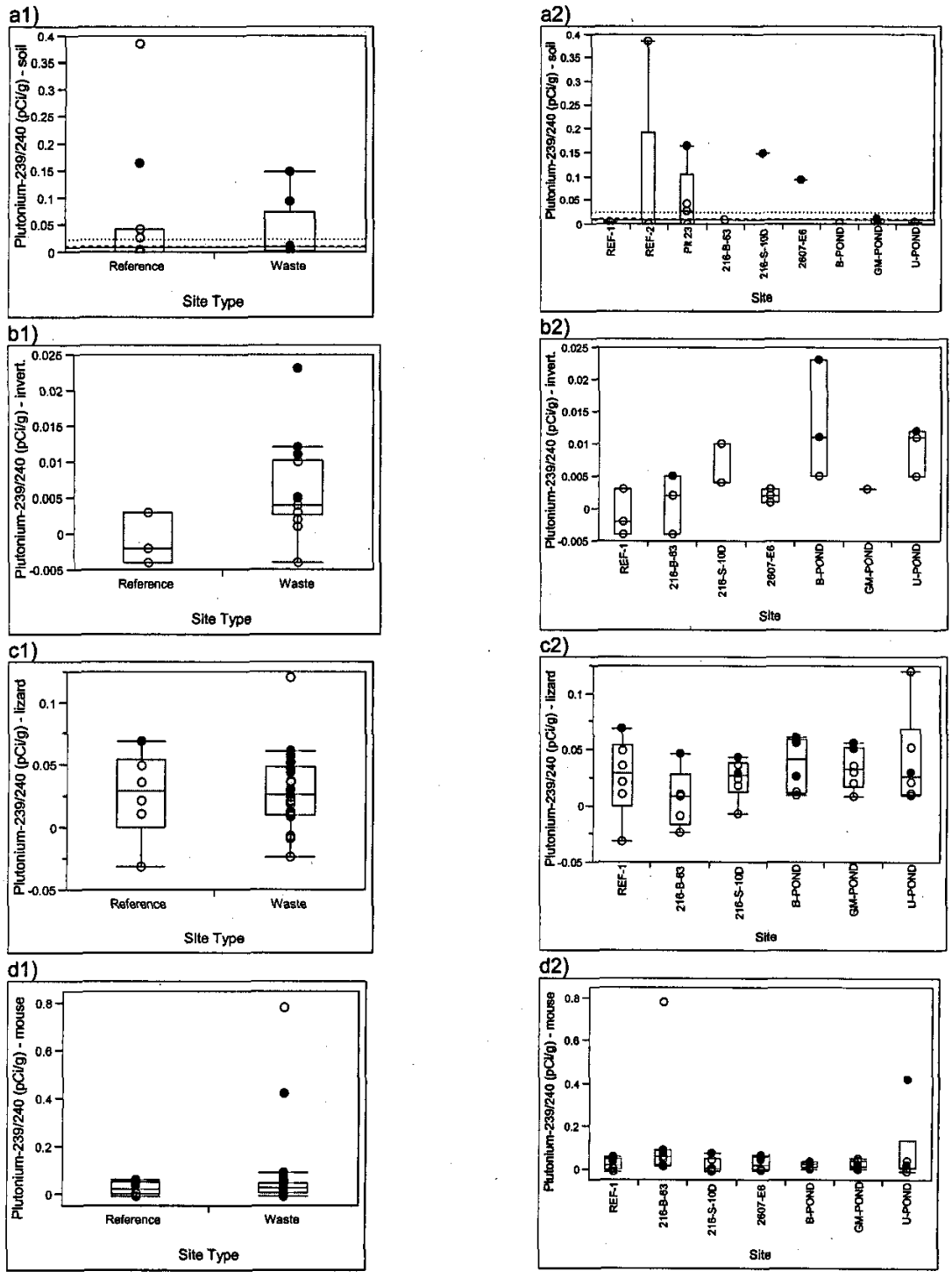


Figure B-89. Plutonium-239/240 Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

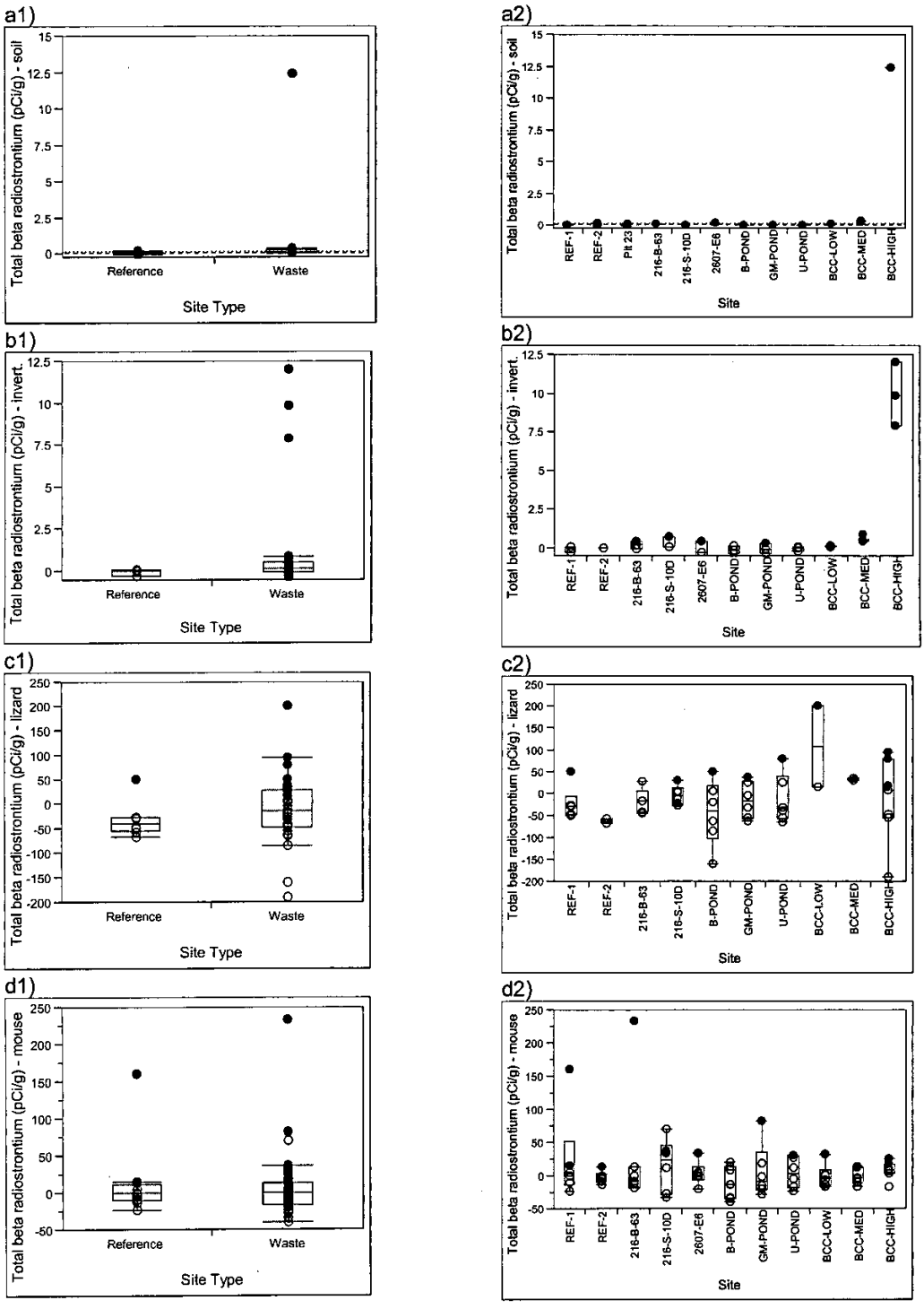


Figure B-90. Total Beta Radiostrontium Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

B-64

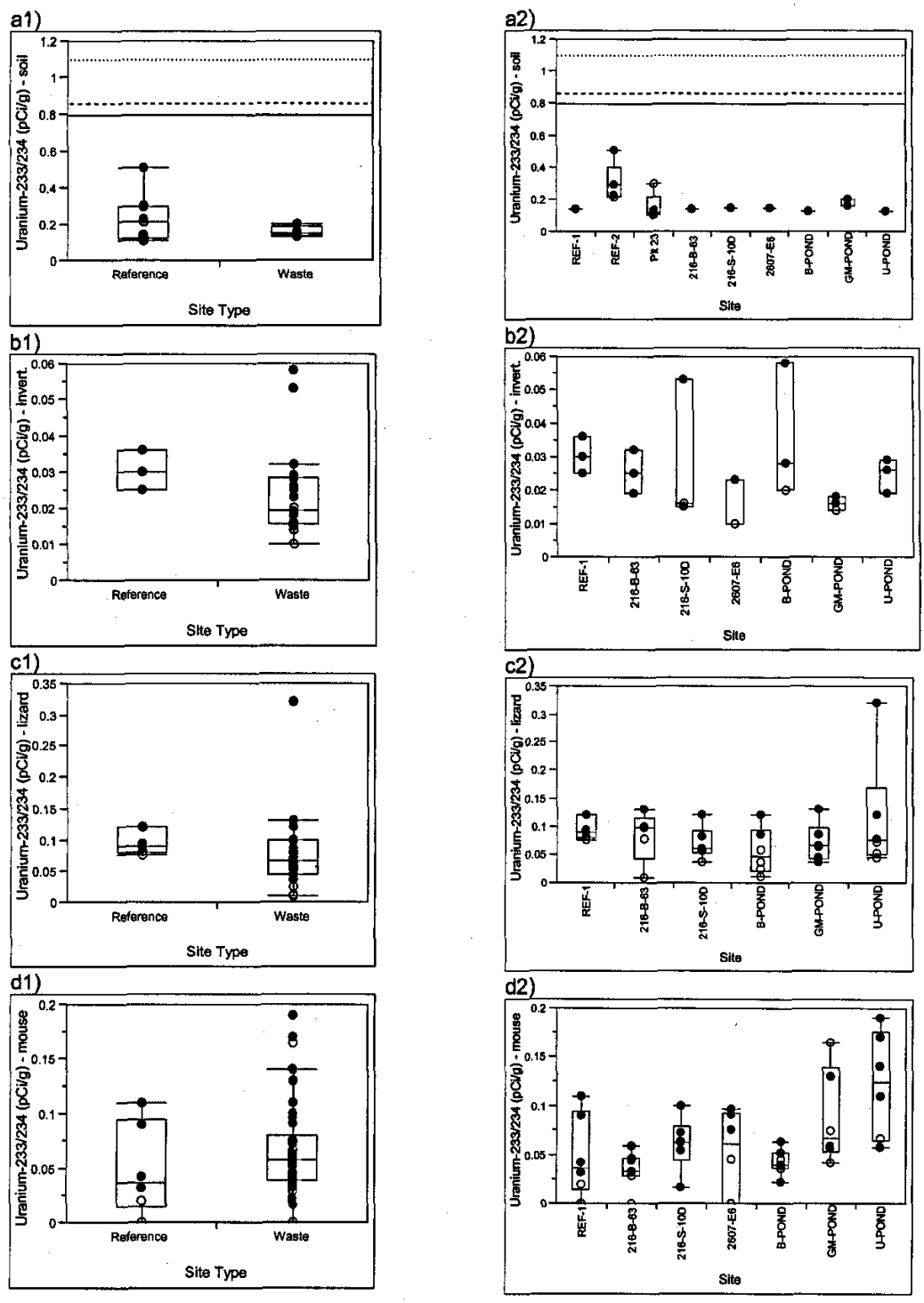


Figure B-91. Uranium-233/234 Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

B-65

WMP-29253 REV 0

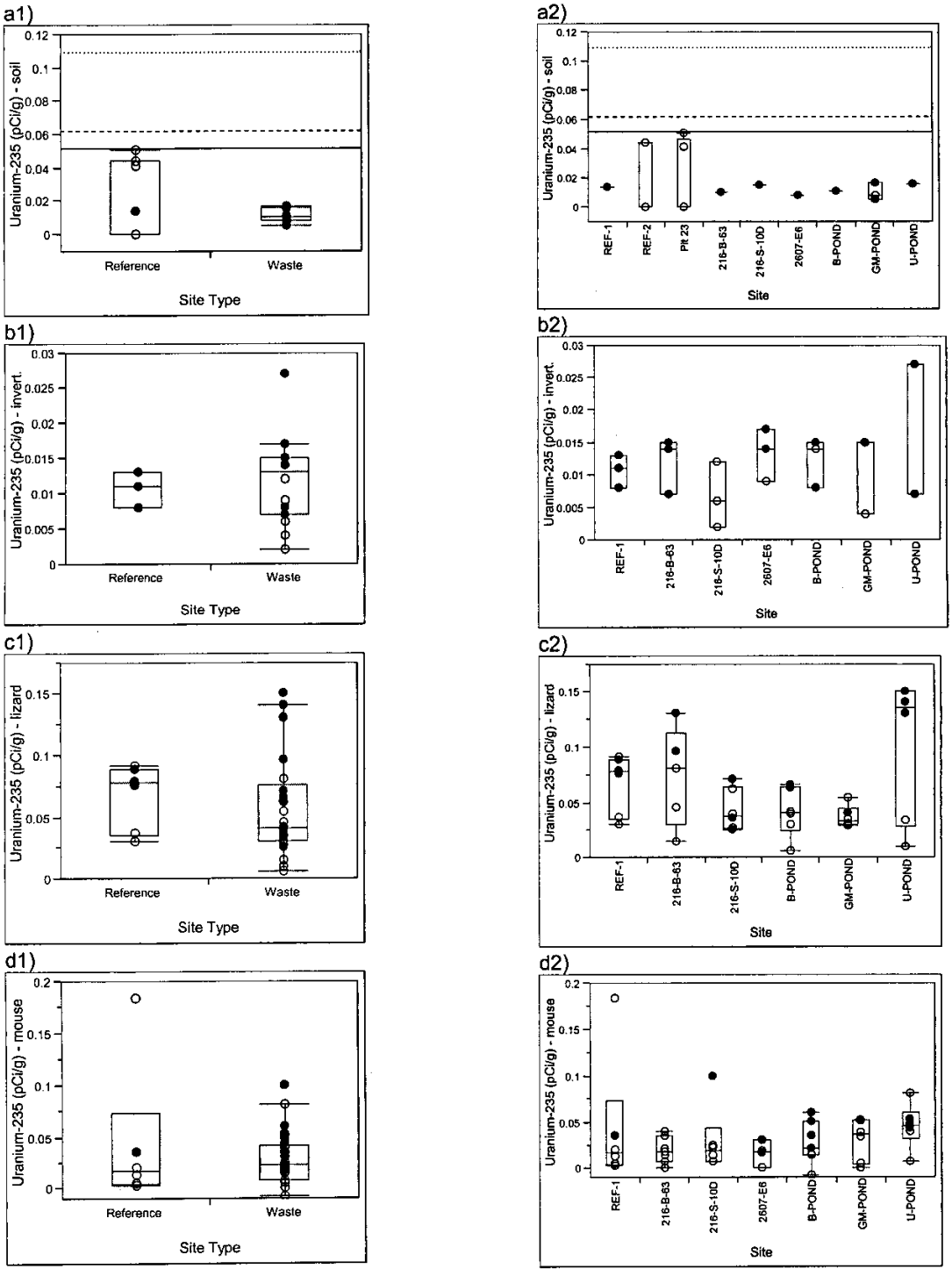


Figure B-92. Uranium-235 Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects.

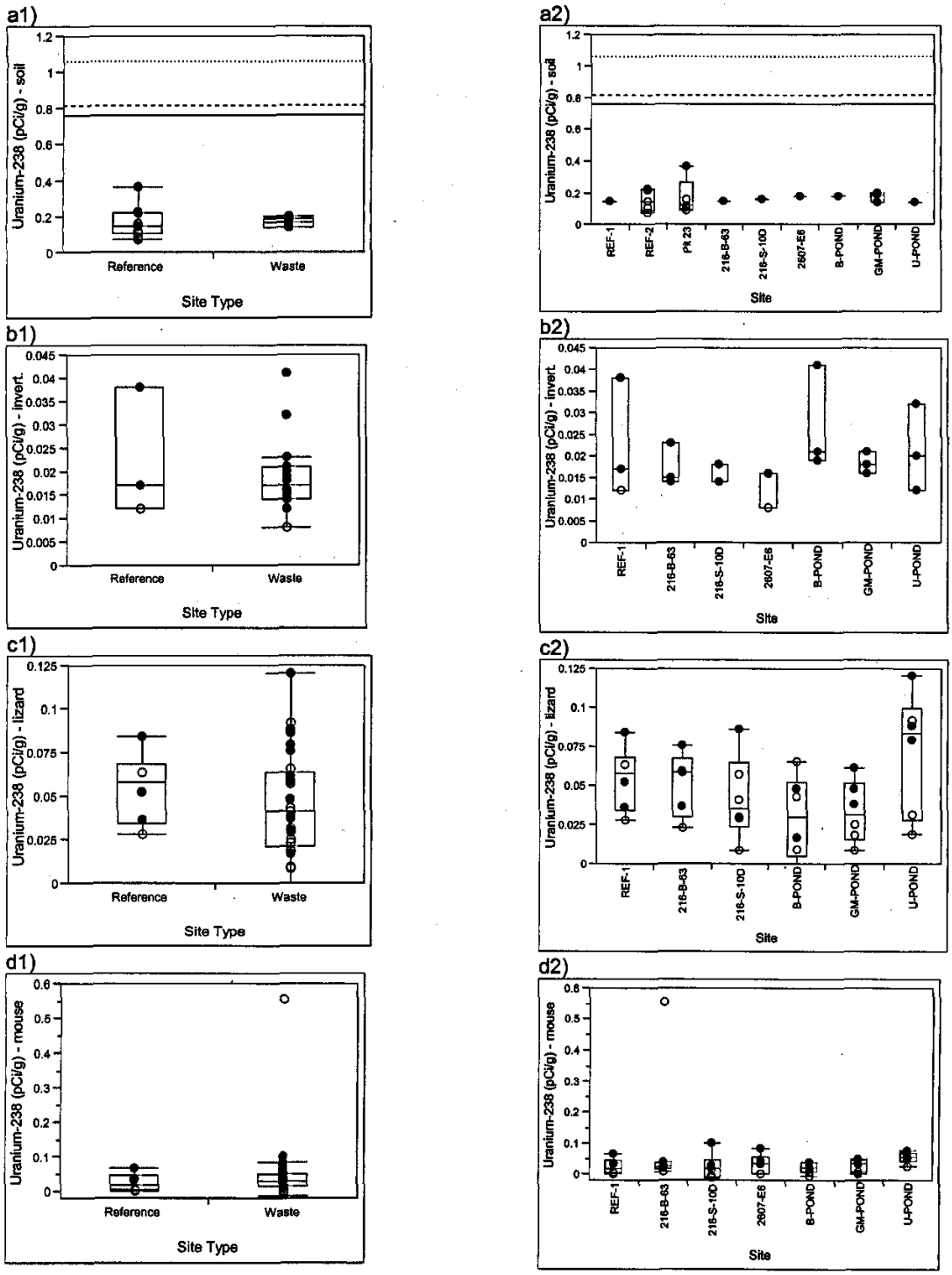
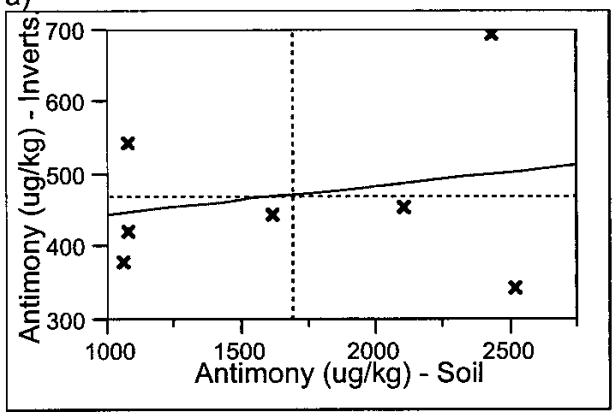


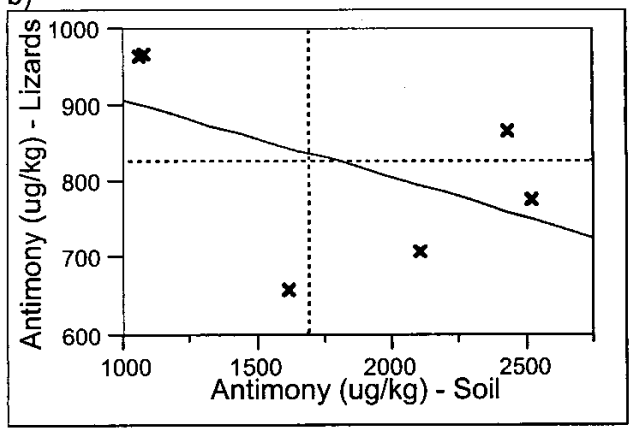
Figure B-93. Uranium-238 Results for Soil (a1, a2), Invertebrates (b1, b2), Lizards (c1, c2), and Mice (d1, d2) at Phase I Investigation Areas. Open circles are non-detects and filled circles are detects

a)



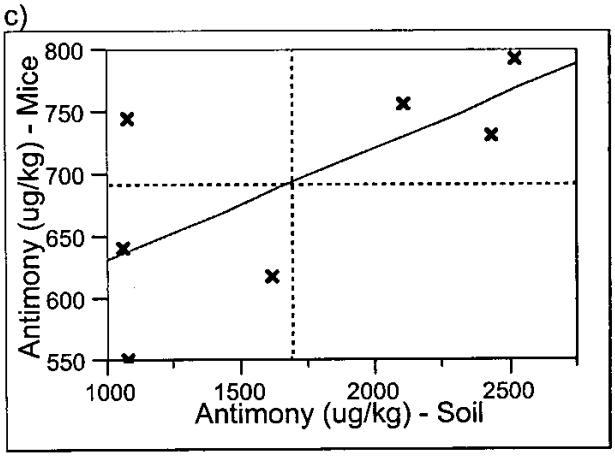
Antimony - Invertebrates = 405 + 0.039 Antimony – Soil; r^2=0.048; n=7; p=0.64

b)



Antimony - Lizards = 1010 - 0.1039563 Antimony – Soil; r^2=0.27; n=6; p=0.29

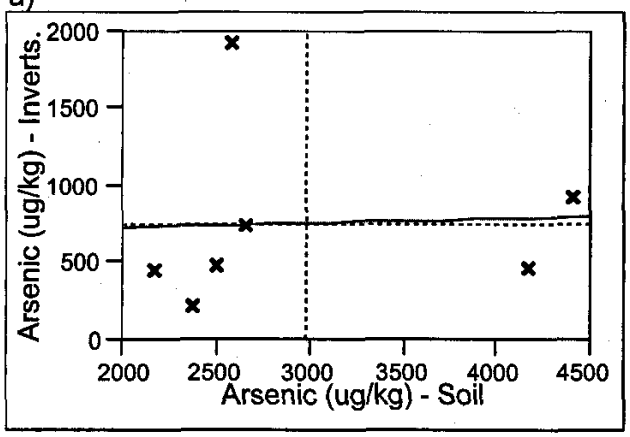
c)



Antimony - Mice = 540 + 0.0901 Antimony – Soil; r^2=0.45; n=7; p=0.10

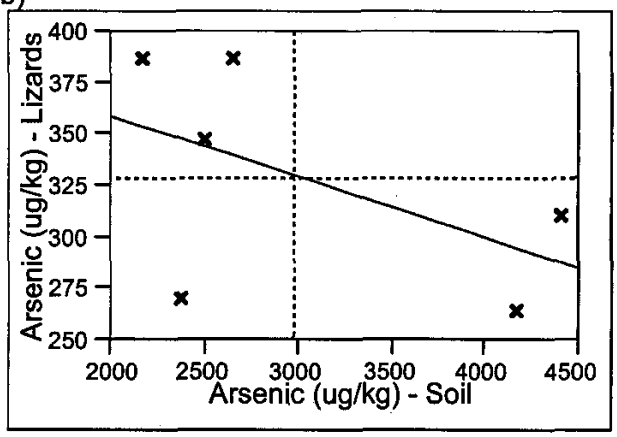
Figure B-94. Soil Bioaccumulation Plots for Antimony in a) Invertebrates, b) Lizards, and c) Mice.

a)



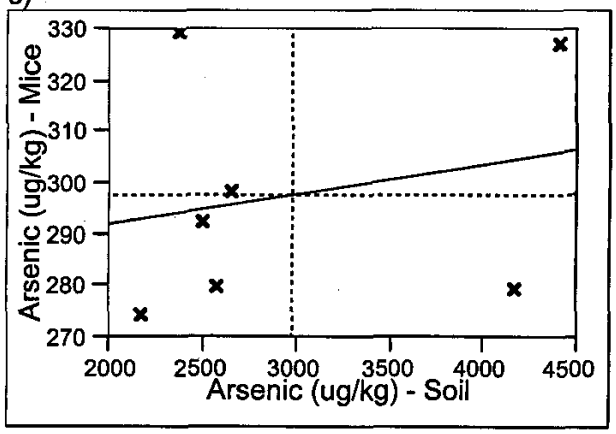
Arsenic - Invertebrates = 673 + 0.0278647 Arsenic – Soil; r^2=0.002; n=7; p=0.92

b)



Arsenic - Lizards = 418 - 0.029665 Arsenic – Soil; r^2=0.28; n=6; p=0.28

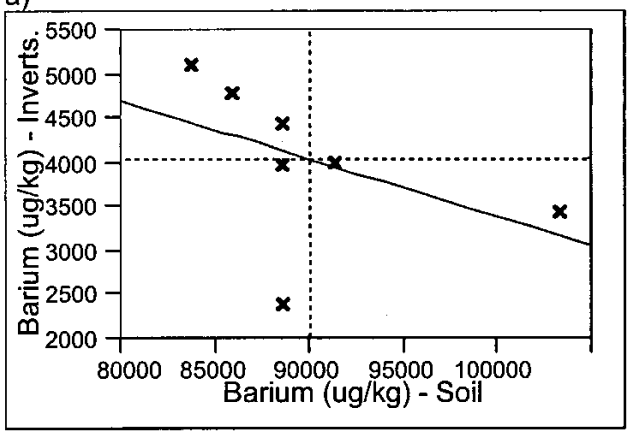
c)



Arsenic - Mice = 280 + 0.00586 Arsenic – Soil; r^2=0.056; n=7; p=0.61

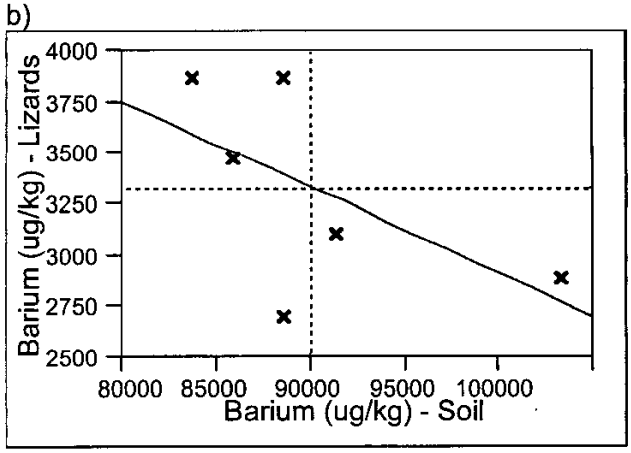
Figure B-95. Soil Bioaccumulation Plots for Arsenic in a) Invertebrates, b) Lizards, and c) Mice.

a)



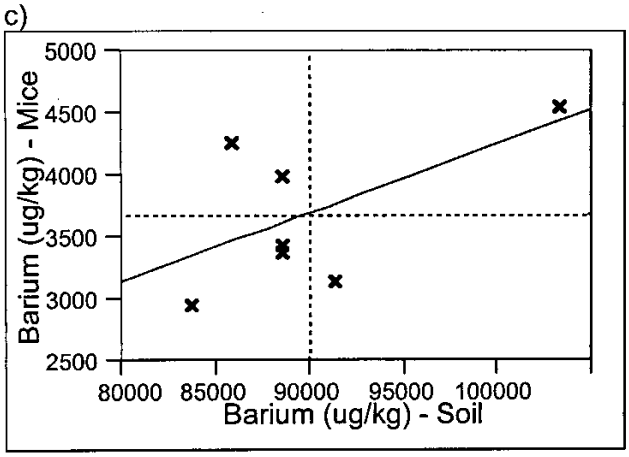
Barium - Invertebrates = 9900 - 0.065244 – Soil; r^2=0.21; n=7; p=0.30

b)



Barium - Lizards = 7120 - 0.0421 Barium – Soil; r^2=0.34; n=6; p=0.23

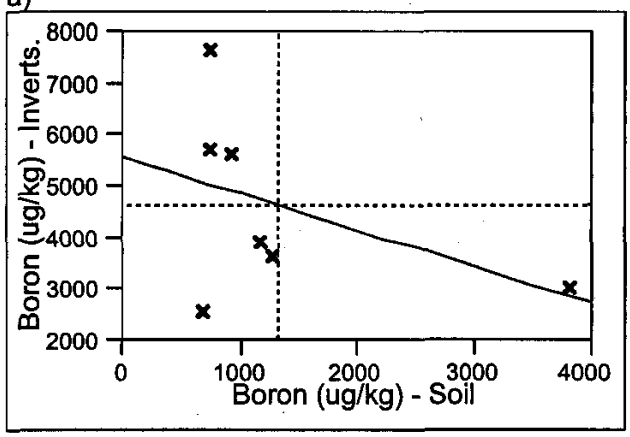
c)



Barium - Mice = -1340 + 0.0558 Barium – Soil; r^2=0.35; n=7; p=0.16

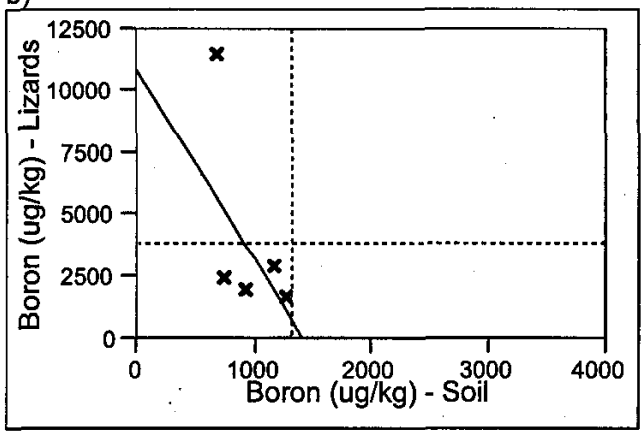
Figure B-96. Soil Bioaccumulation Plots for Barium in a) Invertebrates, b) Lizards, and c) Mice.

a)



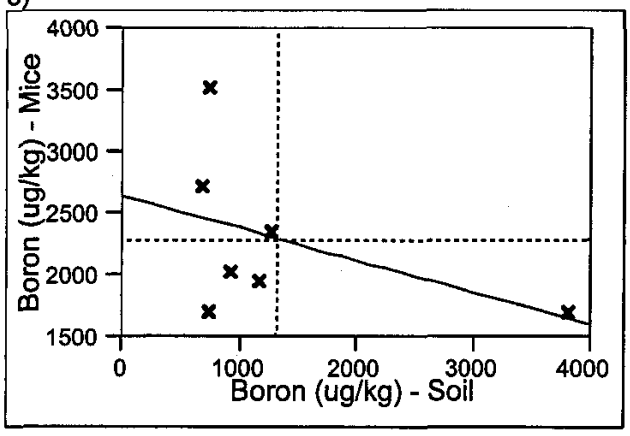
Boron - Invertebrates = 5550 - 0.707 Boron – Soil; r^2=0.19; n=7; p=0.33

b)



Boron - Lizards = 10800 - 7.67 Boron – Soil; r^2=0.25; n=6; p=0.31

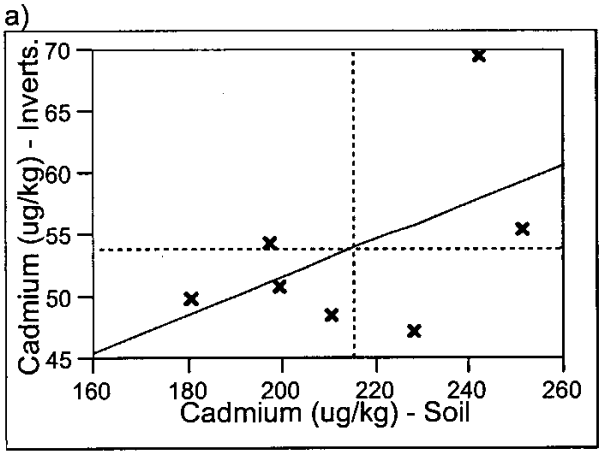
c)



Boron - Mice = 2640 - 0.261 Boron – Soil; r^2=0.20; n=7; p=0.32

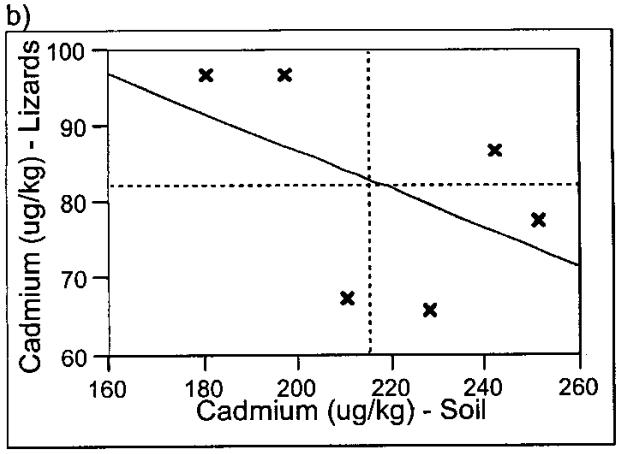
Figure B-97. Soil Bioaccumulation Plots for Boron in a) Invertebrates, b) Lizards, and c) Mice.

a)



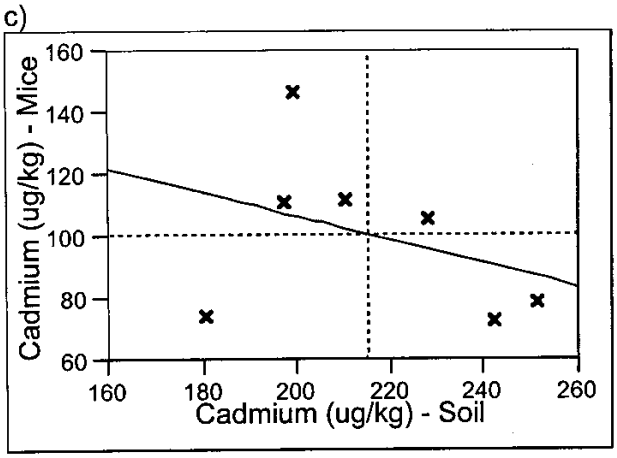
Cadmium - Invertebrates = 21.2 + 0.151 Cadmium – Soil; r^2=0.27; n=7; p=0.24

b)



Cadmium - Lizards = 137 - 0.254 Cadmium – Soil; r^2=0.25; n=6; p=0.31

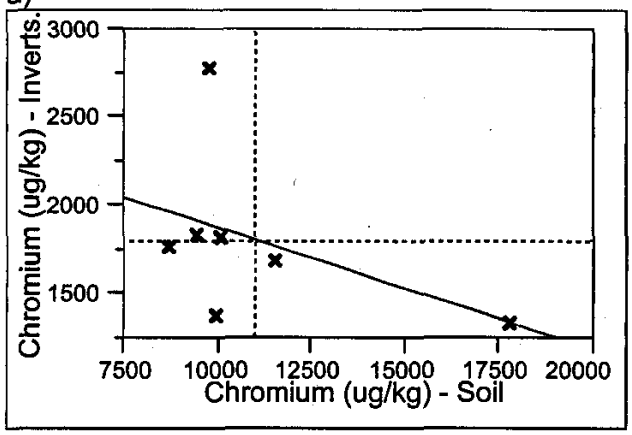
c)



Cadmium - Mice = 183 - 0.382 Cadmium – Soil; r^2=0.14; n=7; p=0.42

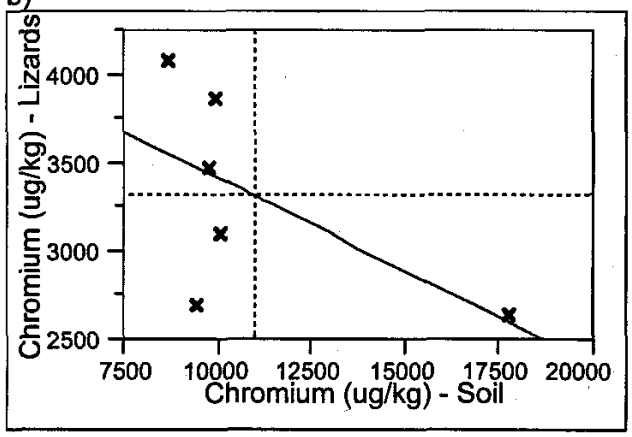
Figure B-98. Soil Bioaccumulation Plots for Cadmium in a) Invertebrates, b) Lizards, and c) Mice.

a)



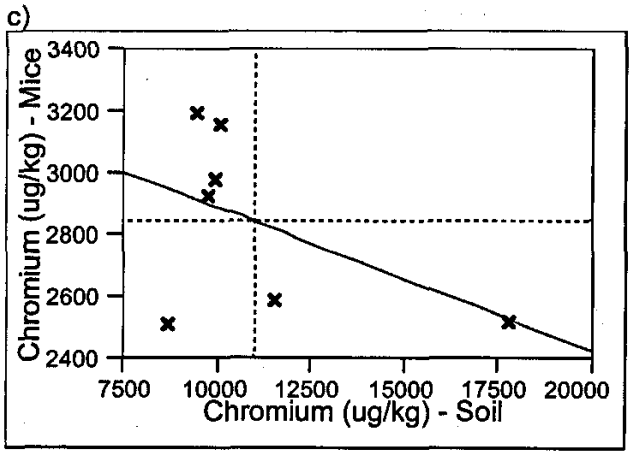
Chromium - Invertebrates = 2560 - 0.0688 Chromium – Soil; r^2=0.20; n=7; p=0.31

b)



Chromium - Lizards = 4460 - 0.105 Chromium – Soil; r^2=0.35; n=6; p=0.22

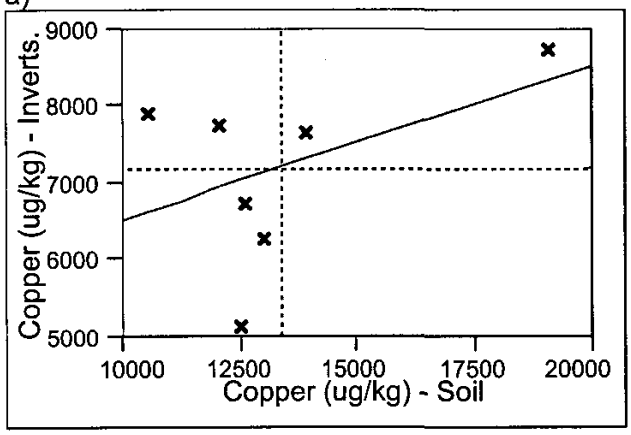
c)



Chromium - Mice = 3350 - 0.0465 Chromium – Soil; r^2=0.23; n=7; p=0.27

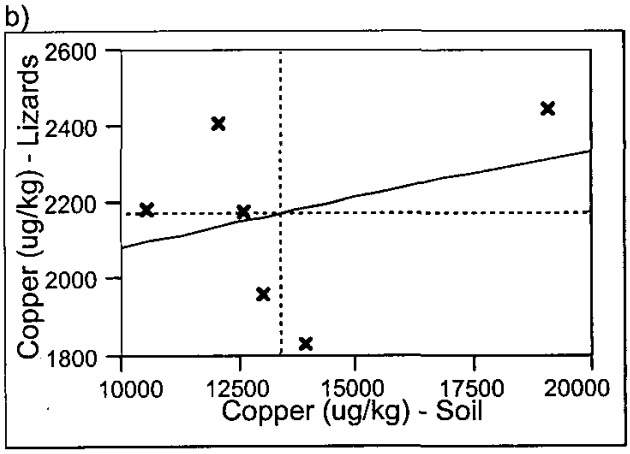
Figure B-99. Soil Bioaccumulation Plots for Chromium in a) Invertebrates, b) Lizards, and c) Mice.

a)



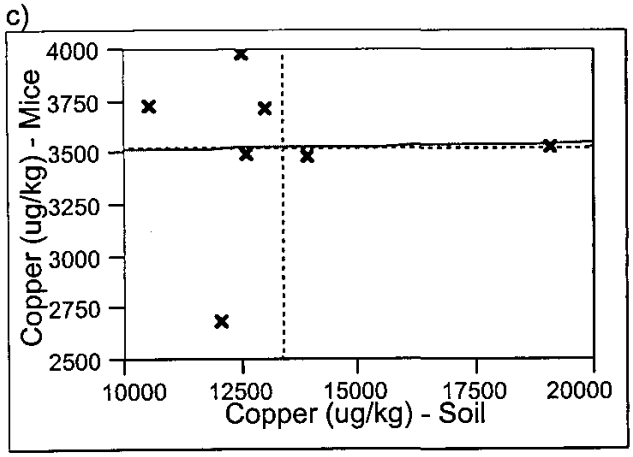
Copper - Invertebrates = 4540 + 0.198 Copper – Soil; r^2=0.20; n=7; p=0.32

b)



Copper - Lizards = 1830 + 0.0254123 Copper – Soil; r^2=0.095; n=6; p=0.55

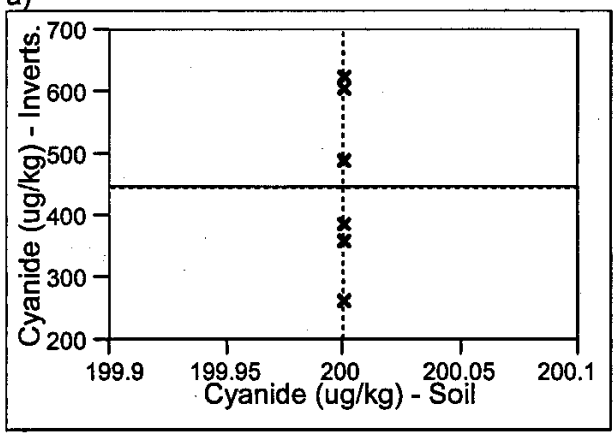
c)



Copper - Mice = 3480 + 0.0031711 Copper – Soil; r^2=0.0004; n=7; p=0.96

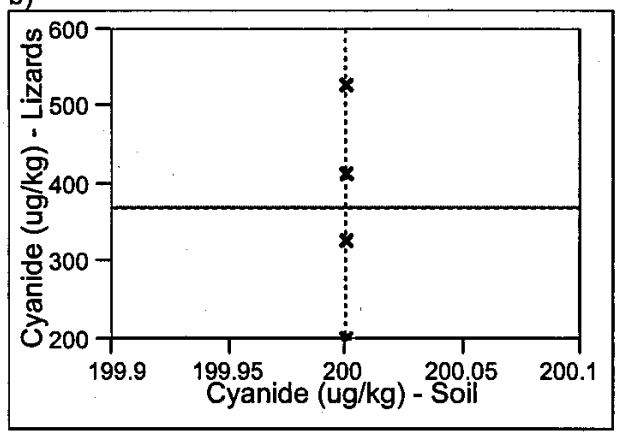
Figure B-100. Soil Bioaccumulation Plots for Copper in a) Invertebrates, b) Lizards, and c) Mice.

a)



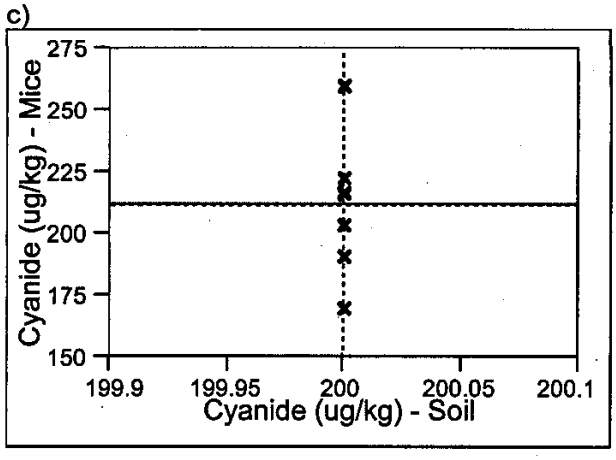
Cyanide - Invertebrates = 448 + 0 Cyanide – Soil; r^2=0; n=7; p=0

b)



Cyanide - Lizards = 370 + 0 Cyanide – Soil; r^2=0; n=4; p=0

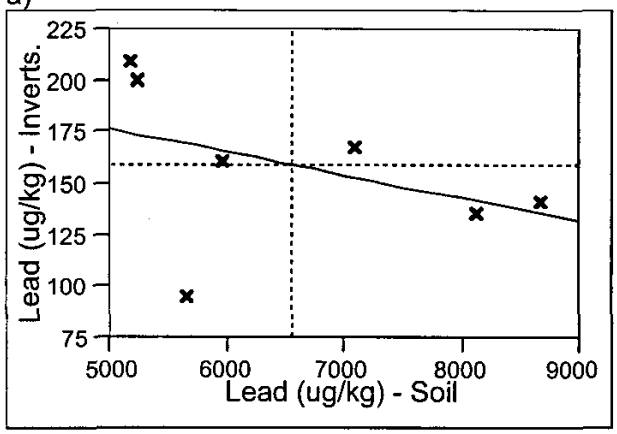
c)



Cyanide - Mice = 212 + 0 Cyanide – Soil; r^2=0; n=7; p=0

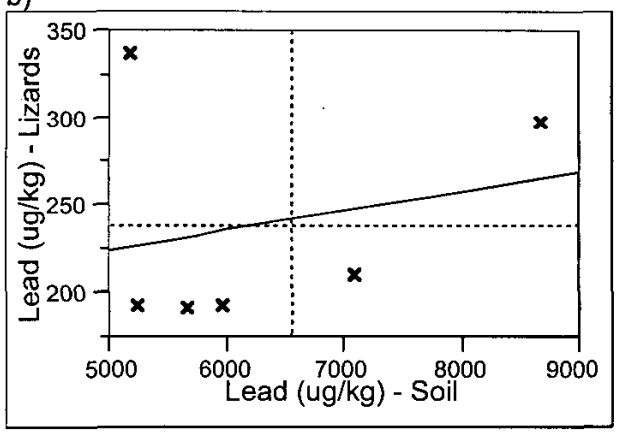
Figure B-101. Soil Bioaccumulation Plots for Cyanide in a) Invertebrates, b) Lizards, and c) Mice.

a)



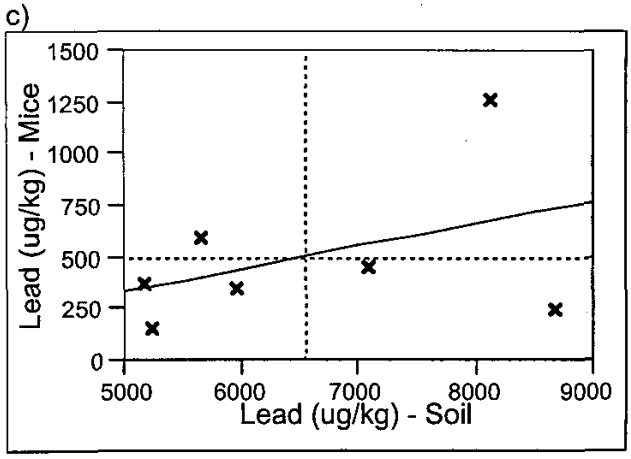
Lead - Invertebrates = 233 - 0.0113 Lead – Soil; r^2=0.17; n=7; p=0.37

b)



Lead - Lizards = 169 + 0.0109 Lead – Soil; r^2=0.053; n=6; p=0.66

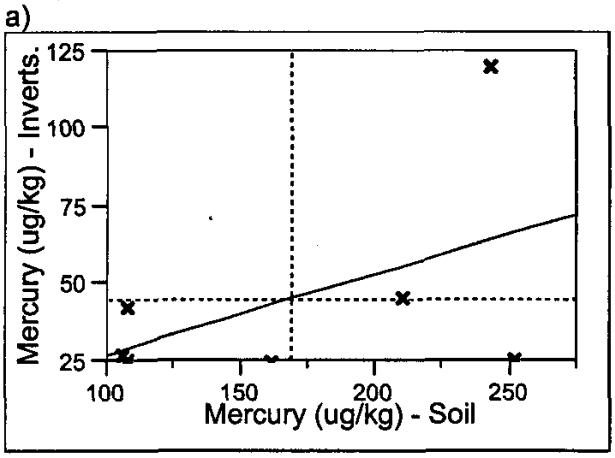
c)



Lead - Mice = -206 + 0.108 Lead – Soil; r^2=0.17; n=7; p=0.36

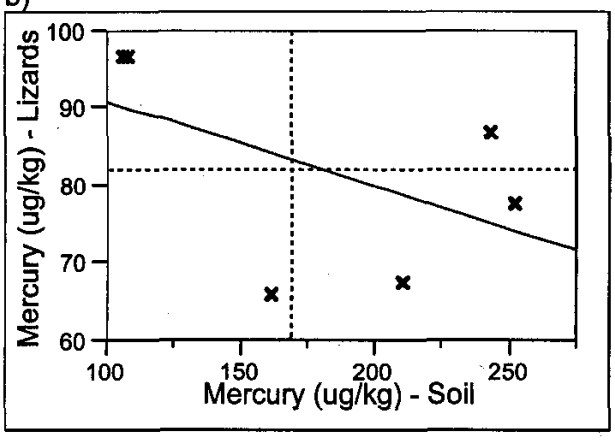
Figure B-102. Soil Bioaccumulation Plots for Lead in a) Invertebrates, b) Lizards, and c) Mice.

a)



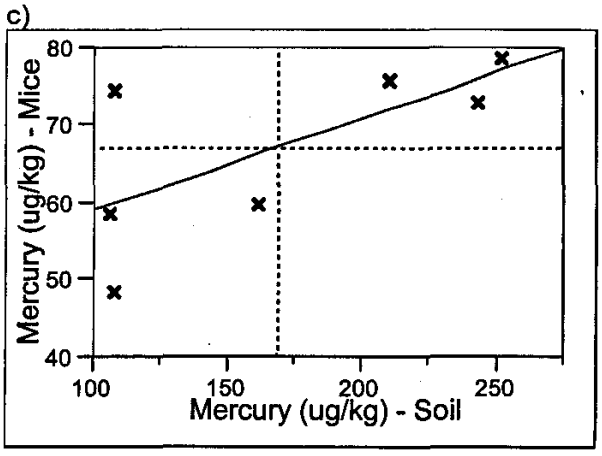
Mercury - Invertebrates = 1.049 + 0.259 Mercury – Soil; r^2=0.240738; n=7; p=0.26

b)



Mercury - Lizards = 102 - 0.111 Mercury – Soil; r^2=0.27; n=6; p=0.29

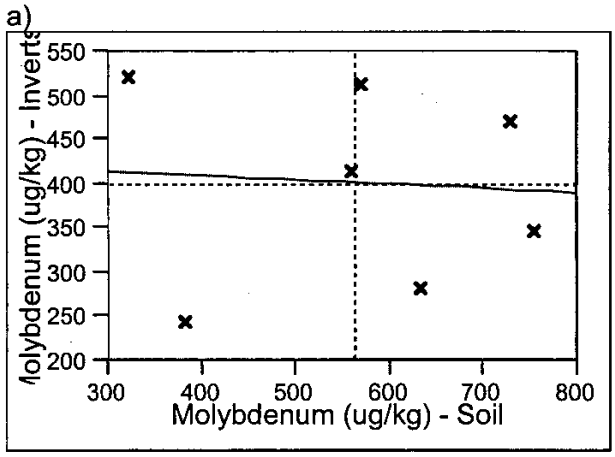
c)



Mercury - Mice = 47.0 + 0.119 Mercury – Soil; r^2=0.47; n=7; p=0.09

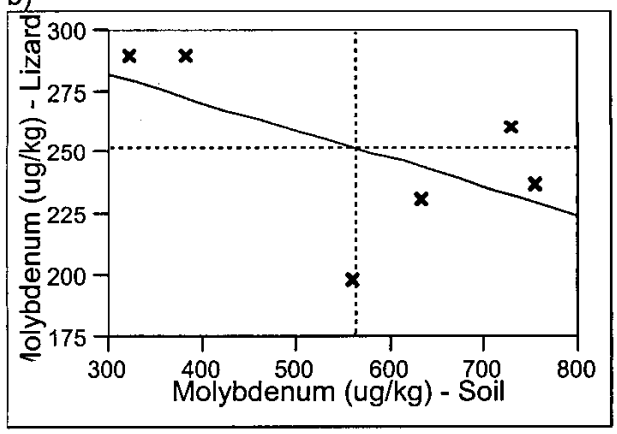
Figure B-103. Soil Bioaccumulation Plots for Mercury in a) Invertebrates, b) Lizards, and c) Mice.

a)



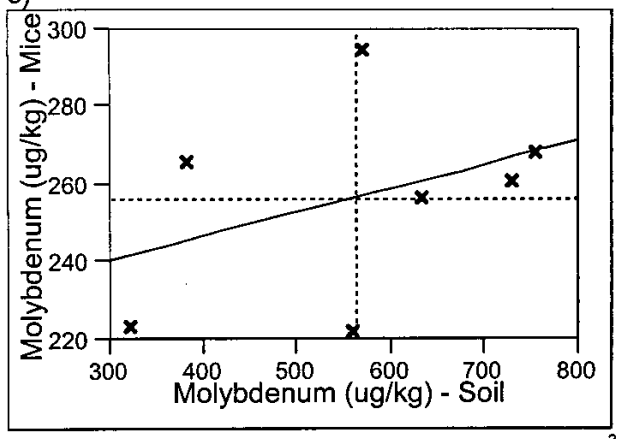
Molybdenum - Invertebrates = 427 - 0.0469 Molybdenum – Soil; r^2=0.0047; n=7; p=0.88

b)



Molybdenum - Lizards = 317 - 0.116 Molybdenum – Soil; r^2=0.33; n=6; p=0.23

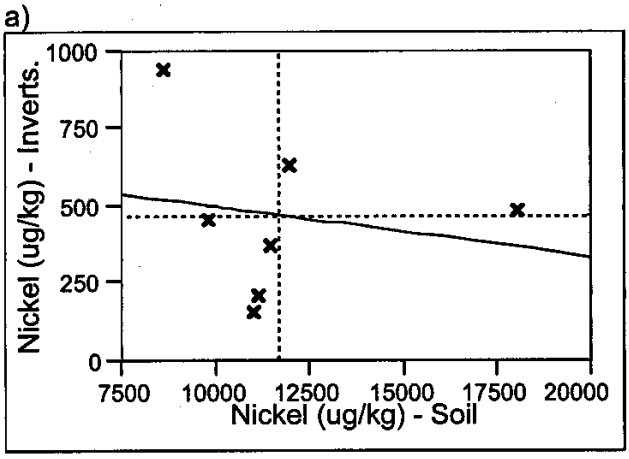
c)



Molybdenum - Mice = 222 + 0.0612 Molybdenum – Soil; r^2=0.15; n=7; p=0.39

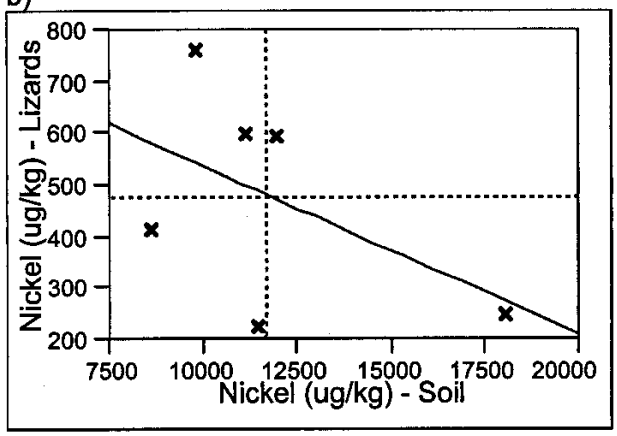
Figure B-104. Soil Bioaccumulation Plots for Molybdenum in a) Invertebrates, b) Lizards, and c) Mice.

a)



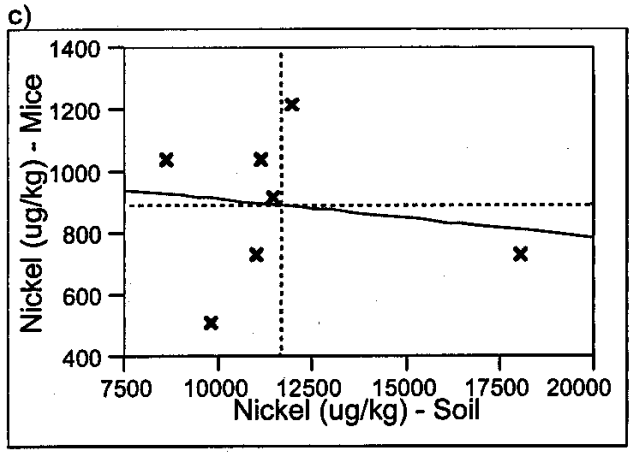
Nickel - Invertebrates = 661 - 0.0163 Nickel – Soil; r^2=0.034; n=7; p=0.69

b)



Nickel - Lizards = 864 - 0.0329 Nickel – Soil; r^2=0.25; n=6; p=0.31

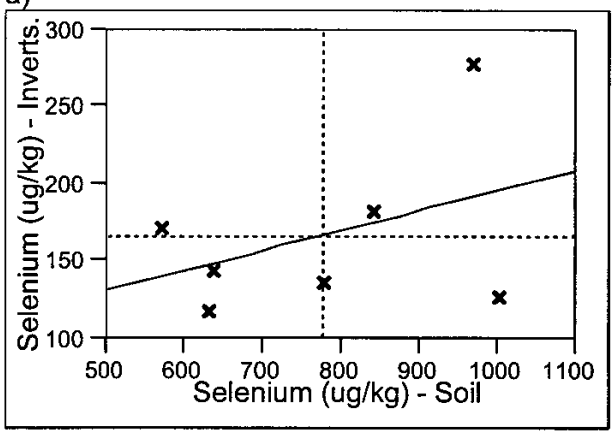
c)



Nickel - Mice = 1030 - 0.0123 Nickel – Soil; r^2=0.024; n=7; p=0.74

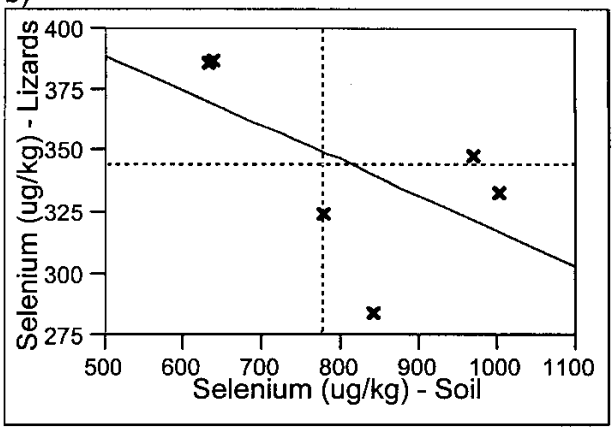
Figure B-105. Soil Bioaccumulation Plots for Nickel in a) Invertebrates, b) Lizards, and c) Mice.

a)



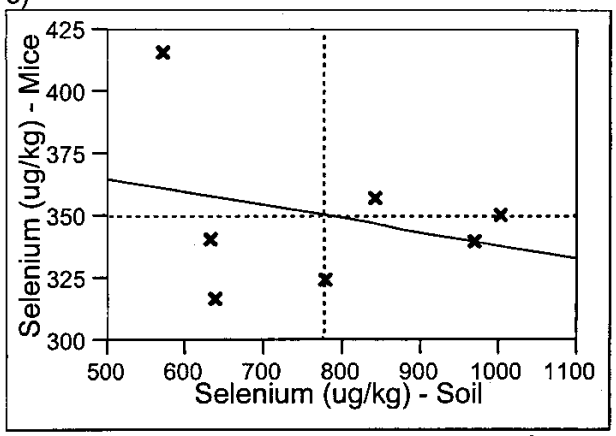
Selenium - Invertebrates = 65.3 + 0.130 Selenium – Soil; r^2=0.16; n=7; p=0.37

b)



Selenium - Lizards = 459 - 0.141 Selenium – Soil; r^2=0.33; n=6; p=0.24

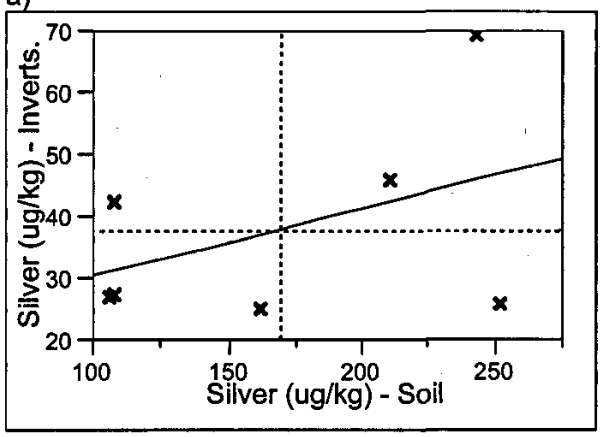
c)



Selenium - Mice = 391 - 0.0532 Selenium – Soil; r^2=0.078; n=7; p=0.54

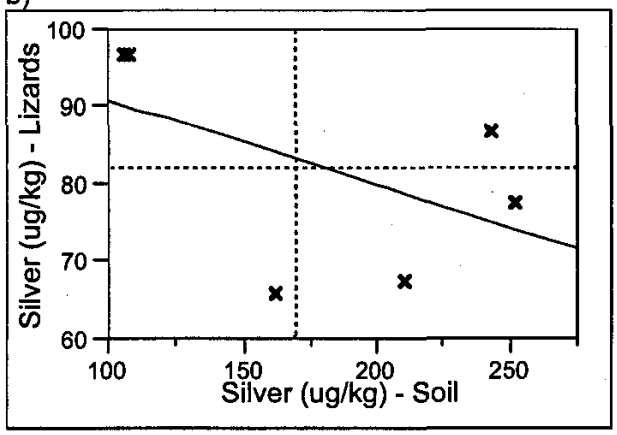
Figure B-106. Soil Bioaccumulation Plots for Selenium in a) Invertebrates, b) Lizards, and c) Mice.

a)



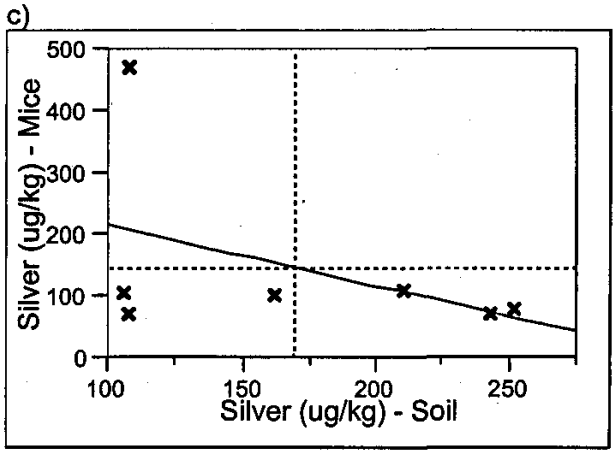
Silver - Invertebrates = 19.4 + 0.109 Silver – Soil; r^2=0.189265; n=7; p=0.33

b)



Silver - Lizards = 102 - 0.111 Silver – Soil; r^2=0.27; n=6; p=0.29

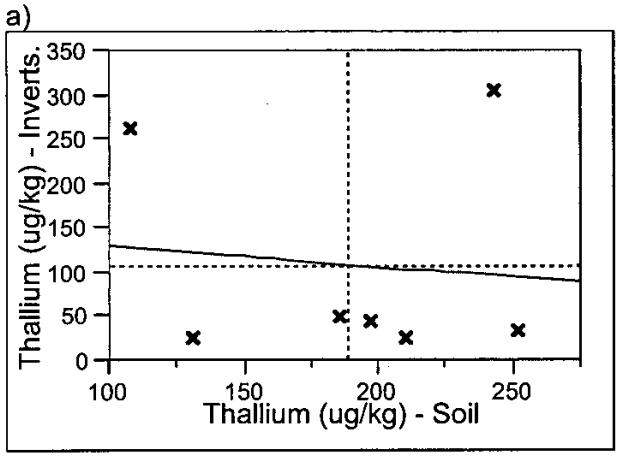
c)



Silver - Mice = 312 - 0.984 Silver – Soil; r^2=0.20; n=7; p=0.32

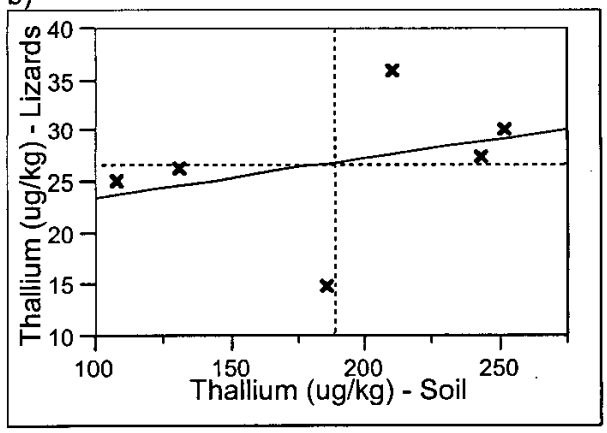
Figure B-107. Soil Bioaccumulation Plots for Silver in a) Invertebrates, b) Lizards, and c) Mice.

a)



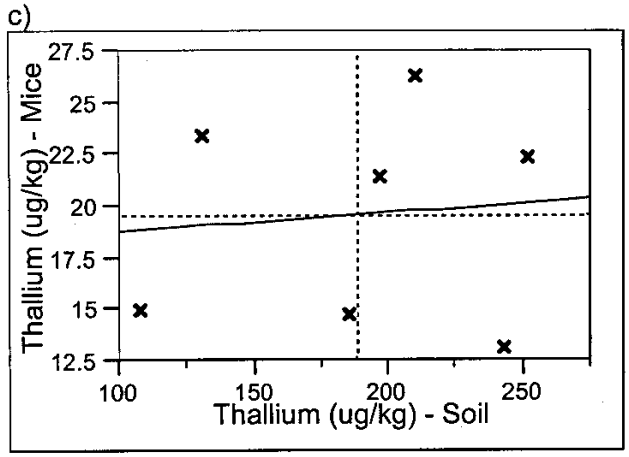
Thallium - Invertebrates = 151 - 0.227 Thallium – Soil; r^2=0.010; n=7; p=0.83

b)



Thallium - Lizards = 19.8 + 0.0369502 Thallium – Soil; r^2=0.099; n=6; p=0.54

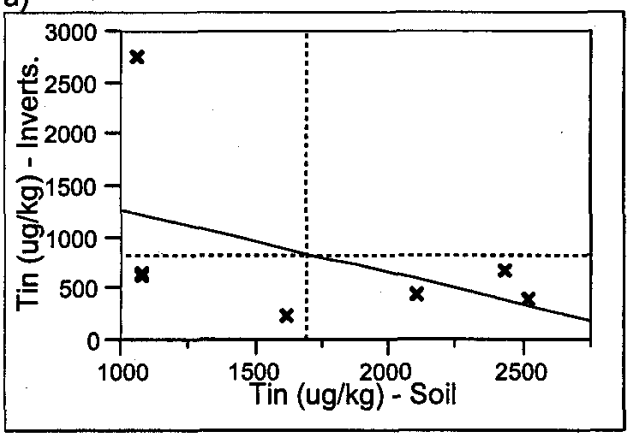
c)



Thallium - Mice = 17.8 + 0.00922 Thallium – Soil; r^2=0.0093; n=7; p=0.84

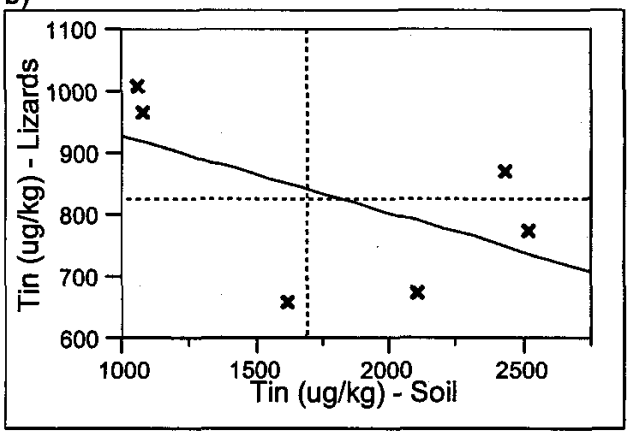
Figure B-108. Soil Bioaccumulation Plots for Thallium in a) Invertebrates, b) Lizards, and c) Mice.

a)



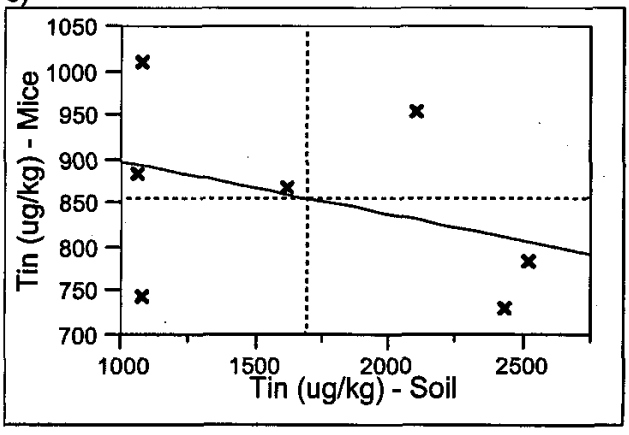
Tin - Invertebrates = 1870 - 0.610 Tin – Soil; r^2=0.21; n=7; p=0.30

b)



Tin - Lizards = 1050 - 0.125 Tin – Soil; r^2=0.30; n=6; p=0.26

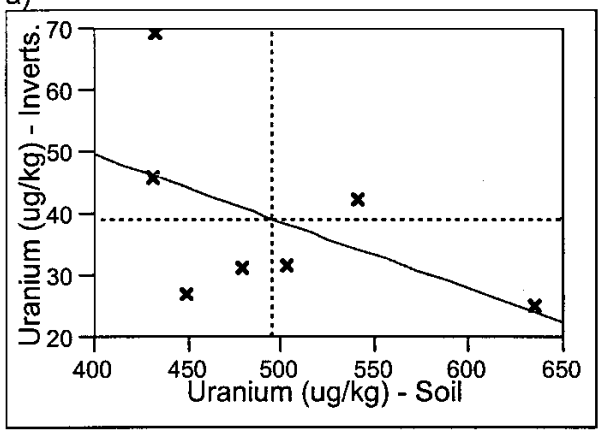
c)



Tin - Mice = 958 - 0.0606 Tin – Soil; r^2=0.14; n=7; p=0.41

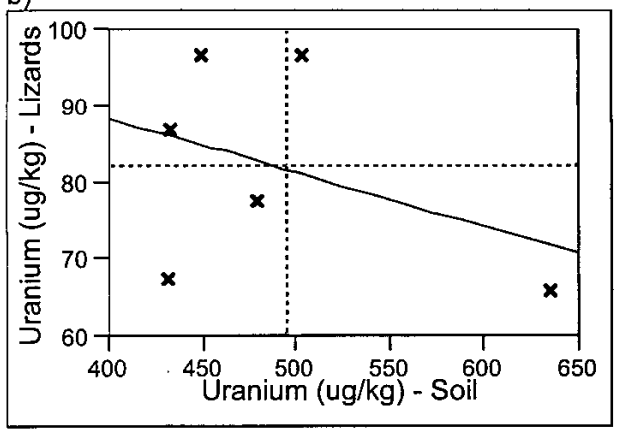
Figure B-109. Soil Bioaccumulation Plots for Tin in a) Invertebrates, b) Lizards, and c) Mice.

a)



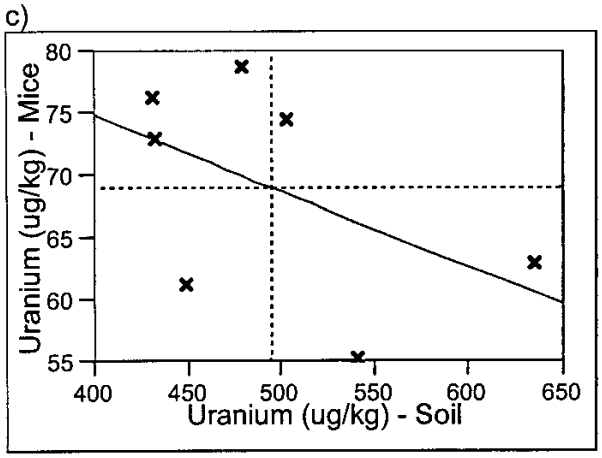
Uranium - Invertebrates = 993 - 0.109 Uranium – Soil; r^2=0.27; n=7; p=0.24

b)



Uranium - Lizards = 117 - 0.0706 Uranium – Soil; r^2=0.16; n=6; p=0.44

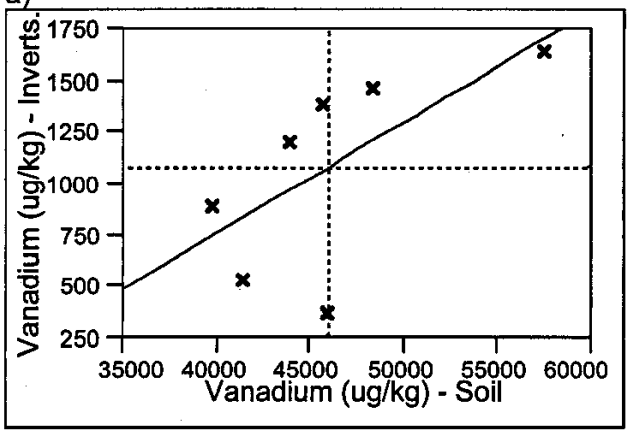
c)



Uranium - Mice = 99.0 - 0.0606 Uranium – Soil; r^2=0.24; n=7; p=0.26

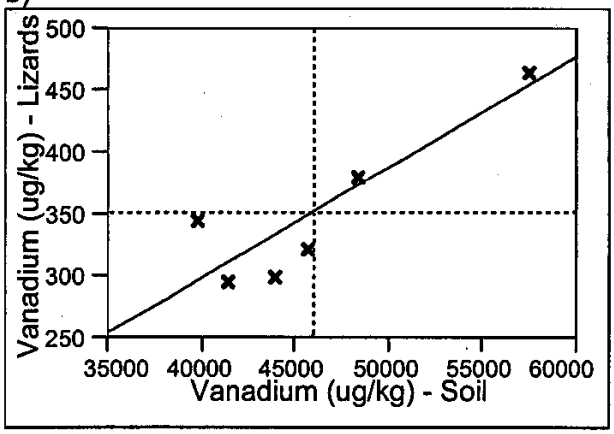
Figure B-110. Soil Bioaccumulation Plots for Uranium in a) Invertebrates, b) Lizards, and c) Mice.

a)



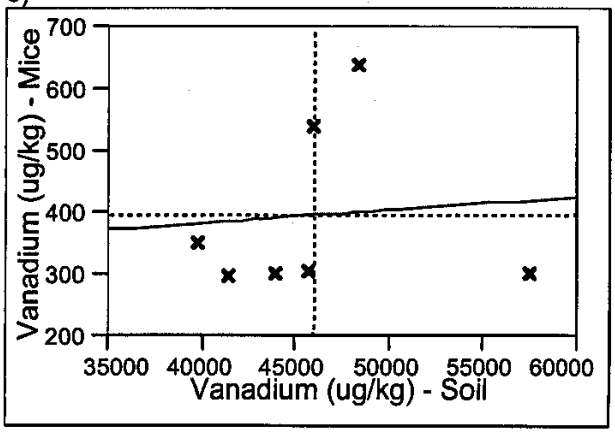
Vanadium - Invertebrates = -1400 + 0.0539 – Vanadium Soil; r^2=0.41; n=7; p=0.12

b)



Vanadium - Lizards = -58.7 + 0.00892 Vanadium – Soil; r^2=0.77; n=6; p=0.02

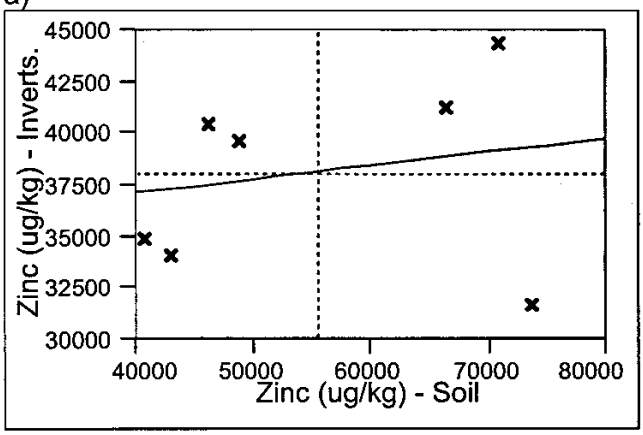
c)



Vanadium - Mice = 299 + 0.00208 Vanadium – Soil; r^2=0.0074; n=7; p=0.85

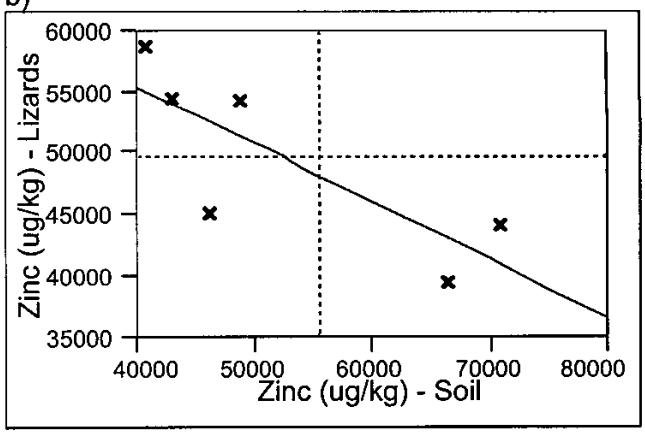
Figure B-111. Soil Bioaccumulation Plots for Vanadium in a) Invertebrates, b) Lizards, and c) Mice.

a)



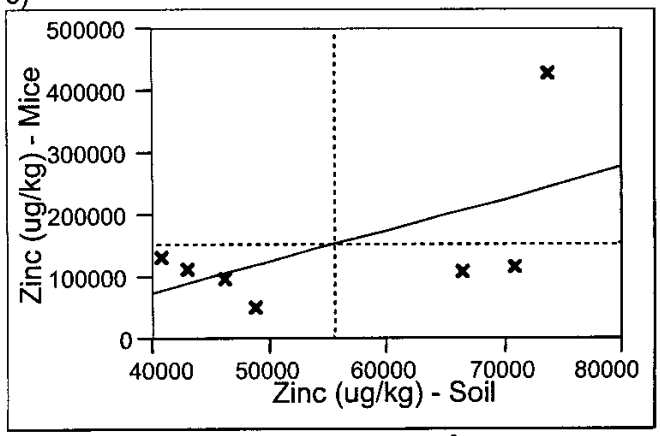
Zinc - Invertebrates = -34500 + 0.0655 – Zinc Soil; r^2=0.041; n=7; p=0.66

b)



Zinc - Lizards = 74300 - 0.472 Zinc – Soil; r^2=0.64; n=6; p=0.05

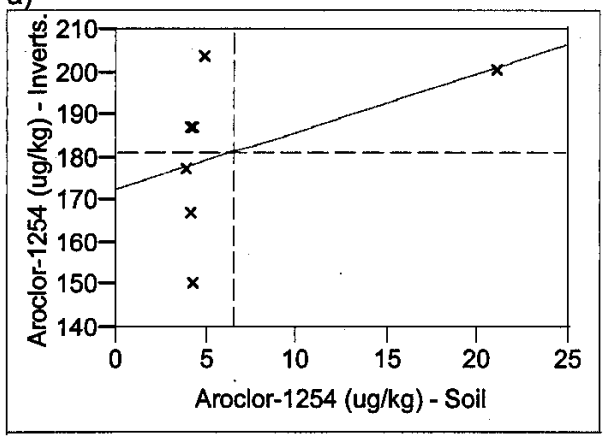
c)



Zinc - Mice = -127000 + 5.02 Zinc – Soil; r^2=0.32; n=7; p=0.18

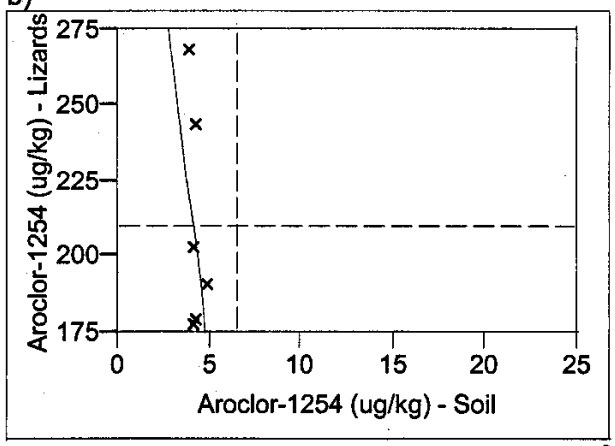
Figure B-112. Soil Bioaccumulation Plots for Zinc in a) Invertebrates, b) Lizards, and c) Mice.

a)



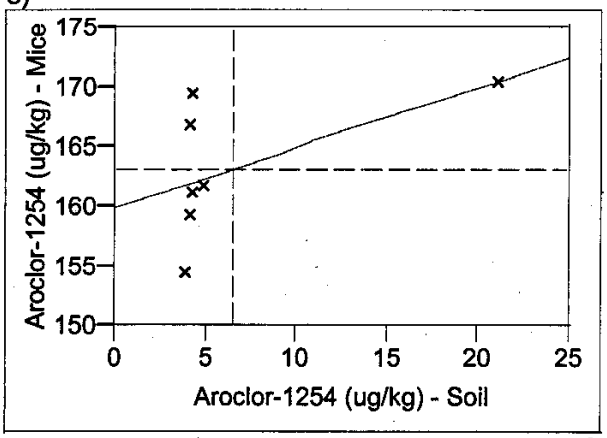
Aroclor-1254 - Invertebrates = 172 + 1.36 – Aroclor-1254 Soil; r^2=0.21; n=7; p=0.30

b)



Aroclor-1254 - Lizards = 419 - 49.5 Aroclor-1254 – Soil; r^2=0.23; n=6; p=0.33

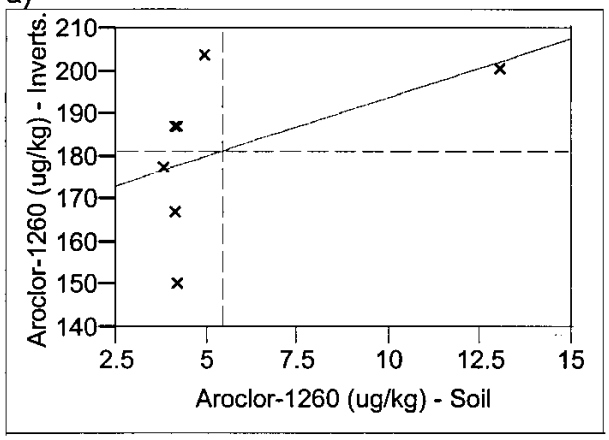
c)



Aroclor-1254 - Mice = 160 + 0.505 Aroclor-1254– Soil; r^2=0.30; n=7; p=0.20

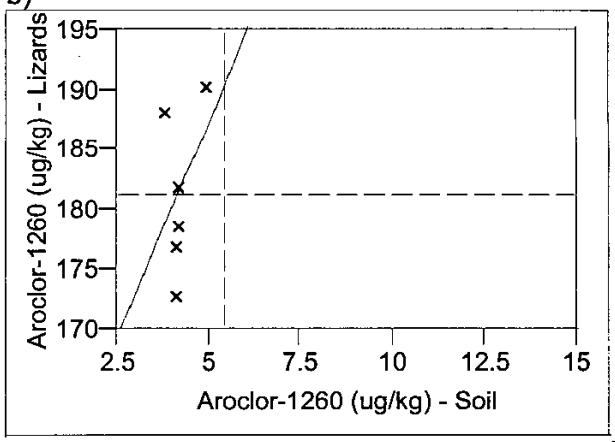
Figure B-113. Soil Bioaccumulation Plots for Aroclor-1254 in a) Invertebrates, b) Lizards, and c) Mice.

a)



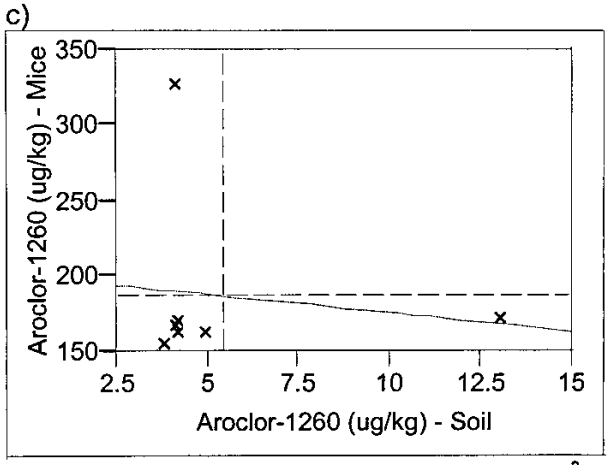
Aroclor-1260 - Invertebrates = 167 + 2.72 – Aroclor-1260 Soil; r^2=0.234; n=7; p=0.27

b)



Aroclor-1260 - Lizards = 151 + 7.13 Aroclor-1260 – Soil; r^2=0.149; n=6; p=0.45

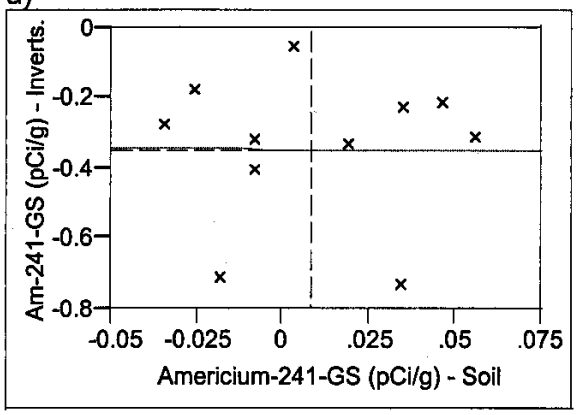
c)



Aroclor-1260 - Mice = 200 - 2.45 Aroclor-1260– Soil; r^2=0.018; n=7; p=0.78

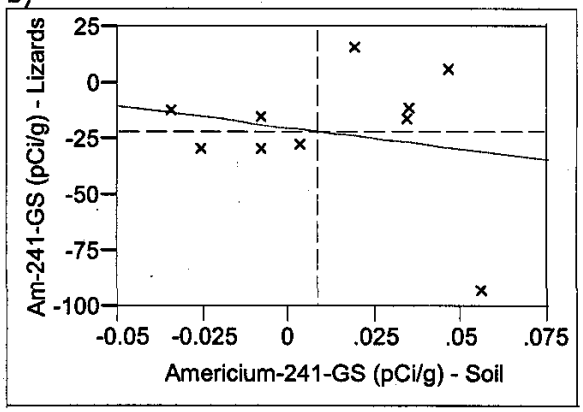
Figure B-114. Soil Bioaccumulation Plots for Aroclor-1260 in a) Invertebrates, b) Lizards, and c) Mice.

a)



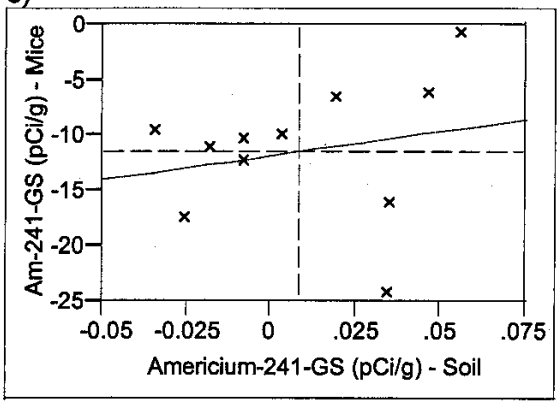
Americium-241-GS - Invertebrates = -0.345 - 0.0188 – Americium-241-GS Soil; r^2<0.001; n=11; p=0.99

b)



Americium-241-GS - Lizards = -19.9 - 188. Americium-241-GS – Soil; r^2=0.040; n=10; p=0.58

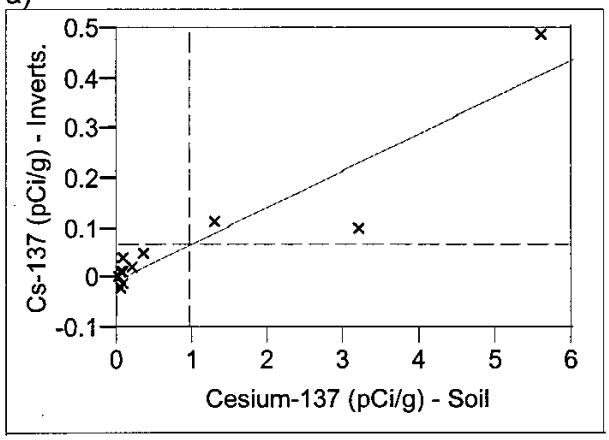
c)



Americium-241-GS - Mice = -11.9 + 43.7 Americium-241-GS – Soil; r^2=0.018; n=7; p=0.78

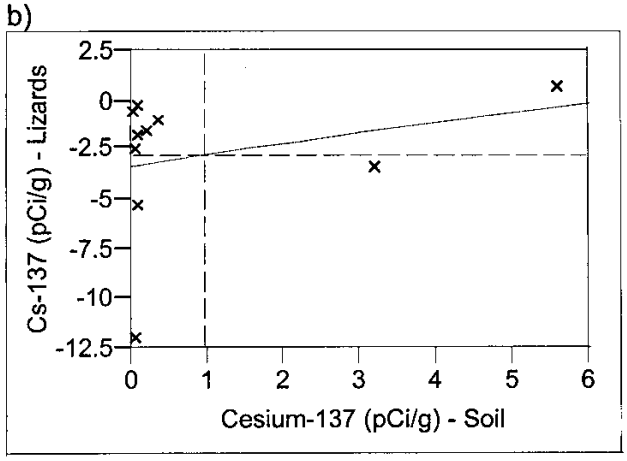
Figure B-115. Soil Bioaccumulation Plots for Americium-241-GS in a) Invertebrates, b) Lizards, and c) Mice.

a)



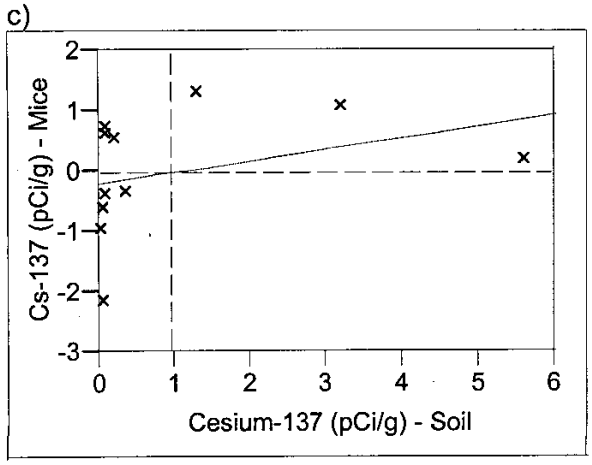
Cesium-137 - Invertebrates = -0.00406 + 0.0739 – Cesium-137 Soil; r^2=0.866; n=11; p<.0001

b)



Cesium-137 - Lizards = -3.40 + 0.553 Cesium-137 – Soil; r^2=0.082; n=10; p=0.42

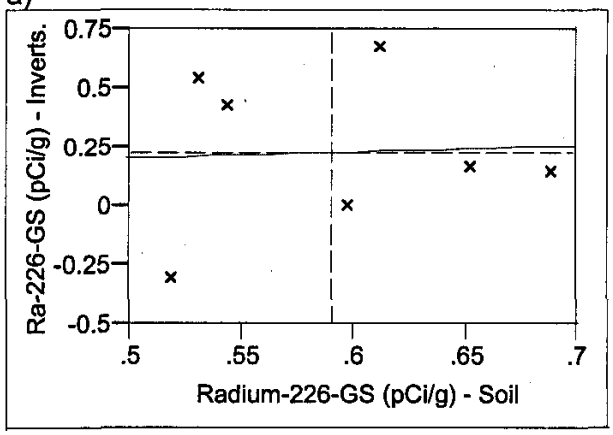
c)



Cesium-137 - Mice = -0.210 + 0.189 Cesium-137 – Soil; r^2=0.11; n=11; p=0.31

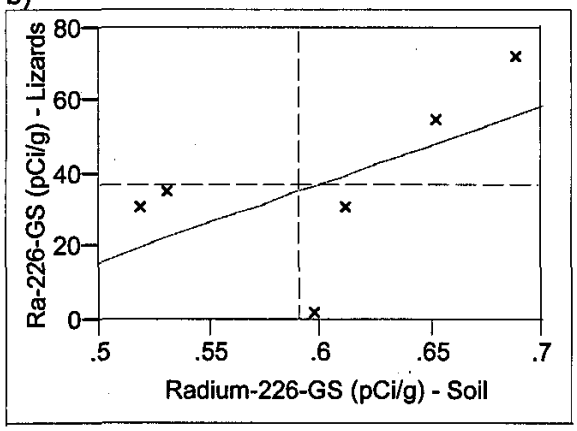
Figure B-116. Soil Bioaccumulation Plots for Cesium-137 in a) Invertebrates, b) Lizards, and c) Mice.

a)



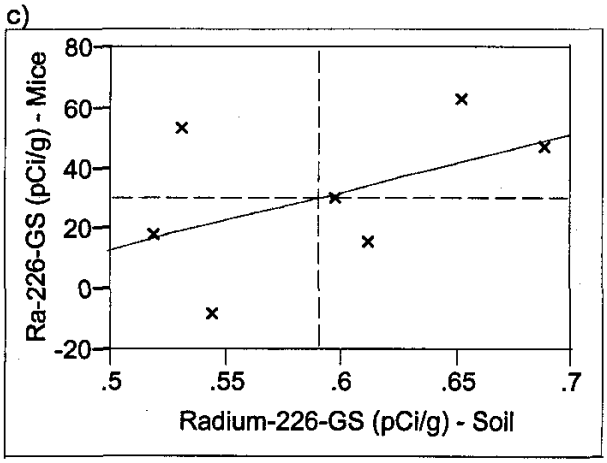
Radium-226-GS - Invertebrates = 0.0722 + 0.264 – Radium-226-GS Soil; r^2=0.0025; n=7; p=0.92

b)



Radium-226-GS - Lizards = -91.0 + 214 Radium-226-GS – Soil; r^2=0.35; n=6; p=0.22

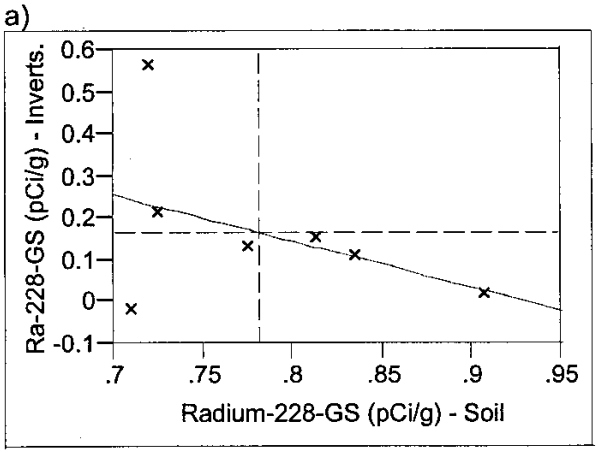
c)



Radium-226-GS - Mice = -82.5 + 191 Radium-226-GS – Soil; r^2=0.24; n=7; p=0.27

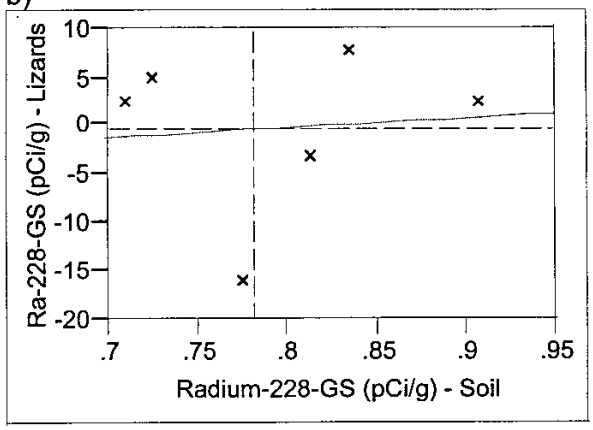
Figure B-117. Soil Bioaccumulation Plots for Radium-226-GS in a) Invertebrates, b) Lizards, and c) Mice.

a)



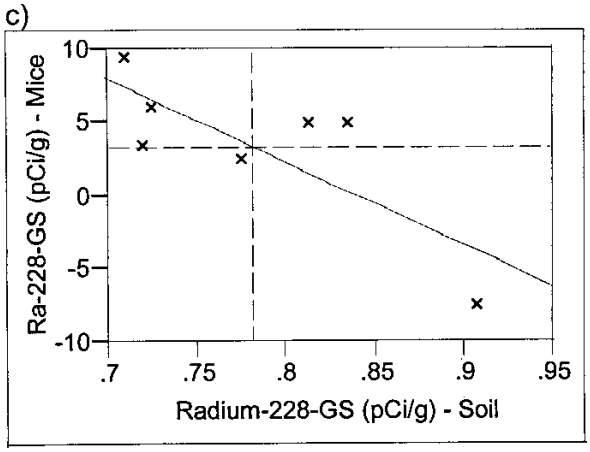
Radium-228-GS - Invertebrates = 1.03 - 1.10 – Radium-228-GS Soil; r^2=0.18; n=7; p=0.35

b)



Radium-228-GS - Lizards = -8.73 + 10.4 Radium-228-GS – Soil; r^2=0.008; n=6; p=0.87

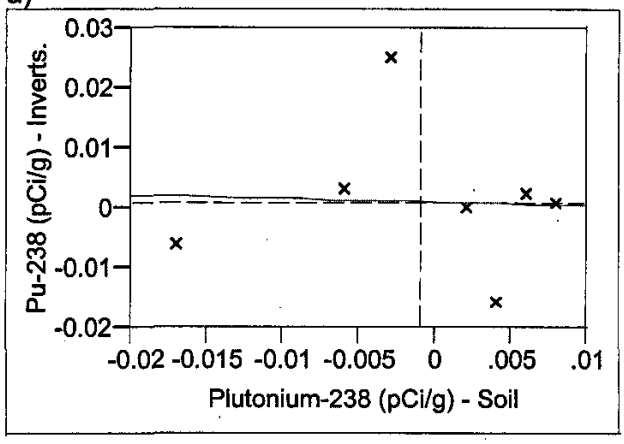
c)



Radium-228-GS - Mice = 47.9 – 57.0 Radium-228-GS – Soil; r^2=0.62; n=7; p=0.037

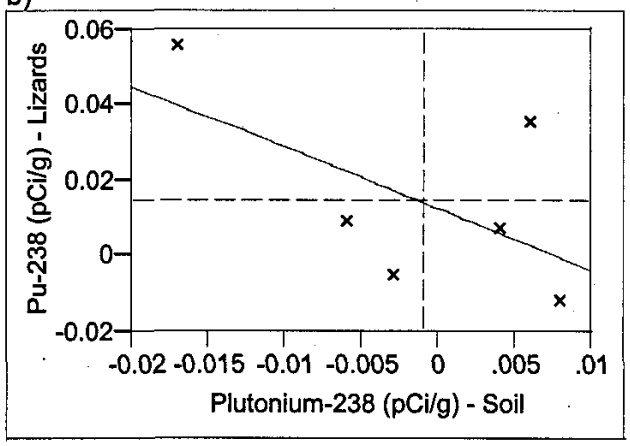
Figure B-118. Soil Bioaccumulation Plots for Radium-228-GS in a) Invertebrates, b) Lizards, and c) Mice.

a)



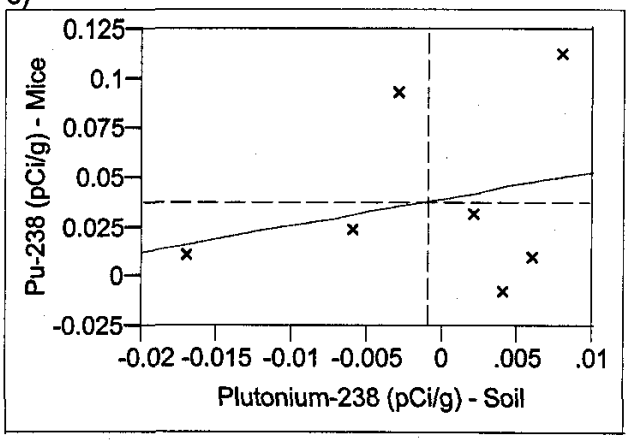
Plutonium-238 - Invertebrates = 0.00110 - 0.0538 – Plutonium-238 Soil; r^2=0.0014; n=7; p=0.94

b)



Plutonium-238 - Lizards = 0.0125 - 1.63 Plutonium-238 – Soil; r^2=0.35; n=6; p=0.21

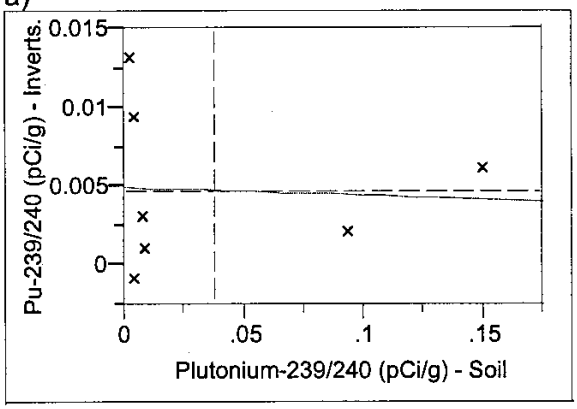
c)



Plutonium-238 - Mice = 0.0400 + 1.37 Plutonium-238 – Soil; r^2=0.067; n=7; p=0.57

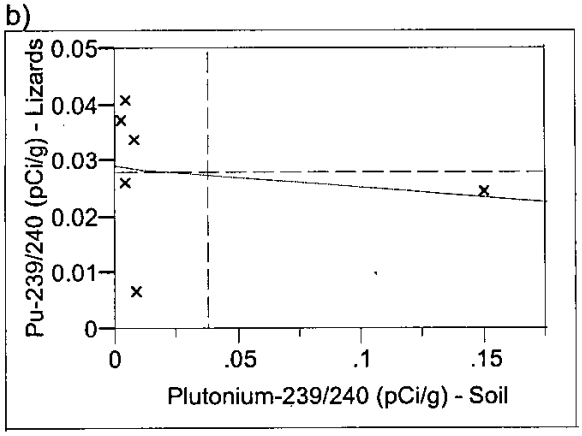
Figure B-119. Soil Bioaccumulation Plots for Plutonium-238 in a) Invertebrates, b) Lizards, and c) Mice.

a)



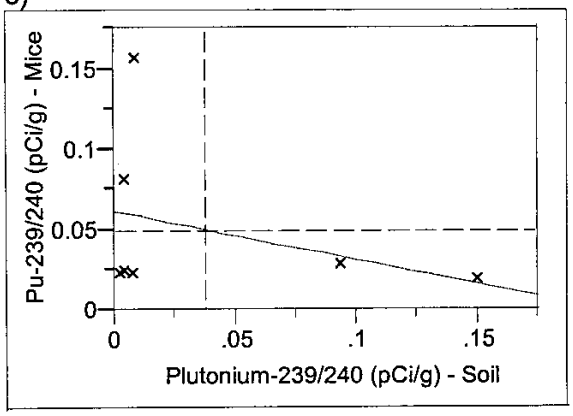
Plutonium-239/240 - Invertebrates = 0.00495 - 0.00491 – Plutonium-239/240 Soil; r^2=0.003; n=7; p=0.90

b)



Plutonium-239/240 - Lizards = 0.0288 - 0.0363 Plutonium-239/240– Soil; r^2=0.030; n=6; p=0.74

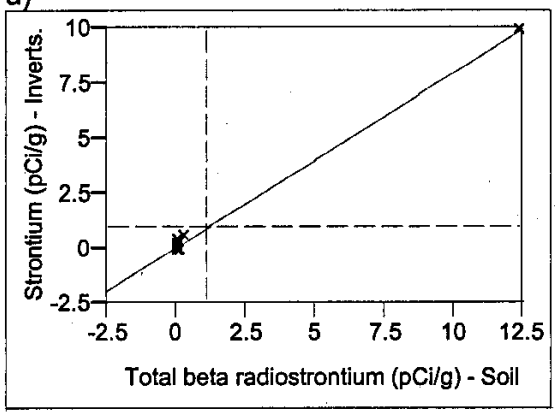
c)



Plutonium-239/240 - Mice = 0.0612 - 0.297 Plutonium-239/240 – Soil; r^2=0.118; n=7; p=0.45

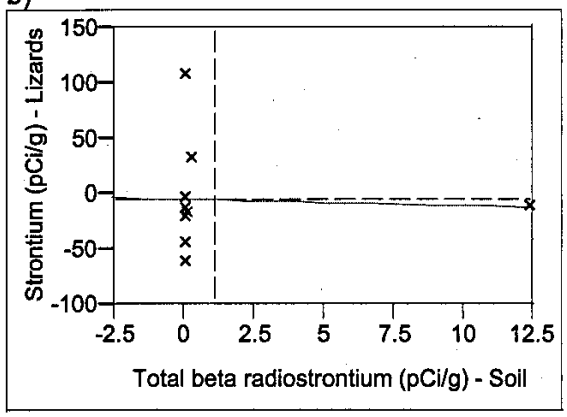
Figure B-120. Soil Bioaccumulation Plots for Plutonium-239/240 in a) Invertebrates, b) Lizards, and c) Mice.

a)



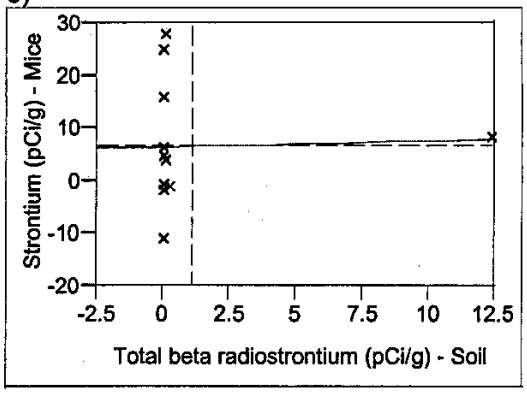
Total beta radiostrontium - Invertebrates = 0.0105 + 0.798 – Total beta radiostrontium Soil; r^2=0.997; n=11; p=<.0001

b)



Total beta radiostrontium - Lizards = -4.96 - 0.558 Total beta radiostrontium – Soil; r^2=0.002; n=10; p=0.90

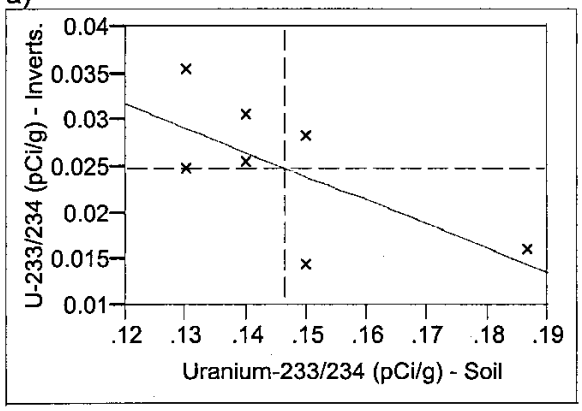
c)



Total beta radiostrontium - Mice = 6.47 + 0.109 Total beta radiostrontium – Soil; r^2=0.0012; n=11; p=0.92

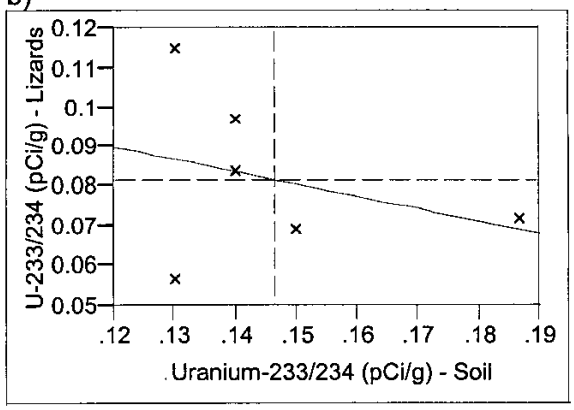
Figure B-121. Soil Bioaccumulation Plots for Total Beta Radiostrontium in a) Invertebrates, b) Lizards, and c) Mice.

a)



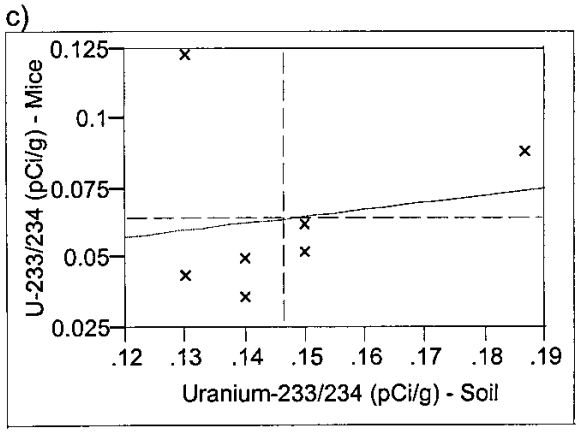
Uranium-233/234 - Invertebrates = 0.0630 - 0.260 – Uranium-233/234 Soil; r^2=0.453; n=7; p=0.098

b)



Uranium-233/234 - Lizards = 0.126 - 0.306 Uranium-233/234 – Soil; r^2=0.095; n=6; p=0.55

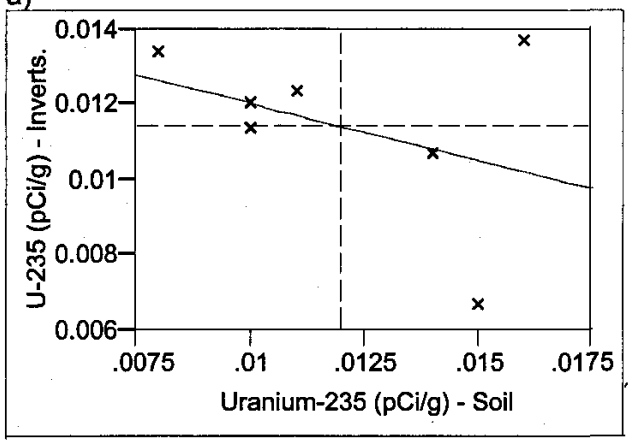
c)



Uranium-233/234 - Mice = 0.0276 + 0.250 Uranium-233/234 – Soil; r^2=0.025; n=7; p=0.73

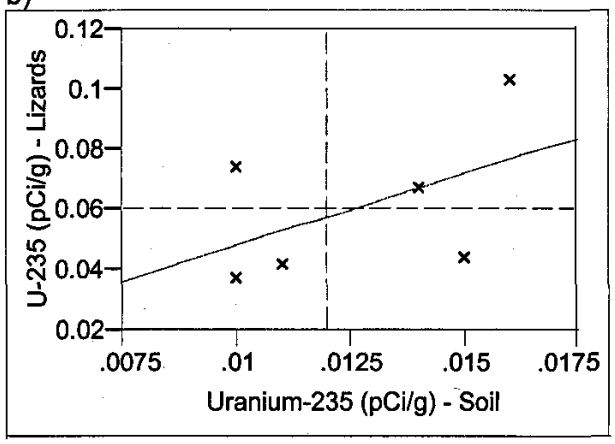
Figure B-122 Soil Bioaccumulation Plots for Uranium-233/234 in a) Invertebrates, b) Lizards, and c) Mice.

a)



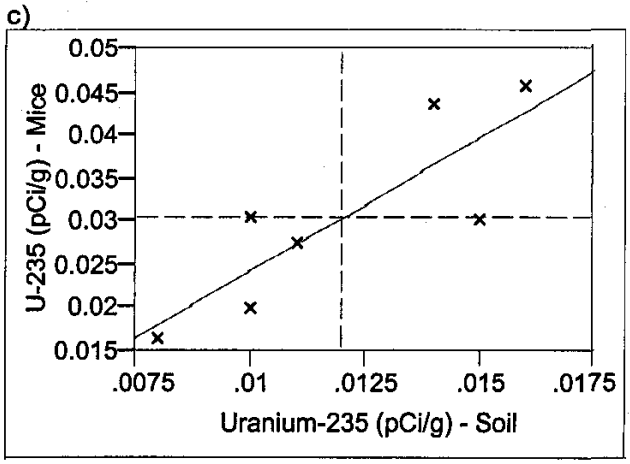
Uranium-235 - Invertebrates = 0.0151 - 0.302 – Uranium-235 Soil; r^2=0.150; n=7; p=0.39

b)



Uranium-235 - Lizards = 0.0000745 + 4.78 Uranium-235 – Soil; r^2=0.253; n=6; p=0.31

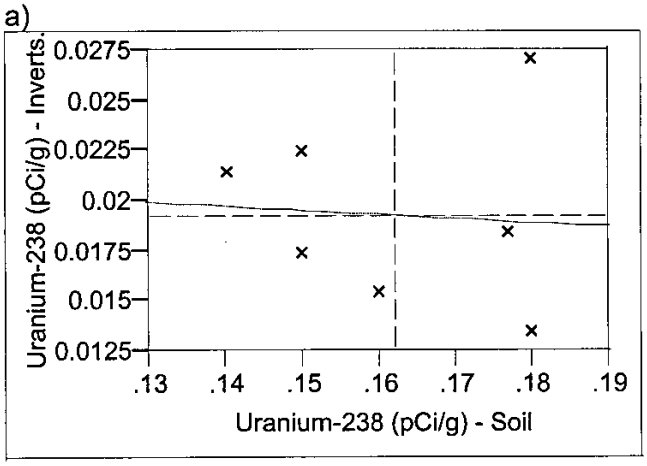
c)



Uranium-235 - Mice = -0.00666 + 3.09 Uranium-235 – Soil; r^2=0.706; n=7; p=0.018

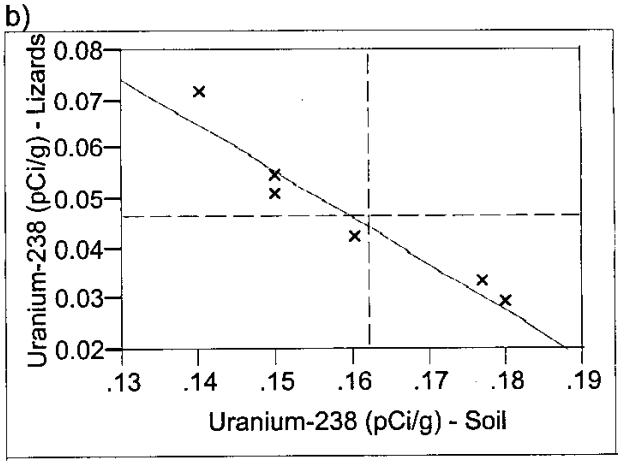
Figure B-123. Soil Bioaccumulation Plots for Uranium-235 in a) Invertebrates, b) Lizards, and c) Mice.

a)



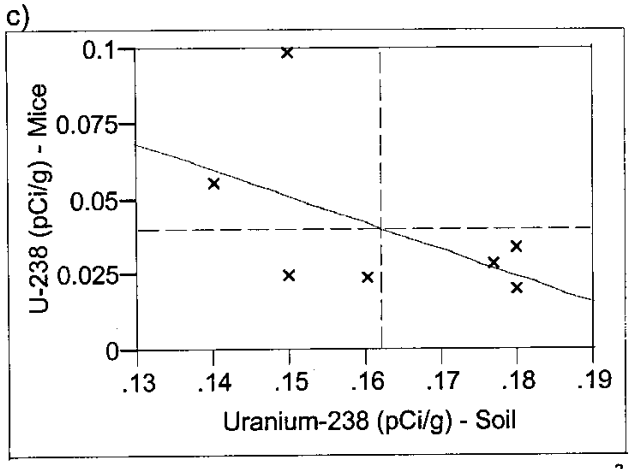
Uranium-238 - Invertebrates = 0.0225 - 0.0200 – Uranium-238 Soil; r^2=0.005; n=7; p=0.88

b)



Uranium-238 - Lizards = 0.196 - 0.936 Uranium-238 – Soil; r^2=0.920; n=6; p=0.002

c)



Uranium-238 - Mice = 0.185 - 0.892 Uranium-238 – Soil; r^2=0.276; n=7; p=0.23

Figure B-124. Soil Bioaccumulation Plots for Uranium-238 in a) Invertebrates, b) Lizards, and c) Mice.

Table B-1. Counts of Small-Mammal Captures by Gender and Species.

		Gender			
	Count	**Female**	**Male**	**ns**	**Totals**
Species code	Mumu	0	1	0	1
	Onlu	2	0	0	2
	Pema	8	22	0	30
	Pepa	5	19	3	27
	Reme	1	3	2	6
	Totals	16	45	5	66

Table B-2. Counts of Small-Mammal Captures by Reproductive Status and Species.

		Reproductive Status					
	Count	**Lactating**	**Non-Lactating**	**Non-Scrotal**	**Scrotal**	**ns**	**Totals**
Species code	Mumu	0	0	0	1	0	1
	Onlu	1	1	0	0	0	2
	Pema	2	6	13	9	0	30
	Pepa	2	3	1	18	3	27
	Reme	1	0	1	2	2	6
	Totals	6	10	15	30	5	66

Table B-3. Counts of Small-Mammal Captures by Approximate Age and Species.

		Age (Approximate)					
	Count	**Adult**	**Juv**	**Unk**	**ns**	**unk**	**Totals**
Species code	Mumu	1	0	0	0	0	1
	Onlu	1	0	0	0	1	2
	Pema	20	8	1	0	1	30
	Pepa	22	2	0	3	0	27
	Reme	4	0	0	1	1	6
	Totals	48	10	1	4	3	66

Table B-4. Counts of Small-Mammal Captures by Gender and Site.

		Gender			
	Count	**Female**	**Male**	**ns**	**Total**
Site ID	B Pond	2	4	0	6
	B-63 Ditch	2	3	0	5
	E6 Septic Tank	3	1	2	6
	Gable Mt. Pond	0	5	1	6
	S-10 Ditch	3	3	0	6
	U Pond	2	4	0	6
	BC Low	1	5	0	6
	BC Medium	1	5	0	6
	BC High	1	5	0	6
	Reference Site I	1	4	1	6
	Reference Site II	0	6	0	6
	Total	16	45	4	65

Table B-5. Counts of Small-Mammal Captures by Reproductive Status and Site.

		Reproductive Status					
	Count	**Lactating**	**Non-Lactating**	**Non-Scrotal**	**Scrotal**	**ns**	**Total**
Site ID	B Pond	1	1	1	3	0	6
	B-63 Ditch	0	2	1	2	0	5
	E6 Septic Tank	1	2	0	1	2	6
	Gable Mt. Pond	0	0	0	5	1	6
	S-10 Ditch	2	1	0	3	0	6
	U Pond	1	1	1	3	0	6
	BC Low	0	1	4	1	0	6
	BC Medium	0	1	3	2	0	6
	BC High	0	1	2	3	0	6
	Reference Site I	1	0	2	2	1	6
	Reference Site II	0	0	1	5	0	6
	Total	6	10	15	30	4	65

Table B-6. Counts of Small-Mammal Captures by Approximate Age and Site.

		Age (Approximate)					
	Count	**Adult**	**Juv**	**Unk**	**ns**	**unk**	**Totals**
Site ID	B Pond	5	1	0	0	0	6
	B-63 Ditch	5	0	0	0	0	5
	E6 Septic Tank	4	0	0	2	0	6
	Gable Mt. Pond	5	0	0	1	0	6
	S-10 Ditch	5	0	0	0	1	6
	U Pond	6	0	0	0	0	6
	BC Low	3	3	0	0	0	6
	BC Medium	3	3	0	0	0	6
	BC High	4	2	0	0	0	6
	Reference Site I	3	1	1	1	0	6
	Reference Site II	5	0	0	0	1	6
	Totals	48	10	1	4	2	65

Table B-7. Counts of Small-Mammal Captures by Species and Site.

		Species					
	Count	**Mumu**	**Onlu**	**Pema**	**Pepa**	**Reme**	**Totals**
Site ID	B Pond	0	0	3	0	3	6
	B-63 Ditch	0	0	4	0	2	6
	E6 Septic Tank	0	0	4	1	1	6
	Gable Mt. Pond	0	0	1	5	0	6
	S-10 Ditch	0	1	0	5	0	6
	U Pond	1	0	2	3	0	6
	BC Low	0	0	4	2	0	6
	BC Medium	0	0	4	2	0	6
	BC High	0	0	2	4	0	6
	Reference Site I	0	1	4	1	0	6
	Reference Site II	0	0	2	4	0	6
	Totals	1	2	30	27	6	66

Table B-8. Counts of Small-Mammal Captures by Gender and Site.

		Gender			
	Count	**Female**	**Male**	**ns**	**Totals**
Site ID	B Pond	2	4	0	6
	B-63 Ditch	2	3	1	6
	E6 Septic Tank	3	1	2	6
	Gable Mt. Pond	0	5	1	6
	S-10 Ditch	3	3	0	6
	U Pond	2	4	0	6
	BC Low	1	5	0	6
	BC Medium	1	5	0	6
	BC High	1	5	0	6
	Reference Site I	1	4	1	6
	Reference Site II	0	6	0	6
	Totals	16	45	5	66

Table B-9. Counts of Small-Mammal Captures by Reproductive Status and Site.

		Reproductive Status					
	Count	**Lactating**	**Non-Lactating**	**Non-Scrotal**	**Scrotal**	**ns**	**Totals**
Site ID	B Pond	1	1	1	3	0	6
	B-63 Ditch	0	2	1	2	1	6
	E6 Septic Tank	1	2	0	1	2	6
	Gable Mt. Pond	0	0	0	5	1	6
	S-10 Ditch	2	1	0	3	0	6
	U Pond	1	1	1	3	0	6
	BC Low	0	1	4	1	0	6
	BC Medium	0	1	3	2	0	6
	BC High	0	1	2	3	0	6
	Reference Site I	1	0	2	2	1	6
	Reference Site II	0	0	1	5	0	6
	Totals	6	10	15	30	5	66

Table B-10. Counts of Small-Mammal Captures by Approximate Age and Site.

		Age (Approximate)					
	Count	**Adult**	**Juv**	**Unk**	**ns**	**unk**	**Totals**
Site ID	B Pond	5	1	0	0	0	6
	B-63 Ditch	5	0	0	0	1	6
	E6 Septic Tank	4	0	0	2	0	6
	Gable Mt. Pond	5	0	0	1	0	6
	S-10 Ditch	5	0	0	0	1	6
	U Pond	6	0	0	0	0	6
	BC Low	3	3	0	0	0	6
	BC Medium	3	3	0	0	0	6
	BC High	4	2	0	0	0	6
	Reference Site I	3	1	1	1	0	6
	Reference Site II	5	0	0	0	1	6
	Totals	48	10	1	4	3	66

Table B-11. Counts of Small-Mammal Captures by Species and Phase.

	Species					
Count	**Mumu**	**Onlu**	**Pema**	**Pepa**	**Reme**	**Totals**
Phase I	1	2	18	15	6	42
Phase II	0	0	12	12	0	24
Totals	1	2	30	27	6	66

Table B-12. Counts of Small-Mammal Captures by Gender and Phase.

	Gender			
Count	**Female**	**Male**	**ns**	**Totals**
Phase I	13	24	5	42
Phase II	3	21	0	24
Totals	16	45	5	66

Table B-13. Counts of Small-Mammal Captures by Reproductive Status and Phase.

	Reproductive Status					
Count	**Lactating**	**Non-Lactating**	**Non-Scrotal**	**Scrotal**	**ns**	**Totals**
Phase I	6	7	5	19	5	42
Phase II	0	3	10	11	0	24
Totals	6	10	15	30	5	66

Table B-14. Counts of Small-Mammal Captures by Approximate Age and Phase.

	Age (Approximate)					
Count	**Adult**	**Juv**	**Unk**	**ns**	**unk**	**Totals**
Phase I	33	2	1	4	2	42
Phase II	15	8	0	0	1	24
Totals	48	10	1	4	3	66

Table B-15. Counts of Small-Mammal Captures by Species and Site Type.

	Species					
Count	**Mumu**	**Onlu**	**Pema**	**Pepa**	**Reme**	**Totals**
Reference	0	1	6	5	0	12
Waste	1	1	24	22	6	54
Totals	1	2	30	27	6	66

Table B-16. Counts of Small-Mammal Captures by Gender and Site Type.

	Gender			
Count	**Female**	**Male**	**ns**	**Total**
Reference	1	10	1	12
Waste	15	35	4	54
Totals	16	45	5	66

Table B-17. Counts of Small-Mammal Captures by Reproductive Status and Site Type.

	Reproductive Status					
Count	**Lactating**	**Non-Lactating**	**Non-Scrotal**	**Scrotal**	**ns**	**Totals**
Reference	1	0	3	7	1	12
Waste	5	10	12	23	4	54
Totals	6	10	15	30	5	66

Table B-18. Counts of Small-Mammal Captures by Approximate Age and Site Type.

	Age (Approximate)					
Count	**Adult**	**Juv**	**Unk**	**ns**	**unk**	**Totals**
Reference	8	1	1	1	1	12
Waste	40	9	0	3	2	54
Totals	48	10	1	4	3	66

APPENDIX C

NON-WASTE-SITE/HABITAT DATA

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C1.0 DATA CD FILE C-3

C2.0 REFERENCES C-3

TABLE

Table C-1. Data Table. C-5

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APPENDIX C
NON-WASTE-SITE/HABITAT DATA

This appendix contains the data evaluated in Chapter 3.0 of the main text. Table C-1 provides the following fields:

- Source – the document number or data source identifier; refer to Chapter 3.0 for more information; source includes the following list:
  - BHI-00032 – electronic records were obtained from the *Hanford Environmental Information System* (HEIS)
  - BHI-00172 – electronic records were obtained from HEIS
  - DOE-RL-92-24 – electronic records were obtained from HEIS
  - DOE-RL-95-55 – data were hand-entered from the source document
  - DOE-RL-96-12 – electronic records were obtained from HEIS
  - Duratek_2004 – electronic records were obtained from HEIS
  - ESR (environmental surveillance report) – electronic records were obtained from the Pacific Northwest National Laboratory
  - HNF-6150 – data were hand-entered from the source document
  - Near facility – electronic records were obtained from Duratek Technical Services
  - RHO-RE-ST-45P – data were hand-entered from the source document
  - TWRS – electronic records were obtained from Duratek Technical Services
  - WHC-EP-0150 – data were hand-entered from the source document
  - WHC-EP-0771 – data were hand-entered from the source document
  - WHC-SD-C018H-RPT-004 – data were hand-entered from the source document
- samp_site_name – this is the sample site name (if any) reported by the source document or data file
- samp_num – this is the sample site number (if any) reported by the source document or data file
- Year – this is the sample collection year reported by the source document or data file

- samp_item – this is the sample item reported by the source document or data file
- samp_from – this is the sample from media reported by the source document or data file
- Medium – this field was created from the sample item or sample from fields or from the original document or data file
  - Aquatic veg.
  - Cryptogam
  - Invertebrate
  - Litter
  - Small mammals
  - Soil
  - Vegetation
- Qualifiers – a "y" or "n" value depending on whether the qualifier or detect status was by the original document or data file; in some cases the qualifier could be "added" based on other information reported (e.g., the minimum detectable activity or uncertainty); qualifiers also were "available" to be hand-entered in some cases from the source document but were not for this project
- Easting – the coordinates in Washington State planer; coordinates were estimated in some cases from maps provided in original documents
- Northing — the coordinates in Washington State planer; coordinates were estimated in some cases from maps provided in original documents
- Cesium-137 – concentration in pCi/g for this radionuclide as reported by the source document or data file
- Cesium-137_code – the code is -1 for nondetects and 1 for detects
- Plutonium-238 – concentration in pCi/g for this radionuclide as reported by the source document or data file
- Plutonium-238_code – the code is -1 for nondetects and 1 for detects
- Plutonium-239_240 – concentration in pCi/g for this radionuclide as reported by the source document or data file
- Plutonium-239_240_code – the code is -1 for nondetects and 1 for detects
- Strontium-90 – concentration in pCi/g for this radionuclide as reported by the source document or data file
- Strontium-90_code – the code is -1 for nondetects and 1 for detects

C1.0 DATA CD FILE

The following file is included on the data CD for Appendix C. Data fields within the files are described in the tables under each file name.

habitat & CP Phase I,II.xls

Excel Column Header	Definition
Source	Data source document
samp_site_name	Sample site description
samp_num	Unique sample identification
Year	Calendar year
samp_item	Specific description of matrix
samp_from	Soil depth description
Medium	General type of matrix for sample
Qualifiers	Data qualifiers
Interval Top	Top of sample depth interval
Interval Bottom	Bottom of sample depth interval
Interval units	Self-explanatory
Easting	Easting coordinates
Northing	Northing coordinates
y	Variable created for plotting data
Rows O through GV	COPEC concentrations (µg/kg or pCi/g) for soil or biotic tissues and COPEC data coding for detection (1) or nondetection (-1) status

Excel is a trademark of Microsoft Corporation, Redmond, Washington.

COPEC = contaminant of potential ecological concern.

C2.0 REFERENCES

BHI-00032, 1995, *Ecological Sampling at Four Waste Sites in the 200 Areas*, Rev. 1, Bechtel Hanford, Inc., Richland, Washington.

BHI-00172, 1995, *Preoperational Environmental Baseline Survey Conducted at the Environmental Restoration Disposal Facility (ERDF)*, Rev. 0, Bechtel Hanford Inc., Richland, Washington.

DOE/RL-92-24, 2001, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, Rev. 4, 2 vols., U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-95-55, 1995, *Hanford Site Background: Evaluation of Existing Soil Radionuclide Data*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-96-12, 1996, *Hanford Site Background: Part 2, Soil Background for Radionuclides*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Duratek, 2004, *Soil and Biota Collections at Gable Mountain Pond, B-Pond and Control Site*, Duratek Technical Services, Richland, Washington.

Hanford Environmental Information System, Hanford Site database.

HNF-6150, 2000, *Preoperational Environmental Survey for the Spent Nuclear Fuel Project Facilities*, Fluor Hanford, Inc., Richland, Washington.

RHO-RE-ST-45P, 1985, *PUREX Preoperational Environmental Survey Report*, Rockwell Hanford Operations, Richland, Washington.

WHC-EP-0150, 1988, *Grout Treatment Facility Environmental Baseline and Site Characterization Report*, Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0771, 1994, *Comparison of Radionuclide Levels in Soil, Sagebrush, Plant Litter, Cryptogams, and Small Mammals*, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-C018H-RPT-004, 1995, *Preoperational Environmental Survey Report: 200 Areas Effluent Treatment Facility (ETF), State Approved Land Disposal Structure (SALDS), and Liquid Effluent Retention Facility (LERF) (C018H)*, Westinghouse Hanford Company, Richland, Washington.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
BHI-00032	Control	B08YL9	1993	bulrush		Aquatic veg.	Yes	568197	152400	-0.015	-1	.	.	.	.	0.17	1
BHI-00032	Control	B08YM0	1993	cheatgrass		Vegetation	Yes	568197	152400	0.046	1	.	.	.	.	0.072	1
BHI-00032	Control	B08YM1	1993	willow		Aquatic veg.	Yes	568197	152400	0	-1	.	.	.	.	0.05	1
BHI-00032	Control	B08YM2	1993	cattail		Aquatic veg.	Yes	568197	152400	0.015	-1	.	.	.	.	0.02	-1
BHI-00032	Control	B08YM3	1993	thistle		Vegetation	Yes	568197	152400	0.027	-1	.	.	.	.	0.021	1
BHI-00032	Control	B08YM4	1993	soil		Soil	Yes	568197	152400	0.0817	1	.	.	.	.	0.099	1
BHI-00032	Control	B08YM5	1993	soil		Soil	Yes	568197	152400	0.0947	1	.	.	.	.	0.059	-1
BHI-00032	Control	B08YM6	1993	deer mouse		Small mammals	Yes	568197	152400	0.059	-1	.	.	.	.	0	-1
BHI-00032	Control	B08YM7	1993	deer mouse		Small mammals	Yes	568197	152400	-0.023	-1	.	.	.	.	-0.019	-1
BHI-00032	Control	B08YM8	1993	pocket mouse		Small mammals	Yes	568197	152400	0.035	-1	.	.	.	.	0.13	-1
BHI-00032	Control	B08YM9	1993	pocket mouse		Small mammals	Yes	568197	152400	-0.0021	-1	.	.	.	.	0.071	-1
BHI-00032	Control	B08YN3	1993	insect		Invertebrate	Yes	568197	152400	0.084	-1	.	.	.	.	0.025	-1
BHI-00172	1	B0C261	1994	Soil		Soil	Yes	568750	134300	0.0921	1	0.00614	-1	0.0221	-1	0.336	1
BHI-00172	1	B0C286	1994	Sagebrush		Vegetation	Yes	568750	134300	0.0512	1	.	.	.	.	0.195	1
BHI-00172	1	B0C299	1994	Cryptogam		Cryptogam	Yes	568750	134300	0.918	1	.	.	.	.	0.224	1
BHI-00172	1	B0C2B0	1994	Litter		Litter	Yes	568750	134300	0.871	1	.	.	.	.	0.632	1
BHI-00172	1	B0C2B3	1994	Small Mammals		Small mammals	Yes	568750	134300	3	-1	.	.	.	.	0.25	-1
BHI-00172	1	B0C2B4	1994	Small Mammals		Small mammals	Yes	568750	134300	3	-1	.	.	.	.	0.26	-1
BHI-00172	10	B0C268	1994	Soil		Soil	Yes	571150	134100	0.242	1	0.00598	-1	0.0179	-1	0.184	1
BHI-00172	10	B0C293	1994	Sagebrush		Vegetation	Yes	571150	134100	0.00266	-1	.	.	.	.	0.0129	-1
BHI-00172	10	B0C2B9	1994	Small Mammals		Small mammals	Yes	571150	134100	5	-1	.	.	.	.	-0.009	-1
BHI-00172	10	B0C2C0	1994	Small Mammals		Small mammals	Yes	571150	134100	4	-1	.	.	.	.	0.003	-1
BHI-00172	10 (dup)	B0C269	1994	Soil		Soil	Yes	571150	134100	0.213	1	0	-1	0.0136	-1	0.179	1
BHI-00172	10 (dup)	B0C294	1994	Sagebrush		Vegetation	Yes	571150	134100	0.0139	-1	.	.	.	.	0.0764	-1
BHI-00172	10 (split)	B0C270	1994	Soil		Soil	Yes	571150	134100	0.48	1	.	.	0.023	1	0.14	-1
BHI-00172	11	B0C271	1994	Soil		Soil	Yes	571150	134300	0.312	1	0	-1	0.0224	-1	0.226	1
BHI-00172	11	B0C296	1994	Sagebrush		Vegetation	Yes	571150	134300	-0.00204	-1	.	.	.	.	0.056	-1
BHI-00172	2	B0C262	1994	Soil		Soil	Yes	568500	134050	0.0438	1	0	-1	0.00494	-1	0.256	1
BHI-00172	2	B0C287	1994	Sagebrush		Vegetation	Yes	568500	134050	0.07	1	.	.	.	.	0.0927	-1
BHI-00172	2	B0C2B1	1994	Cryptogam		Cryptogam	Yes	568500	134050	.	.	.	.	.	.	0.277	1
BHI-00172	2	B0C2B2	1994	Litter		Litter	Yes	568500	134050	0.689	1	.	.	.	.	0.301	1
BHI-00172	3	B0C263	1994	Soil		Soil	Yes	468750	134000	0.112	1	0.0032	-1	0.00853	-1	0.237	1
BHI-00172	3	B0C288	1994	Sagebrush		Vegetation	Yes	468750	134000	0.0468	1	.	.	.	.	0.136	-1
BHI-00172	4	B0C264	1994	Soil		Soil	Yes	569300	134300	0.221	1	0.0142	-1	0.0114	-1	0.258	1
BHI-00172	4	B0C289	1994	Sagebrush		Vegetation	Yes	569300	134300	0.0374	-1	.	.	.	.	0.207	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
BHI-00172	4	B0C2B5	1994	Small Mammals		Small mammals	Yes	569300	134300	4	-1	.	.	.	.	0.22	-1
BHI-00172	4	B0C2B6	1994	Small Mammals		Small mammals	Yes	569300	134300	3	-1	.	.	.	.	0.15	-1
BHI-00172	5	B0C265	1994	Soil		Soil	Yes	569900	134000	0.227	1	0	-1	0.00644	-1	0.149	1
BHI-00172	5	B0C290	1994	Sagebrush		Vegetation	Yes	569900	134000	0.042	-1	.	.	.	.	0.202	1
BHI-00172	6	B0C266	1994	Soil		Soil	Yes	570200	134300	0.557	1	0	-1	0.111	1	0.288	1
BHI-00172	6	B0C291	1994	Sagebrush		Vegetation	Yes	570200	134300	0.00503	-1	.	.	.	.	0.113	-1
BHI-00172	7	B0C273	1994	Soil		Soil	Yes	570700	134450	0.159	1	0	-1	0.00581	-1	0.241	1
BHI-00172	7	B0C298	1994	Sagebrush		Vegetation	Yes	570700	134450	0.0206	-1	.	.	.	.	0.0801	-1
BHI-00172	7	B0C2B7	1994	Small Mammals		Small mammals	Yes	570700	134450	2	-1	.	.	.	.	0.16	-1
BHI-00172	7	B0C2B8	1994	Small Mammals		Small mammals	Yes	570700	134450	2	-1	.	.	.	.	0.13	-1
BHI-00172	8	B0C272	1994	Soil		Soil	Yes	570700	134300	0.258	1	0	-1	0.00528	-1	0.242	1
BHI-00172	9	B0C267	1994	Soil		Soil	Yes	571050	134000	0.464	1	0	-1	0.0406	-1	0.332	1
BHI-00172	9	B0C292	1994	Sagebrush		Vegetation	Yes	571050	134000	-0.00419	-1	.	.	.	.	0.0559	-1
Duratek_2004	Control	B17TM5	2003	Vegetation		Vegetation	Yes	567989	136540	0.022	-1	.	.	.	.	0.023	-1
Duratek_2004	Control	B17VJ1	2003	Soil		Soil	Yes	567989	136540	0.588	1	.	.	.	.	0.077	-1
Duratek_2004	Control	B17VJ2	2003	Invertebrate		Invertebrate	Yes	567989	136540	0.073	-1	.	.	.	.	0.005	-1
HNF-6150	100 K	59015-11	1999	soil		Soil	Added	568397	146278	0.16	1	0.0039	-1	0.2	1	0.68	1
HNF-6150	100 K	59015-12	1999	litter		Litter	Added	568397	146278	0.27	1	-0.0071	-1	-0.06	-1	0.59	1
HNF-6150	100 K	59015-13	1999	veg		Vegetation	Added	568397	146278	-0.0096	-1	0.0066	1	0.5	1	0.49	1
HNF-6150	100 K	59015-14	1999	cryptogam		Cryptogam	Added	568397	146278	0.7	1	0.0068	1	-0.1	-1	0.55	1
HNF-6150	100 K	59015-15	1999	soil		Soil	Added	568248	146197	0.17	1	-0.0039	-1	0.7	1	0.73	1
HNF-6150	100 K	59015-16	1999	litter		Litter	Added	568248	146197	0.21	1	0.013	1	-0.054	-1	0.53	1
HNF-6150	100 K	59015-17	1999	veg		Vegetation	Added	568248	146197	.	.	.	.	.	.	.	.
HNF-6150	100 K	59015-18	1999	cryptogam		Cryptogam	Added	568248	146197	0.22	1	0.023	1	0.2	1	1.2	1
HNF-6150	100 K	59015-19	1999	soil		Soil	Added	569470	147056	0.14	1	0.011	1	0.4	1	1.5	1
HNF-6150	100 K	59015-20	1999	litter		Litter	Added	569470	147056	0.25	1	-0.017	-1	0.3	1	1	1
HNF-6150	100 K	59015-21	1999	veg		Vegetation	Added	569470	147056	0.003	-1	0.0047	-1	0.024	1	0.88	1
HNF-6150	100 K	59015-22	1999	cryptogam		Cryptogam	Added	569470	147056	26	1	1.1	1	6.4	1	1.2	1
HNF-6150	100 K	59015-23	1999	soil		Soil	Added	569353	146203	0.091	1	0.012	1	1	1	1.1	1
HNF-6150	100 K	59015-24	1999	soil		Soil	Added	568807	145916	1.1	1	0.062	1	0.6	1	1.1	1
HNF-6150	100 K	59015-25	1999	soil		Soil	Added	568640	145850	0.079	1	0.031	1	0.4	1	0.82	1
HNF-6150	100 K	6865	1999	mice		Small mammals	Added	568915	146428	0.95	-1	0.19	-1	0.19	-1	7.7	1
HNF-6150	100 K	6866	1999	mice		Small mammals	Added	568915	146428	1	-1	0.21	-1	0.21	-1	5.4	1
HNF-6150	100 K	6867	1999	mice		Small mammals	Added	568915	146428	0.94	-1	0.2	-1	0.2	-1	6	1
HNF-6150	100 K	DOH sample	1999	soil		Soil	Added	568248	146197	0.2	1	.	.	0.003	-1	0.019	1

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Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
HNF-6150	100 K	DOH sample	1999	veg		Vegetation	Added	568248	146197	0.0009	-1	.	.	.	.	.	.
HNF-6150	100 K	DOH sample	1999	soil		Soil	Added	568397	146278	0.19	1	.	.	0.002	-1	0.034	1
HNF-6150	100 K	DOH sample	1999	veg		Vegetation	Added	568397	146278	0.019	1	.	.	.	.	.	.
HNF-6150	100 K	DOH sample	1999	veg		Vegetation	Added	568807	145916	0.015	1	.	.	0.0009	-1	.	.
HNF-6150	100 K	K0N4V5	2000	veg		Vegetation	Added	568397	146278	0.013	1	.	.	0.0018	1	0.41	1
HNF-6150	100 K	K0N4V6	2000	veg		Vegetation	Added	568397	146278	0.0063	-1	.	.	0.0019	-1	0.2	1
HNF-6150	100 K	K0N4V7	2000	soil		Soil	Added	569470	147056	.	.	.	.	.	.	.	.
HNF-6150	100 K	K0N4V7	2000	soil		Soil	Added	569470	147056	0.044	1	.	.	0.0071	-1	1.1	1
HNF-6150	100 K	K0N4V8	2000	soil		Soil	Added	569470	147056	.	.	.	.	.	.	.	.
HNF-6150	100 K	K0N4V8	2000	soil		Soil	Added	569470	147056	0.059	1	.	.	0.0073	-1	0.69	1
HNF-6150	100 K	K0N4V9	2000	soil		Soil	Added	569651	146748	.	.	.	.	.	.	.	.
HNF-6150	100 K	K0N4V9	2000	soil		Soil	Added	569651	146748	0.004	1	.	.	0.019	1	0.75	1
HNF-6150	100 K	S0007-03	1999	soil		Soil	Added	569651	146748	0.26	1	0.014	1	0.3	1	0.72	1
HNF-6150	100 K	S0007-04	1999	soil		Soil	Added	568807	145916	1.3	1	0.059	1	-0.8	-1	0.94	1
HNF-6150	100 K	S0007-07	1999	cryptogam		Cryptogam	Added	569651	146748	2.6	1	0.1	1	1.2	1	0.96	1
HNF-6150	100 K	S0007-08	1999	cryptogam		Cryptogam	Added	568807	145916	1.5	1	0.078	1	1.3	1	0.58	1
HNF-6150	100 K	S0007-09	1999	veg		Vegetation	Added	569651	146748	-0.0099	-1	0.0073	1	-0.9	-1	0.36	1
HNF-6150	100 K	S0007-10	1999	veg		Vegetation	Added	568807	145916	0.023	1	0.019	1	-1.6	-1	0.49	1
HNF-6150	100 K	S9015-17	1999	veg		Vegetation	Added	568248	146197	-0.016	-1	0.0038	1	-0.018	-1	0.69	1
HNF-6150	200 E	59015-01	1999	soil		Soil	Added	573003	136468	0.13	1	.	.	0.018	1	1.4	1
HNF-6150	200 E	59015-02	1999	litter		Litter	Added	573003	136468	0.75	1	.	.	0.041	1	1.1	1
HNF-6150	200 E	59015-03	1999	veg		Vegetation	Added	573003	136468	0.02	1	.	.	0.0027	-1	0.67	1
HNF-6150	200 E	59015-04	1999	soil		Soil	Added	573015	136078	0.25	1	.	.	0.017	1	0.84	1
HNF-6150	200 E	59015-05	1999	litter		Litter	Added	573015	136078	1.8	1	.	.	0.035	1	0.62	1
HNF-6150	200 E	59015-06	1999	veg		Vegetation	Added	573015	136078	0.0044	-1	.	.	0.037	1	0.4	1
HNF-6150	200 E	59015-07	1999	soil		Soil	Added	572933	136041	0.15	1	.	.	0.049	1	1.2	1
HNF-6150	200 E	59015-08	1999	soil		Soil	Added	572696	136146	0.24	1	.	.	-0.0037	-1	0.76	1
HNF-6150	200 E	59015-09	1999	litter		Litter	Added	572696	136146	2	1	.	.	0.04	1	1	1
HNF-6150	200 E	59015-10	1999	veg		Vegetation	Added	572696	136146	0.0077	-1	.	.	-0.0032	-1	0.33	1
HNF-6150	200 E	6863	1999	mice		Small mammals	Added	572932	136222	0.94	-1	.	.	0.2	-1	0.64	-1
HNF-6150	200 E	6864	1999	mice		Small mammals	Added	572932	136222	1	-1	.	.	0.21	-1	0.59	-1
HNF-6150	200 E	DOH sample	1999	soil		Soil	Added	572696	136146	0.35	1	.	.	0.0062	1	0.04	1
HNF-6150	200 E	DOH sample	1999	veg		Vegetation	Added	572696	136146	0.02	1	.	.	.	.	.	.
HNF-6150	200 E	DOH sample	1999	soil		Soil	Added	573003	136468	0.44	1	.	.	0.015	1	.	.
HNF-6150	200 E	DOH sample	1999	soil		Soil	Added	573015	136078	0.33	1	.	.	0	-1	0.073	1
HNF-6150	200 E	DOH sample	1999	veg		Vegetation	Added	573015	136078	0.0003	-1	.	.	.	.	.	.
HNF-6150	200 E	S0007-01	1999	soil		Soil	Added	573003	136468	0.31	1	.	.	0.06	1	0.96	1
HNF-6150	200 E	S0007-02	1999	soil		Soil	Added	573015	136078	0.18	1	.	.	0.028	1	1	1
HNF-6150	200 E	S0007-05	1999	cryptogam		Cryptogam	Added	573003	136468	1.2	1	.	.	0.024	1	0.46	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
HNF-6150	200 E	S0007-06	1999	cryptogam		Cryptogam	Added	573015	136078	0.78	1	.	.	0.011	1	0.48	1
RHO-RE-ST-45P	A0	1982	1982	Sagebrush		Vegetation	No	575500	132500	0.16	.	0.0004	.	0.002	.	0.09	.
RHO-RE-ST-45P	A0	1982	1982	Soil		Soil	No	575500	132500	0.63	.	-0.003	.	0.01	.	0.18	.
RHO-RE-ST-45P	A10	1982	1982	Cheatgrass		Vegetation	No	579100	135700	0.04	.	.	.	.	.	.	.
RHO-RE-ST-45P	A10	No date	.	Cryptogam		Cryptogam	No	579100	135700	4.87	.	0.04	.	0.01	.	0.35	.
RHO-RE-ST-45P	A10	No date	.	Litter		Litter	No	579100	135700	5.6	.	0.004	.	0.04	.	0.65	.
RHO-RE-ST-45P	A10	No date	.	Mice		Small mammals	No	579100	135700	0.08	.	.	.	.	.	.	.
RHO-RE-ST-45P	A10	1956-1972	1972	Sagebrush		Vegetation	No	579100	135700	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	A10	1973-1981	1981	Sagebrush		Vegetation	No	579100	135700	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	A10	1981	1981	Sagebrush		Vegetation	No	579100	135700	3.07	.	.	.	0.01	.	1	.
RHO-RE-ST-45P	A10	1982	1982	Sagebrush		Vegetation	No	579100	135700	1.08	.	.	.	.	.	0.22	.
RHO-RE-ST-45P	A10	1981	1981	Soil		Soil	No	579100	135700	0.48	.	.	.	0.01	.	0.17	.
RHO-RE-ST-45P	A10	1982	1982	Soil		Soil	No	579100	135700	1.23	.	.	.	.	.	0.85	.
RHO-RE-ST-45P	A11	1982	1982	Sagebrush		Vegetation	No	579500	136000	0.27	.	.	.	.	.	0.5	.
RHO-RE-ST-45P	A11	1982	1982	Soil		Soil	No	579500	136000	0.49	.	.	.	.	.	0.34	.
RHO-RE-ST-45P	A12	1982	1982	Sagebrush		Vegetation	No	579500	136500	0.12	.	.	.	.	.	0.01	.
RHO-RE-ST-45P	A12	1982	1982	Soil		Soil	No	579500	136500	1.84	.	.	.	.	.	0.41	.
RHO-RE-ST-45P	A13	1982	1982	Sagebrush		Vegetation	No	579500	136800	0.37	.	.	.	.	.	0.03	.
RHO-RE-ST-45P	A13	1982	1982	Soil		Soil	No	579500	136800	0.81	.	.	.	.	.	0.12	.
RHO-RE-ST-45P	A14	1982	1982	Sagebrush		Vegetation	No	579500	136800	0.13	.	0.2	.	1.51	.	0.01	.
RHO-RE-ST-45P	A14	1982	1982	Soil		Soil	No	579500	136800	0.77	.	-0.004	.	0.007	.	0.19	.
RHO-RE-ST-45P	A2	1982	1982	Cheatgrass		Vegetation	No	575800	132600	0.4	.	.	.	.	.	.	.
RHO-RE-ST-45P	A2	No date	.	Cryptogam		Cryptogam	No	575800	132600	2.04	.	.	.	.	.	0.2	.
RHO-RE-ST-45P	A2	No date	.	Litter		Litter	No	575800	132600	6.28	.	.	.	.	.	0.7	.
RHO-RE-ST-45P	A2	No date	.	Mice		Small mammals	No	575800	132600	-0.02	.	.	.	.	.	.	.
RHO-RE-ST-45P	A2	1956-1972	1972	Sagebrush		Vegetation	No	575800	132600	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	A2	1981	1981	Sagebrush		Vegetation	No	575800	132600	0.36	.	.	.	0.01	.	0.19	.
RHO-RE-ST-45P	A2	1982	1982	Sagebrush		Vegetation	No	575800	132600	0.32	.	.	.	.	.	0.06	.
RHO-RE-ST-45P	A2	1981	1981	Soil		Soil	No	575800	132600	0.39	.	.	.	0.01	.	0.23	.
RHO-RE-ST-45P	A2	1982	1982	Soil		Soil	No	575800	132600	0.56	.	.	.	.	.	0.21	.
RHO-RE-ST-45P	A3	1982	1982	Cheatgrass		Vegetation	No	576300	133000	0.17	.	.	.	.	.	.	.
RHO-RE-ST-45P	A3	1956-1972	1972	Sagebrush		Vegetation	No	576300	133000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	A3	1973-1981	1981	Sagebrush		Vegetation	No	576300	133000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	A3	1981	1981	Sagebrush		Vegetation	No	576300	133000	1.53	.	.	.	.	.	1.6	.
RHO-RE-ST-45P	A3	1982	1982	Sagebrush		Vegetation	No	576300	133000	0.15	.	.	.	.	.	.	.
RHO-RE-ST-45P	A3	1981	1981	Soil		Soil	No	576300	133000	0.14	.	.	.	0.01	.	0.17	.
RHO-RE-ST-45P	A3	1982	1982	Soil		Soil	No	576300	133000	0.39	.	.	.	.	.	.	.
RHO-RE-ST-45P	A4	1982	1982	Cheatgrass		Vegetation	No	576900	133000	0.03	.	.	.	.	.	.	.
RHO-RE-ST-45P	A4	No date	.	Cryptogam		Cryptogam	No	576900	133000	3.13	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
RHO-RE-ST-45P	A4	No date	.	Litter		Litter	No	576900	133000	9.84	.	.	.	.	.	.	.
RHO-RE-ST-45P	A4	No date	.	Mice		Small mammals	No	576900	133000	0.1	.	.	.	.	.	.	.
RHO-RE-ST-45P	A4	1981	1981	Sagebrush		Vegetation	No	576900	133000	1.9	.	.	.	.	.	1.48	.
RHO-RE-ST-45P	A4	1982	1982	Sagebrush		Vegetation	No	576900	133000	0.52	.	.	.	.	.	0.07	.
RHO-RE-ST-45P	A4	1981	1981	Soil		Soil	No	576900	133000	0.31	.	.	.	.	.	0.24	.
RHO-RE-ST-45P	A4	1982	1982	Soil		Soil	No	576900	133000	0.49	.	.	.	0.02	.	0.12	.
RHO-RE-ST-45P	A5	1982	1982	Cheatgrass		Vegetation	No	577300	134000	0.21	.	.	.	.	.	.	.
RHO-RE-ST-45P	A5	No date	.	Cryptogam		Cryptogam	No	577300	134000	2.29	.	.	.	.	.	0.6	.
RHO-RE-ST-45P	A5	No date	.	Litter		Litter	No	577300	134000	1.68	.	.	.	.	.	0.8	.
RHO-RE-ST-45P	A5	No date	.	Mice		Small mammals	No	577300	134000	0.01	.	.	.	.	.	0.02	.
RHO-RE-ST-45P	A5	1956-1972	1972	Sagebrush		Vegetation	No	577300	134000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	A5	1973-1981	1981	Sagebrush		Vegetation	No	577300	134000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	A5	1981	1981	Sagebrush		Vegetation	No	577300	134000	0.22	.	.	.	0.01	.	0.31	.
RHO-RE-ST-45P	A5	1982	1982	Sagebrush		Vegetation	No	577300	134000	0.18	.	.	.	.	.	.	.
RHO-RE-ST-45P	A5	1981	1981	Soil		Soil	No	577300	134000	0.78	.	.	.	0.03	.	0.57	.
RHO-RE-ST-45P	A5	1982	1982	Soil		Soil	No	577300	134000	0.94	.	.	.	.	.	.	.
RHO-RE-ST-45P	A6	1982	1982	Cheatgrass		Vegetation	No	578200	134000	0.23	.	.	.	.	.	.	.
RHO-RE-ST-45P	A6	No date	.	Cryptogam		Cryptogam	No	578200	134000	4.7	.	.	.	.	.	.	.
RHO-RE-ST-45P	A6	No date	.	Litter		Litter	No	578200	134000	6.35	.	.	.	.	.	.	.
RHO-RE-ST-45P	A6	No date	.	Mice		Small mammals	No	578200	134000	-0.01	.	.	.	.	.	0.05	.
RHO-RE-ST-45P	A6	1981	1981	Sagebrush		Vegetation	No	578200	134000	0.6	.	.	.	0.01	.	0.42	.
RHO-RE-ST-45P	A6	1982	1982	Sagebrush		Vegetation	No	578200	134000	1.07	.	.	.	.	.	0.23	.
RHO-RE-ST-45P	A6	1981	1981	Soil		Soil	No	578200	134000	0.97	.	.	.	0.01	.	0.29	.
RHO-RE-ST-45P	A6	1982	1982	Soil		Soil	No	578200	134000	0.72	.	.	.	.	.	0.41	.
RHO-RE-ST-45P	A7	1982	1982	Cheatgrass		Vegetation	No	578500	134500	0.3	.	.	.	.	.	.	.
RHO-RE-ST-45P	A7	No date	.	Mice		Small mammals	No	578500	134500	-0.27	.	.	.	.	.	.	.
RHO-RE-ST-45P	A7	1981	1981	Sagebrush		Vegetation	No	578500	134500	0.96	.	.	.	.	.	0.43	.
RHO-RE-ST-45P	A7	1982	1982	Sagebrush		Vegetation	No	578500	134500	0.74	.	.	.	.	.	.	.
RHO-RE-ST-45P	A7	1981	1981	Soil		Soil	No	578500	134500	1.05	.	.	.	0.03	.	0.4	.
RHO-RE-ST-45P	A7	1982	1982	Soil		Soil	No	578500	134500	0.84	.	.	.	.	.	.	.
RHO-RE-ST-45P	A8	1982	1982	Cheatgrass		Vegetation	No	578750	135000	0.32	.	.	.	.	.	.	.
RHO-RE-ST-45P	A8	1981	1981	Sagebrush		Vegetation	No	578750	135000	0.82	.	.	.	.	.	0.33	.
RHO-RE-ST-45P	A8	1982	1982	Sagebrush		Vegetation	No	578750	135000	-0.04	.	.	.	.	.	.	.
RHO-RE-ST-45P	A8	1981	1981	Soil		Soil	No	578750	135000	0.83	.	.	.	0.02	.	0.37	.
RHO-RE-ST-45P	A8	1982	1982	Soil		Soil	No	578750	135000	1.35	.	.	.	.	.	.	.
RHO-RE-ST-45P	A9	1982	1982	Cheatgrass		Vegetation	No	578950	135000	0.29	.	.	.	.	.	.	.
RHO-RE-ST-45P	A9	No date	.	Cryptogam		Cryptogam	No	578950	135000	5.4	.	.	.	.	.	.	.
RHO-RE-ST-45P	A9	No date	.	Litter		Litter	No	578950	135000	10.2	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
RHO-RE-ST-45P	A9	No date	.	Mice		Small mammals	No	578950	135000	0.02	.	.	.	.	.	0.02	.
RHO-RE-ST-45P	A9	1981	1981	Sagebrush		Vegetation	No	578950	135000	11.5	.	.	.	.	.	0.42	.
RHO-RE-ST-45P	A9	1982	1982	Sagebrush		Vegetation	No	578950	135000	0.95	.	.	.	.	.	.	.
RHO-RE-ST-45P	A9	1981	1981	Soil		Soil	No	578950	135000	0.97	.	.	.	0.01	.	0.36	.
RHO-RE-ST-45P	A9	1982	1982	Soil		Soil	No	578950	135000	1.15	.	.	.	.	.	.	.
RHO-RE-ST-45P	AX	1982	1982	Cheatgrass		Vegetation	No	577800	133750	0.4	.	.	.	.	.	.	.
RHO-RE-ST-45P	AX	No date	.	Mice		Small mammals	No	577800	133750	0.06	.	.	.	.	.	.	.
RHO-RE-ST-45P	AX	1982	1982	Sagebrush		Vegetation	No	577800	133750	0.62	.	.	.	.	.	.	.
RHO-RE-ST-45P	AX	1981	1981	Soil		Soil	No	577800	133750	0.45	.	.	.	0.01	.	0.38	.
RHO-RE-ST-45P	AX	1982	1982	Soil		Soil	No	577800	133750	0.58	.	.	.	.	.	.	.
RHO-RE-ST-45P	B0	1982	1982	Sagebrush		Vegetation	No	576900	130900	0.11	.	.	.	.	.	0.04	.
RHO-RE-ST-45P	B0	1982	1982	Soil		Soil	No	576900	130900	0.74	.	.	.	.	.	0.23	.
RHO-RE-ST-45P	B1	1982	1982	Cheatgrass		Vegetation	No	577500	131000	0.09	.	.	.	.	.	.	.
RHO-RE-ST-45P	B1	No date	.	Cryptogam		Cryptogam	No	577500	131000	1.43	.	.	.	.	.	0.22	.
RHO-RE-ST-45P	B1	No date	.	Litter		Litter	No	577500	131000	0.82	.	.	.	.	.	0.16	.
RHO-RE-ST-45P	B1	No date	.	Mice		Small mammals	No	577500	131000	0.7	.	.	.	.	.	.	.
RHO-RE-ST-45P	B1	1956-1972	1972	Sagebrush		Vegetation	No	577500	131000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	B1	1973-1981	1981	Sagebrush		Vegetation	No	577500	131000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	B1	1981	1981	Sagebrush		Vegetation	No	577500	131000	0.29	.	.	.	0.01	.	0.55	.
RHO-RE-ST-45P	B1	1982	1982	Sagebrush		Vegetation	No	577500	131000	0.28	.	.	.	.	.	0.07	.
RHO-RE-ST-45P	B1	1981	1981	Soil		Soil	No	577500	131000	0.53	.	.	.	0.01	.	0.26	.
RHO-RE-ST-45P	B1	1982	1982	Soil		Soil	No	577500	131000	0.56	.	.	.	.	.	0.19	.
RHO-RE-ST-45P	B10	1982	1982	Cheatgrass		Vegetation	No	581925	134600	0.74	.	.	.	.	.	.	.
RHO-RE-ST-45P	B10	No date	.	Cryptogam		Cryptogam	No	581925	134600	6.1	.	0.07	.	0.03	.	1.21	.
RHO-RE-ST-45P	B10	No date	.	Litter		Litter	No	581925	134600	4.02	.	0.004	.	0.07	.	1.65	.
RHO-RE-ST-45P	B10	No date	.	Mice		Small mammals	No	581925	134600	0.28	.	.	.	.	.	.	.
RHO-RE-ST-45P	B10	1956-1972	1972	Sagebrush		Vegetation	No	581925	134600	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	B10	1973-1981	1981	Sagebrush		Vegetation	No	581925	134600	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	B10	1981	1981	Sagebrush		Vegetation	No	581925	134600	1.06	.	.	.	0.01	.	0.34	.
RHO-RE-ST-45P	B10	1982	1982	Sagebrush		Vegetation	No	581925	134600	0.46	.	.	.	.	.	0.16	.
RHO-RE-ST-45P	B10	1981	1981	Soil		Soil	No	581925	134600	0.5	.	.	.	0.02	.	0.28	.
RHO-RE-ST-45P	B10	1982	1982	Soil		Soil	No	581925	134600	0.81	.	.	.	.	.	0.18	.
RHO-RE-ST-45P	B11	1982	1982	Sagebrush		Vegetation	No	581950	135100	0.43	.	0.0009	.	0.005	.	0.12	.
RHO-RE-ST-45P	B11	1982	1982	Soil		Soil	No	581950	135100	0.71	.	-0.004	.	0.01	.	0.21	.
RHO-RE-ST-45P	B2	1982	1982	Cheatgrass		Vegetation	No	578000	131200	0.43	.	.	.	.	.	0.04	.
RHO-RE-ST-45P	B2	No date	.	Mice		Small mammals	No	578000	131200	0.05	.	.	.	.	.	0.07	.
RHO-RE-ST-45P	B2	1981	1981	Sagebrush		Vegetation	No	578000	131200	0.42	.	.	.	.	.	0.26	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
RHO-RE-ST-45P	B2	1981	1981	Soil		Soil	No	578000	131200	0.54	.	.	.	.	.	0.17	.
RHO-RE-ST-45P	B3	1982	1982	Cheatgrass		Vegetation	No	578750	131500	0.11	.	.	.	.	.	.	.
RHO-RE-ST-45P	B3	No date	.	Cryptogam		Cryptogam	No	578750	131500	2.12	.	.	.	.	.	.	.
RHO-RE-ST-45P	B3	No date	.	Litter		Litter	No	578750	131500	2.1	.	.	.	.	.	.	.
RHO-RE-ST-45P	B3	No date	.	Mice		Small mammals	No	578750	131500	0.16	.	.	.	.	.	.	.
RHO-RE-ST-45P	B3	1956-1972	1972	Sagebrush		Vegetation	No	578750	131500	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	B3	1973-1981	1981	Sagebrush		Vegetation	No	578750	131500	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	B3	1981	1981	Sagebrush		Vegetation	No	578750	131500	0.35	.	.	.	0.01	.	0.37	.
RHO-RE-ST-45P	B3	1982	1982	Sagebrush		Vegetation	No	578750	131500	0.44	.	.	.	.	.	.	.
RHO-RE-ST-45P	B3	1981	1981	Soil		Soil	No	578750	131500	0.07	.	.	.	0.01	.	0.1	.
RHO-RE-ST-45P	B3	1982	1982	Soil		Soil	No	578750	131500	0.46	.	.	.	.	.	.	.
RHO-RE-ST-45P	B4	1982	1982	Cheatgrass		Vegetation	No	579500	131750	0.23	.	.	.	.	.	0.19	.
RHO-RE-ST-45P	B4	No date	.	Mice		Small mammals	No	579500	131750	0.1	.	.	.	.	.	0.14	.
RHO-RE-ST-45P	B4	1981	1981	Sagebrush		Vegetation	No	579500	131750	0.78	.	.	.	.	.	0.22	.
RHO-RE-ST-45P	B4	1981	1981	Soil		Soil	No	579500	131750	0.24	.	.	.	.	.	0.2	.
RHO-RE-ST-45P	B5	1982	1982	Cheatgrass		Vegetation	No	580000	132100	0.14	.	.	.	.	.	.	.
RHO-RE-ST-45P	B5	No date	.	Cryptogam		Cryptogam	No	580000	132100	2.83	.	.	.	.	.	.	.
RHO-RE-ST-45P	B5	No date	.	Litter		Litter	No	580000	132100	3.17	.	.	.	.	.	.	.
RHO-RE-ST-45P	B5	No date	.	Mice		Small mammals	No	580000	132100	-0.01	.	.	.	.	.	.	.
RHO-RE-ST-45P	B5	1956-1972	1972	Sagebrush		Vegetation	No	580000	132100	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	B5	1973-1981	1981	Sagebrush		Vegetation	No	580000	132100	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	B5	1981	1981	Sagebrush		Vegetation	No	580000	132100	0.6	.	.	.	0.01	.	0.31	.
RHO-RE-ST-45P	B5	1982	1982	Sagebrush		Vegetation	No	580000	132100	0.35	.	.	.	.	.	0.07	.
RHO-RE-ST-45P	B5	1981	1981	Soil		Soil	No	580000	132100	0.48	.	.	.	0.01	.	0.2	.
RHO-RE-ST-45P	B5	1982	1982	Soil		Soil	No	580000	132100	0.91	.	.	.	.	.	0.12	.
RHO-RE-ST-45P	B6	1982	1982	Cheatgrass		Vegetation	No	581000	132500	0.34	.	.	.	.	.	0.2	.
RHO-RE-ST-45P	B6	No date	.	Cryptogam		Cryptogam	No	581000	132500	2.21	.	.	.	.	.	.	.
RHO-RE-ST-45P	B6	No date	.	Litter		Litter	No	581000	132500	1.62	.	.	.	.	.	.	.
RHO-RE-ST-45P	B6	1981	1981	Sagebrush		Vegetation	No	581000	132500	.	.	.	.	.	.	0.28	.
RHO-RE-ST-45P	B6	1981	1981	Soil		Soil	No	581000	132500	0.56	.	.	.	.	.	0.34	.
RHO-RE-ST-45P	B7	1982	1982	Cheatgrass		Vegetation	No	581500	133000	0.2	.	.	.	.	.	.	.
RHO-RE-ST-45P	B7	No date	.	Cryptogam		Cryptogam	No	581500	133000	1.53	.	.	.	.	.	0.29	.
RHO-RE-ST-45P	B7	No date	.	Litter		Litter	No	581500	133000	3.09	.	.	.	.	.	0.24	.
RHO-RE-ST-45P	B7	No date	.	Mice		Small mammals	No	581500	133000	0.64	.	.	.	.	.	.	.
RHO-RE-ST-45P	B7	1981	1981	Sagebrush		Vegetation	No	581500	133000	1.91	.	.	.	.	.	0.54	.
RHO-RE-ST-45P	B7	1982	1982	Sagebrush		Vegetation	No	581500	133000	0.51	.	.	.	.	.	0.09	.
RHO-RE-ST-45P	B7	1981	1981	Soil		Soil	No	581500	133000	0.39	.	.	.	0.01	.	0.2	.
RHO-RE-ST-45P	B7	1982	1982	Soil		Soil	No	581500	133000	0.48	.	.	.	.	.	0.11	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
RHO-RE-ST-45P	B8	1982	1982	Cheatgrass		Vegetation	No	581750	133600	0.57	.	.	.	.	.	0.02	.
RHO-RE-ST-45P	B8	1956-1972	1972	Sagebrush		Vegetation	No	581750	133600	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	B8	1973-1981	1981	Sagebrush		Vegetation	No	581750	133600	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	B8	1981	1981	Sagebrush		Vegetation	No	581750	133600	1.69	.	.	.	.	.	0.43	.
RHO-RE-ST-45P	B8	1981	1981	Soil		Soil	No	581750	133600	0.8	.	.	.	.	.	0.3	.
RHO-RE-ST-45P	B9	1982	1982	Cheatgrass		Vegetation	No	581900	133900	0.38	.	.	.	.	.	0.25	.
RHO-RE-ST-45P	B9	No date	.	Mice		Small mammals	No	581900	133900	0.05	.	.	.	.	.	0.69	.
RHO-RE-ST-45P	B9	1981	1981	Sagebrush		Vegetation	No	581900	133900	4.99	.	.	.	.	.	5.82	.
RHO-RE-ST-45P	B9	1981	1981	Soil		Soil	No	581900	133900	0.39	.	.	.	.	.	0.04	.
RHO-RE-ST-45P	C0	1982	1982	Sagebrush		Vegetation	No	580000	127800	0.31	.	0.0002	.	0.003	.	0.12	.
RHO-RE-ST-45P	C0	1982	1982	Soil		Soil	No	580000	127800	0.62	.	.	.	.	.	0.21	.
RHO-RE-ST-45P	C1	1982	1982	Cheatgrass		Vegetation	No	585000	130000	0.39	.	.	.	.	.	.	.
RHO-RE-ST-45P	C1	No date	.	Cryptogam		Cryptogam	No	585000	130000	1.68	.	.	.	.	.	0.52	.
RHO-RE-ST-45P	C1	No date	.	Litter		Litter	No	585000	130000	1.74	.	.	.	.	.	0.15	.
RHO-RE-ST-45P	C1	No date	.	Mice		Small mammals	No	585000	130000	0.28	.	.	.	.	.	.	.
RHO-RE-ST-45P	C1	1956-1972	1972	Sagebrush		Vegetation	No	585000	130000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	C1	1973-1981	1981	Sagebrush		Vegetation	No	585000	130000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	C1	1981	1981	Sagebrush		Vegetation	No	585000	130000	0.24	.	.	.	.	.	0.11	.
RHO-RE-ST-45P	C1	1982	1982	Sagebrush		Vegetation	No	585000	130000	0.15	.	.	.	.	.	0.4	.
RHO-RE-ST-45P	C1	1981	1981	Soil		Soil	No	585000	130000	0.35	.	.	.	0.01	.	0.24	.
RHO-RE-ST-45P	C1	1982	1982	Soil		Soil	No	585000	130000	0.37	.	.	.	.	.	0.24	.
RHO-RE-ST-45P	C10	1982	1982	Cheatgrass		Vegetation	No	584750	133500	0.2	.	.	.	.	.	.	.
RHO-RE-ST-45P	C10	No date	.	Cryptogam		Cryptogam	No	584750	133500	2.79	.	0.04	.	0	.	1.4	.
RHO-RE-ST-45P	C10	No date	.	Litter		Litter	No	584750	133500	1.73	.	0.001	.	0.03	.	0.39	.
RHO-RE-ST-45P	C10	No date	.	Mice		Small mammals	No	584750	133500	-0.28	.	.	.	.	.	.	.
RHO-RE-ST-45P	C10	1956-1972	1972	Sagebrush		Vegetation	No	584750	133500	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	C10	1973-1981	1981	Sagebrush		Vegetation	No	584750	133500	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	C10	1981	1981	Sagebrush		Vegetation	No	584750	133500	1.04	.	.	.	0.01	.	0.46	.
RHO-RE-ST-45P	C10	1982	1982	Sagebrush		Vegetation	No	584750	133500	0.53	.	.	.	.	.	0.01	.
RHO-RE-ST-45P	C10	1981	1981	Soil		Soil	No	584750	133500	0.27	.	.	.	0.01	.	0.21	.
RHO-RE-ST-45P	C10	1982	1982	Soil		Soil	No	584750	133500	0.71	.	.	.	.	.	0.25	.
RHO-RE-ST-45P	C11	1982	1982	Sagebrush		Vegetation	No	585000	133750	0.18	.	0.0004	.	0.003	.	0.13	.
RHO-RE-ST-45P	C11	1982	1982	Soil		Soil	No	585000	133750	0.17	.	0.0008	.	0.005	.	0.08	.
RHO-RE-ST-45P	C2	1982	1982	Cheatgrass		Vegetation	No	581000	128250	1.32	.	.	.	.	.	.	.
RHO-RE-ST-45P	C2	No date	.	Mice		Small mammals	No	581000	128250	-0.02	.	.	.	.	.	0.06	.
RHO-RE-ST-45P	C2	1981	1981	Sagebrush		Vegetation	No	581000	128250	0.61	.	.	.	.	.	0.87	.
RHO-RE-ST-45P	C2	1981	1981	Soil		Soil	No	581000	128250	0.64	.	.	.	.	.	0.2	.
RHO-RE-ST-45P	C3	1982	1982	Cheatgrass		Vegetation	No	581750	129000	0.45	.	.	.	.	.	0.24	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
RHO-RE-ST-45P	C3	No date	.	Cryptogam		Cryptogam	No	581750	129000	2.86	.	.	.	.	.	.	.
RHO-RE-ST-45P	C3	No date	.	Litter		Litter	No	581750	129000	3.94	.	.	.	.	.	.	.
RHO-RE-ST-45P	C3	1981	1981	Sagebrush		Vegetation	No	581750	129000	0.16	.	.	.	.	.	0.23	.
RHO-RE-ST-45P	C3	1981	1981	Soil		Soil	No	581750	129000	0.43	.	.	.	.	.	0.24	.
RHO-RE-ST-45P	C4	1982	1982	Cheatgrass		Vegetation	No	582500	130000	0.2	.	.	.	.	.	.	.
RHO-RE-ST-45P	C4	No date	.	Cryptogam		Cryptogam	No	582500	130000	.	.	.	.	.	.	0.56	.
RHO-RE-ST-45P	C4	No date	.	Litter		Litter	No	582500	130000	.	.	.	.	.	.	0.05	.
RHO-RE-ST-45P	C4	No date	.	Mice		Small mammals	No	582500	130000	-0.05	.	.	.	.	.	.	.
RHO-RE-ST-45P	C4	1956-1972	1972	Sagebrush		Vegetation	No	582500	130000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	C4	1973-1981	1981	Sagebrush		Vegetation	No	582500	130000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	C4	1981	1981	Sagebrush		Vegetation	No	582500	130000	0.73	.	.	.	.	.	0.24	.
RHO-RE-ST-45P	C4	1982	1982	Sagebrush		Vegetation	No	582500	130000	0.15	.	.	.	.	.	0.06	.
RHO-RE-ST-45P	C4	1981	1981	Soil		Soil	No	582500	130000	0.39	.	.	.	0.01	.	0.3	.
RHO-RE-ST-45P	C4	1982	1982	Soil		Soil	No	582500	130000	0.54	.	.	.	.	.	0.21	.
RHO-RE-ST-45P	C5	1982	1982	Cheatgrass		Vegetation	No	582500	130000	0.34	.	.	.	.	.	0.16	.
RHO-RE-ST-45P	C5	No date	.	Cryptogam		Cryptogam	No	582500	130000	4.54	.	.	.	.	.	.	.
RHO-RE-ST-45P	C5	No date	.	Litter		Litter	No	582500	130000	0.47	.	.	.	.	.	.	.
RHO-RE-ST-45P	C5	1981	1981	Sagebrush		Vegetation	No	582500	130000	0.39	.	.	.	.	.	0.19	.
RHO-RE-ST-45P	C5	1981	1981	Soil		Soil	No	582500	130000	0.41	.	.	.	.	.	0.41	.
RHO-RE-ST-45P	C6	1982	1982	Cheatgrass		Vegetation	No	583000	131100	0.27	.	.	.	.	.	.	.
RHO-RE-ST-45P	C6	No date	.	Cryptogam		Cryptogam	No	583000	131100	2.85	.	.	.	.	.	.	.
RHO-RE-ST-45P	C6	No date	.	Litter		Litter	No	583000	131100	0.8	.	.	.	.	.	.	.
RHO-RE-ST-45P	C6	No date	.	Mice		Small mammals	No	583000	131100	-0.06	.	.	.	.	.	.	.
RHO-RE-ST-45P	C6	1956-1972	1972	Sagebrush		Vegetation	No	583000	131100	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	C6	1973-1981	1981	Sagebrush		Vegetation	No	583000	131100	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	C6	1981	1981	Sagebrush		Vegetation	No	583000	131100	0.77	.	.	.	0.02	.	0.22	.
RHO-RE-ST-45P	C6	1982	1982	Sagebrush		Vegetation	No	583000	131100	0.15	.	.	.	.	.	.	.
RHO-RE-ST-45P	C6	1981	1981	Soil		Soil	No	583000	131100	0.13	.	.	.	0.01	.	0.1	.
RHO-RE-ST-45P	C6	1982	1982	Soil		Soil	No	583000	131100	0.31	.	.	.	.	.	.	.
RHO-RE-ST-45P	C7	1982	1982	Cheatgrass		Vegetation	No	584000	131600	0.87	.	.	.	.	.	0.44	.
RHO-RE-ST-45P	C7	No date	.	Mice		Small mammals	No	584000	131600	0.09	.	.	.	.	.	0.16	.
RHO-RE-ST-45P	C7	1981	1981	Sagebrush		Vegetation	No	584000	131600	1.09	.	.	.	.	.	0.36	.
RHO-RE-ST-45P	C7	1981	1981	Soil		Soil	No	584000	131600	0.56	.	.	.	.	.	0.13	.
RHO-RE-ST-45P	C8	1982	1982	Cheatgrass		Vegetation	No	584250	132600	0.35	.	.	.	.	.	.	.
RHO-RE-ST-45P	C8	No date	.	Cryptogam		Cryptogam	No	584250	132600	4.36	.	.	.	.	.	.	.
RHO-RE-ST-45P	C8	No date	.	Litter		Litter	No	584250	132600	1.73	.	.	.	.	.	.	.
RHO-RE-ST-45P	C8	No date	.	Mice		Small mammals	No	584250	132600	0.09	.	.	.	.	.	.	.
RHO-RE-ST-45P	C8	1956-1972	1972	Sagebrush		Vegetation	No	584250	132600	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
RHO-RE-ST-45P	C8	1973-1981	1981	Sagebrush		Vegetation	No	584250	132600	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	C8	1981	1981	Sagebrush		Vegetation	No	584250	132600	0.59	.	.	.	.	.	0.43	.
RHO-RE-ST-45P	C8	1982	1982	Sagebrush		Vegetation	No	584250	132600	0.21	.	.	.	.	.	0.09	.
RHO-RE-ST-45P	C8	1981	1981	Soil		Soil	No	584250	132600	0.24	.	.	.	0.01	.	0.23	.
RHO-RE-ST-45P	C8	1982	1982	Soil		Soil	No	584250	132600	0.41	.	.	.	.	.	0.12	.
RHO-RE-ST-45P	C9	1982	1982	Cheatgrass		Vegetation	No	584500	132600	0.82	.	.	.	.	.	0.16	.
RHO-RE-ST-45P	C9	No date	.	Mice		Small mammals	No	584500	132600	-0.01	.	.	.	.	.	0.06	.
RHO-RE-ST-45P	C9	1981	1981	Sagebrush		Vegetation	No	584500	132600	0.37	.	.	.	.	.	0.25	.
RHO-RE-ST-45P	C9	1981	1981	Soil		Soil	No	584500	132600	0.4	.	.	.	.	.	0.2	.
RHO-RE-ST-45P	R24	1981	1981	Soil		Soil	No	576000	136000	11.6	.	.	.	0.04	.	1.93	.
RHO-RE-ST-45P	R24	1982	1982	Soil		Soil	No	576000	136000	6.7	.	.	.	0.032	.	1.5	.
RHO-RE-ST-45P	R24	1981	1981	Vegetation		Vegetation	No	576000	136000	1.3	.	.	.	.	.	.	.
RHO-RE-ST-45P	R24	1982	1982	Vegetation		Vegetation	No	576000	136000	0.3	.	.	.	.	.	.	.
RHO-RE-ST-45P	R30	1981	1981	Soil		Soil	No	575800	135500	0.59	.	.	.	0.05	.	0.36	.
RHO-RE-ST-45P	R30	1982	1982	Soil		Soil	No	575800	135500	1.1	.	.	.	0.09	.	0.67	.
RHO-RE-ST-45P	R30	1981	1981	Vegetation		Vegetation	No	575800	135500	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	R30	1982	1982	Vegetation		Vegetation	No	575800	135500	0.39	.	.	.	.	.	.	.
RHO-RE-ST-45P	R35	1981	1981	Soil		Soil	No	575000	134900	0.3	.	.	.	.	.	0.37	.
RHO-RE-ST-45P	R35	1982	1982	Soil		Soil	No	575000	134900	0.71	.	.	.	0.17	.	0.5	.
RHO-RE-ST-45P	R35	1981	1981	Vegetation		Vegetation	No	575000	134900	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	R35	1982	1982	Vegetation		Vegetation	No	575000	134900	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	R36	1981	1981	Soil		Soil	No	576100	135100	0.44	.	.	.	.	.	0.23	.
RHO-RE-ST-45P	R36	1982	1982	Soil		Soil	No	576100	135100	1.1	.	.	.	0.024	.	0.37	.
RHO-RE-ST-45P	R36	1981	1981	Vegetation		Vegetation	No	576100	135100	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	R36	1982	1982	Vegetation		Vegetation	No	576100	135100	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	RA	1981	1981	Soil		Soil	No	577100	135500	0.27	.	.	.	.	.	0.21	.
RHO-RE-ST-45P	RA	1982	1982	Soil		Soil	No	577100	135500	0.46	.	.	.	0.007	.	0.18	.
RHO-RE-ST-45P	RA	1981	1981	Vegetation		Vegetation	No	577100	135500	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	RA	1982	1982	Vegetation		Vegetation	No	577100	135500	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	RB	1981	1981	Soil		Soil	No	577700	135500	1.11	.	.	.	.	.	0.36	.
RHO-RE-ST-45P	RB	1982	1982	Soil		Soil	No	577700	135500	0.19	.	.	.	0.029	.	0.35	.
RHO-RE-ST-45P	RB	1981	1981	Vegetation		Vegetation	No	577700	135500	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	RB	1982	1982	Vegetation		Vegetation	No	577700	135500	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	RC	1981	1981	Soil		Soil	No	577650	136000	0.81	.	.	.	.	.	0.29	.
RHO-RE-ST-45P	RC	1982	1982	Soil		Soil	No	577650	136000	1.19	.	.	.	0.014	.	.	.
RHO-RE-ST-45P	RC	1981	1981	Vegetation		Vegetation	No	577650	136000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	RC	1982	1982	Vegetation		Vegetation	No	577650	136000	.	.	.	.	.	.	.	.
RHO-RE-ST-45P	RD	1981	1981	Soil		Soil	No	577100	136500	1.57	.	.	.	.	.	1.18	.
RHO-RE-ST-45P	RD	1982	1982	Soil		Soil	No	577100	136500	5.4	.	.	.	0.048	.	1.1	.
RHO-RE-ST-45P	RD	1981	1981	Vegetation		Vegetation	No	577100	136500	2.3	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
RHO-RE-ST-45P	RD	1982	1982	Vegetation		Vegetation	No	577100	136500	.	.	.	.	.	.	.	.
WHC-EP-0771	1		1986	CRYPTOGAM		Cryptogam	No	575600	136250	.	.	.	.	.	.	.	.
WHC-EP-0771	1		1986	LITTER		Litter	No	575600	136250	.	.	.	.	.	.	.	.
WHC-EP-0771	1		1986	SAGEBRUSH		Vegetation	No	575600	136250	.	.	.	.	.	.	.	.
WHC-EP-0771	1		1986	SMALL MAMMALS		Small mammals	No	575600	136250	0	.	.	.	.	.	.	.
WHC-EP-0771	1		1986	SOIL		Soil	No	575600	136250	.	.	0.0009	.	0.018	.	.	.
WHC-EP-0771	10		1986	CRYPTOGAM		Cryptogam	No	576100	136150	.	.	.	.	.	.	.	.
WHC-EP-0771	10		1986	LITTER		Litter	No	576100	136150	.	.	.	.	.	.	.	.
WHC-EP-0771	10		1986	SOIL		Soil	No	576100	136150	.	.	.	.	.	.	.	.
WHC-EP-0771	11		1986	SMALL MAMMALS		Small mammals	No	575750	136050	0.05	.	.	.	.	.	.	.
WHC-EP-0771	11		1986	SOIL		Soil	No	575750	136050	.	.	0.0002	.	0.015	.	.	.
WHC-EP-0771	12		1986	CRYPTOGAM		Cryptogam	No	575725	136050	.	.	.	.	.	.	.	.
WHC-EP-0771	12		1986	LITTER		Litter	No	575725	136050	.	.	.	.	.	.	.	.
WHC-EP-0771	12		1986	SMALL MAMMALS		Small mammals	No	575725	136050	0.11	.	.	.	.	.	.	.
WHC-EP-0771	12		1986	SOIL		Soil	No	575725	136050	.	.	0.0003	.	0.022	.	.	.
WHC-EP-0771	13		1986	CRYPTOGAM		Cryptogam	No	575750	135850	.	.	.	.	.	.	.	.
WHC-EP-0771	13		1986	LITTER		Litter	No	575750	135850	.	.	.	.	.	.	.	.
WHC-EP-0771	13		1986	SMALL MAMMALS		Small mammals	No	575750	135850	0.18	.	.	.	.	.	.	.
WHC-EP-0771	13		1986	SOIL		Soil	No	575750	135850	.	.	.	.	.	.	.	.
WHC-EP-0771	15		1986	SOIL		Soil	No	575900	135950	.	.	0.0009	.	0.13	.	.	.
WHC-EP-0771	17		1986	SOIL		Soil	No	576100	136090	.	.	0.0005	.	0.019	.	.	.
WHC-EP-0771	18		1986	SAGEBRUSH		Vegetation	No	576200	136200	.	.	.	.	.	.	.	.
WHC-EP-0771	18		1986	SOIL		Soil	No	576200	136200	.	.	.	.	.	.	.	.
WHC-EP-0771	19		1986	CRYPTOGAM		Cryptogam	No	576350	136325	.	.	.	.	.	.	.	.
WHC-EP-0771	19		1986	LITTER		Litter	No	576350	136325	.	.	.	.	.	.	.	.
WHC-EP-0771	19		1986	SAGEBRUSH		Vegetation	No	576350	136325	.	.	.	.	.	.	.	.
WHC-EP-0771	19		1986	SOIL		Soil	No	576350	136325	.	.	.	.	.	.	.	.
WHC-EP-0771	2		1986	CRYPTOGAM		Cryptogam	No	575750	136090	.	.	.	.	.	.	.	.
WHC-EP-0771	2		1986	SMALL MAMMALS		Small mammals	No	575750	136090	0.11	.	.	.	.	.	.	.
WHC-EP-0771	20		1986	SOIL		Soil	No	575750	135700	.	.	0.0006	.	0.06	.	.	.
WHC-EP-0771	22		1986	CRYPTOGAM		Cryptogam	No	576500	135550	.	.	.	.	.	.	.	.
WHC-EP-0771	22		1986	LITTER		Litter	No	576500	135550	.	.	.	.	.	.	.	.
WHC-EP-0771	22		1986	SOIL		Soil	No	576500	135550	.	.	0.0003	.	0.013	.	.	.
WHC-EP-0771	23		1986	CRYPTOGAM		Cryptogam	No	576550	135400	.	.	.	.	.	.	.	.
WHC-EP-0771	23		1986	LITTER		Litter	No	576550	135400	.	.	.	.	.	.	.	.
WHC-EP-0771	23		1986	SAGEBRUSH		Vegetation	No	576550	135400	.	.	.	.	.	.	.	.
WHC-EP-0771	23		1986	SOIL		Soil	No	576550	135400	.	.	.	.	0.01	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0771	24		1986	SOIL		Soil	No	576150	135375	.	.	.	.	0.011	.	.	.
WHC-EP-0771	25		1986	CRYPTOGAM		Cryptogam	No	575750	135450	.	.	.	.	.	.	.	.
WHC-EP-0771	25		1986	LITTER		Litter	No	575750	135450	.	.	.	.	.	.	.	.
WHC-EP-0771	25		1986	SOIL		Soil	No	575750	135450	.	.	.	.	.	.	.	.
WHC-EP-0771	26		1986	SOIL		Soil	No	575800	135530	.	.	.	.	0.014	.	.	.
WHC-EP-0771	27		1986	SOIL		Soil	No	575750	135750	.	.	.	.	.	.	.	.
WHC-EP-0771	28		1986	SOIL		Soil	No	575600	135775	.	.	.	.	0.07	.	.	.
WHC-EP-0771	3		1986	SMALL MAMMALS		Small mammals	No	575850	136250	0.14	.	.	.	.	.	.	.
WHC-EP-0771	30		1986	SOIL		Soil	No	575750	135850	.	.	0.0008	.	0.12	.	.	.
WHC-EP-0771	31		1986	SOIL		Soil	No	575725	135850	.	.	0.001	.	0.07	.	.	.
WHC-EP-0771	32		1986	SOIL		Soil	No	575750	135775	.	.	0.0009	.	0.05	.	.	.
WHC-EP-0771	33		1986	SOIL		Soil	No	576100	135775	.	.	0.0004	.	0.03	.	.	.
WHC-EP-0771	34		1986	SOIL		Soil	No	576150	135775	.	.	0.0004	.	0.02	.	.	.
WHC-EP-0771	35		1986	CRYPTOGAM		Cryptogam	No	576250	135770	.	.	.	.	.	.	.	.
WHC-EP-0771	35		1986	LITTER		Litter	No	576250	135770	.	.	.	.	.	.	.	.
WHC-EP-0771	35		1986	SOIL		Soil	No	576250	135770	.	.	0.001	.	0.04	.	.	.
WHC-EP-0771	36		1986	SOIL		Soil	No	576450	135770	.	.	0.003	.	0.02	.	.	.
WHC-EP-0771	37		1986	CRYPTOGAM		Cryptogam	No	576500	135770	.	.	.	.	.	.	.	.
WHC-EP-0771	37		1986	SOIL		Soil	No	576500	135770	.	.	0.0006	.	0.038	.	.	.
WHC-EP-0771	38		1986	SOIL		Soil	No	576600	135770	.	.	0.0004	.	0.02	.	.	.
WHC-EP-0771	39		1986	CRYPTOGAM		Cryptogam	No	576700	135770	.	.	.	.	.	.	.	.
WHC-EP-0771	39		1986	SAGEBRUSH		Vegetation	No	576700	135770	.	.	.	.	.	.	.	.
WHC-EP-0771	39		1986	SOIL		Soil	No	576700	135770	.	.	0.0003	.	0.01	.	.	.
WHC-EP-0771	4		1986	CRYPTOGAM		Cryptogam	No	575900	136100	.	.	.	.	.	.	.	.
WHC-EP-0771	4		1986	LITTER		Litter	No	575900	136100	.	.	.	.	.	.	.	.
WHC-EP-0771	4		1986	SOIL		Soil	No	575900	136100	.	.	0.0007	.	0.044	.	.	.
WHC-EP-0771	40		1986	LITTER		Litter	No	575725	135700	.	.	.	.	.	.	.	.
WHC-EP-0771	40		1986	SOIL		Soil	No	575725	135700	.	.	.	.	.	.	.	.
WHC-EP-0771	41		1986	SOIL		Soil	No	575850	135775	.	.	0.0004	.	0.02	.	.	.
WHC-EP-0771	42		1986	SMALL MAMMALS		Small mammals	No	575900	135850	-0.15	.	.	.	.	.	.	.
WHC-EP-0771	43		1986	SMALL MAMMALS		Small mammals	No	575750	135875	-0.03	.	.	.	.	.	.	.
WHC-EP-0771	43		1986	SOIL		Soil	No	575750	135875	.	.	0.0005	.	0.02	.	.	.
WHC-EP-0771	45		1986	CRYPTOGAM		Cryptogam	No	576100	136600	.	.	.	.	.	.	.	.
WHC-EP-0771	45		1986	LITTER		Litter	No	576100	136600	.	.	.	.	.	.	.	.
WHC-EP-0771	45		1986	SOIL		Soil	No	576100	136600	.	.	0.0001	.	0.01	.	.	.
WHC-EP-0771	47		1986	CRYPTOGAM		Cryptogam	No	576250	136090	.	.	.	.	.	.	.	.
WHC-EP-0771	47		1986	LITTER		Litter	No	576250	136090	.	.	.	.	.	.	.	.
WHC-EP-0771	47		1986	SOIL		Soil	No	576250	136090	.	.	0.0003	.	0.01	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0771	49		1986	SOIL		Soil	No	576400	136300	.	.	0.0003	.	0.01	.	.	.
WHC-EP-0771	50		1986	LITTER		Litter	No	576500	136350	.	.	.	.	.	.	.	.
WHC-EP-0771	50		1986	SAGEBRUSH		Vegetation	No	576500	136350	.	.	.	.	.	.	.	.
WHC-EP-0771	50		1986	SOIL		Soil	No	576500	136350	.	.	.	.	.	.	.	.
WHC-EP-0771	51		1986	CRYPTOGAM		Cryptogam	No	576850	135600	.	.	.	.	.	.	.	.
WHC-EP-0771	51		1986	LITTER		Litter	No	576850	135600	.	.	.	.	.	.	.	.
WHC-EP-0771	51		1986	SOIL		Soil	No	576850	135600	.	.	.	.	.	.	.	.
WHC-EP-0771	52		1986	CRYPTOGAM		Cryptogam	No	576900	135500	.	.	.	.	.	.	.	.
WHC-EP-0771	52		1986	LITTER		Litter	No	576900	135500	.	.	.	.	.	.	.	.
WHC-EP-0771	52		1986	SOIL		Soil	No	576900	135500	.	.	.	.	.	.	.	.
WHC-EP-0771	6		1986	SOIL		Soil	No	575600	136090	.	.	0.0002	.	0.016	.	.	.
WHC-EP-0771	7		1986	SOIL		Soil	No	575750	136050	.	.	0.0005	.	0.031	.	.	.
WHC-EP-0771	A0		1986	SAGEBRUSH		Vegetation	No	575500	132500	.	.	0.004	.	0.002	.	.	.
WHC-EP-0771	A0		1986	SOIL		Soil	No	575500	132500	.	.	-0.03	.	0.01	.	.	.
WHC-EP-0771	A10		1986	CRYPTOGAM		Cryptogam	No	579100	135700	.	.	0.04	.	0.1	.	.	.
WHC-EP-0771	A10		1986	LITTER		Litter	No	579100	135700	.	.	0.004	.	0.04	.	.	.
WHC-EP-0771	A10		1986	SAGEBRUSH		Vegetation	No	579100	135700	.	.	.	.	0.01	.	.	.
WHC-EP-0771	A10		1986	SMALL MAMMALS		Small mammals	No	579100	135700	0.08	.	.	.	.	.	.	.
WHC-EP-0771	A10		1986	SOIL		Soil	No	579100	135700	.	.	.	.	0.01	.	.	.
WHC-EP-0771	A14		1986	SAGEBRUSH		Vegetation	No	579500	136800	.	.	0.2	.	1.51	.	.	.
WHC-EP-0771	A14		1986	SOIL		Soil	No	579500	136800	.	.	-0.004	.	0.007	.	.	.
WHC-EP-0771	A2		1986	SAGEBRUSH		Vegetation	No	575800	132600	.	.	.	.	0.01	.	.	.
WHC-EP-0771	A2		1986	SMALL MAMMALS		Small mammals	No	575800	132600	0.02	.	.	.	.	.	.	.
WHC-EP-0771	A2		1986	SOIL		Soil	No	575800	132600	.	.	.	.	0.01	.	.	.
WHC-EP-0771	A3		1986	SOIL		Soil	No	576300	133000	.	.	.	.	0.01	.	.	.
WHC-EP-0771	A4		1986	SMALL MAMMALS		Small mammals	No	576900	133000	0.1	.	.	.	.	.	.	.
WHC-EP-0771	A4		1986	SOIL		Soil	No	576900	133000	.	.	.	.	0.02	.	.	.
WHC-EP-0771	A5		1986	SAGEBRUSH		Vegetation	No	577300	134000	.	.	.	.	0.01	.	.	.
WHC-EP-0771	A5		1986	SMALL MAMMALS		Small mammals	No	577300	134000	0.01	.	.	.	.	.	0.02	.
WHC-EP-0771	A5		1986	SOIL		Soil	No	577300	134000	.	.	.	.	0.03	.	.	.
WHC-EP-0771	A6		1986	SAGEBRUSH		Vegetation	No	578200	134000	.	.	.	.	0.01	.	.	.
WHC-EP-0771	A6		1986	SMALL MAMMALS		Small mammals	No	578200	134000	0.01	.	.	.	.	.	0.05	.
WHC-EP-0771	A6		1986	SOIL		Soil	No	578200	134000	.	.	.	.	0.01	.	.	.
WHC-EP-0771	A7		1986	SMALL MAMMALS		Small mammals	No	578500	134500	0.27	.	.	.	.	.	.	.
WHC-EP-0771	A7		1986	SOIL		Soil	No	578500	134500	.	.	.	.	0.03	.	.	.
WHC-EP-0771	A8		1986	SOIL		Soil	No	578750	135000	.	.	.	.	0.02	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0771	A9		1986	SMALL MAMMALS		Small mammals	No	578950	135000	0.02	.	.	.	.	.	0.02	.
WHC-EP-0771	A9		1986	SOIL		Soil	No	578950	135000	.	.	.	.	0.01	.	.	.
WHC-EP-0771	AX		1986	SMALL MAMMALS		Small mammals	No	577800	133750	0.06	.	.	.	.	.	.	.
WHC-EP-0771	AX		1986	SOIL		Soil	No	577800	133750	.	.	.	.	0.01	.	.	.
WHC-EP-0771	B1		1986	SAGEBRUSH		Vegetation	No	577500	131000	.	.	.	.	0.01	.	.	.
WHC-EP-0771	B1		1986	SMALL MAMMALS		Small mammals	No	577500	131000	0.7	.	.	.	.	.	.	.
WHC-EP-0771	B1		1986	SOIL		Soil	No	577500	131000	.	.	.	.	0.01	.	.	.
WHC-EP-0771	B10		1986	CRYPTOGAM		Cryptogam	No	581925	134600	.	.	0.07	.	0.03	.	.	.
WHC-EP-0771	B10		1986	LITTER		Litter	No	581925	134600	.	.	0.004	.	0.07	.	.	.
WHC-EP-0771	B10		1986	SAGEBRUSH		Vegetation	No	581925	134600	.	.	.	.	0.01	.	.	.
WHC-EP-0771	B10		1986	SMALL MAMMALS		Small mammals	No	581925	134600	0.69	.	.	.	.	.	.	.
WHC-EP-0771	B10		1986	SOIL		Soil	No	581925	134600	.	.	.	.	0.02	.	.	.
WHC-EP-0771	B11		1986	SAGEBRUSH		Vegetation	No	581950	135100	.	.	0.0009	.	0.005	.	.	.
WHC-EP-0771	B11		1986	SOIL		Soil	No	581950	135100	.	.	-0.004	.	0.01	.	.	.
WHC-EP-0771	B2		1986	SMALL MAMMALS		Small mammals	No	578000	131200	0.05	.	.	.	.	.	0.07	.
WHC-EP-0771	B3		1986	SAGEBRUSH		Vegetation	No	578750	131500	.	.	.	.	0.01	.	.	.
WHC-EP-0771	B3		1986	SMALL MAMMALS		Small mammals	No	578750	131500	0.16	.	.	.	.	.	.	.
WHC-EP-0771	B3		1986	SOIL		Soil	No	578750	131500	.	.	.	.	0.01	.	.	.
WHC-EP-0771	B4		1986	SMALL MAMMALS		Small mammals	No	579500	131750	0.1	.	.	.	.	.	0.14	.
WHC-EP-0771	B5		1986	SAGEBRUSH		Vegetation	No	580000	132100	.	.	.	.	0.01	.	.	.
WHC-EP-0771	B5		1986	SMALL MAMMALS		Small mammals	No	580000	132100	0.29	.	.	.	.	.	.	.
WHC-EP-0771	B5		1986	SOIL		Soil	No	580000	132100	.	.	.	.	0.01	.	.	.
WHC-EP-0771	B7		1986	SMALL MAMMALS		Small mammals	No	581500	133000	0.01	.	.	.	.	.	.	.
WHC-EP-0771	B7		1986	SOIL		Soil	No	581500	133000	.	.	.	.	0.01	.	.	.
WHC-EP-0771	B9		1986	SMALL MAMMALS		Small mammals	No	581900	133900	0.64	.	.	.	.	.	0.05	.
WHC-EP-0771	C0		1986	SAGEBRUSH		Vegetation	No	580000	127800	.	.	0.0002	.	0.003	.	.	.
WHC-EP-0771	C1		1986	SMALL MAMMALS		Small mammals	No	585000	130000	0.28	.	.	.	.	.	.	.
WHC-EP-0771	C1		1986	SOIL		Soil	No	585000	130000	.	.	.	.	0.01	.	.	.
WHC-EP-0771	C10		1986	CRYPTOGAM		Cryptogam	No	584750	133500	.	.	0.04	.	0	.	.	.
WHC-EP-0771	C10		1986	LITTER		Litter	No	584750	133500	.	.	0.001	.	0.3	.	.	.
WHC-EP-0771	C10		1986	SAGEBRUSH		Vegetation	No	584750	133500	.	.	.	.	0.01	.	.	.
WHC-EP-0771	C10		1986	SMALL MAMMALS		Small mammals	No	584750	133500	0.28	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0771	C10		1986	SOIL		Soil	No	584750	133500	.	.	.	.	0.01	.	.	.
WHC-EP-0771	C11		1986	SAGEBRUSH		Vegetation	No	585000	133750	.	.	0.0004	.	0.003	.	.	.
WHC-EP-0771	C11		1986	SOIL		Soil	No	585000	133750	.	.	0.0008	.	0.005	.	.	.
WHC-EP-0771	C2		1986	SMALL MAMMALS		Small mammals	No	581000	128250	0.01	.	.	.	.	.	0.06	.
WHC-EP-0771	C4		1986	SMALL MAMMALS		Small mammals	No	582500	130000	0.05	.	.	.	.	.	.	.
WHC-EP-0771	C4		1986	SOIL		Soil	No	582500	130000	.	.	.	.	0.01	.	.	.
WHC-EP-0771	C6		1986	SAGEBRUSH		Vegetation	No	583000	131100	.	.	.	.	0.02	.	.	.
WHC-EP-0771	C6		1986	SMALL MAMMALS		Small mammals	No	583000	131100	0.06	.	.	.	.	.	.	.
WHC-EP-0771	C6		1986	SOIL		Soil	No	583000	131100	.	.	.	.	0.01	.	.	.
WHC-EP-0771	C7		1986	SMALL MAMMALS		Small mammals	No	584000	131600	0.09	.	.	.	.	.	0.16	.
WHC-EP-0771	C8		1986	SMALL MAMMALS		Small mammals	No	584250	132600	0.06	.	.	.	.	.	.	.
WHC-EP-0771	C8		1986	SOIL		Soil	No	584250	132600	.	.	.	.	0.01	.	.	.
WHC-EP-0771	C9		1986	SMALL MAMMALS		Small mammals	No	584500	132600	0.01	.	.	.	.	.	0.06	.
WHC-SD-C018H-RPT-004		5351	1993	Sagebrush		Vegetation	Yes	575900	137600	0.0957	1	0.00122	1	0.00127	1	.	.
WHC-SD-C018H-RPT-004		5352	1993	Sagebrush		Vegetation	Yes	576100	137350	-0.0009	-1	0.000126	-1	0.000849	1	.	-1
WHC-SD-C018H-RPT-004		5353	1993	Sagebrush		Vegetation	Yes	575550	137075	0.0947	1	-0.0000105	-1	0.000699	1	.	-1
WHC-SD-C018H-RPT-004		5348	1993	Sagebrush		Vegetation	Yes	566500	139000	-0.00385	-1	0.0000391	-1	0.000802	1	.	.
WHC-SD-C018H-RPT-004		5349	1993	Sagebrush		Vegetation	Yes	566000	139000	0.00365	-1	-0.0000647	-1	0.000655	1	.	-1
WHC-SD-C018H-RPT-004		5350	1993	Sagebrush		Vegetation	Yes	566500	137800	0.00365	-1	-0.0000647	-1	0.000655	1	.	-1
DOE-RL-95-55	Background		1991	Soil		Soil	available	496974	137361	0.372	.	.	.	0.0087	.	0.104	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	568071	131394	0.131	.	.	.	0.0072	.	0.12	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	568071	131394	0.08	.	.	.	0.0026	.	0.023	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	568071	131394	0.075	.	.	.	0.0005	.	0.037	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	568071	131394	0.075	.	.	.	0.0009	.	0.0202	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	568071	131394	.	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	496700	138304	0.468	.	.	.	0.0092	.	0.12	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	584875	139386	1.14	.	.	.	0.0192	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	584875	139386	0.882	.	.	.	0.0209	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	584875	139386	1.17	.	.	.	0.027	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	584875	139386	0.271	.	.	.	0.00368	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	624888	149477	0.33	.	.	.	0.0022	.	0.055	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	584606	127841	0.588	.	.	.	0.0107	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
DOE-RL-95-55	Background		1988	Soil		Soil	available	584606	127841	0.559	.	.	.	0.00825	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	584606	127841	0.391	.	.	.	0.00748	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	584606	127841	0.66	.	.	.	0.0168	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	598862	102675	0.86	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	598862	102675	1.3	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	598862	102675	0.451	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	598862	102675	1.78	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	598862	102675	0.197	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	595484	115960	0.227	.	.	.	0.00345	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	595484	115960	0.523	.	.	.	0.00975	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	595484	115960	0.682	.	.	.	0.0138	.	.	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	595484	115960	0.623	.	.	.	0.00901	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	595484	115960	0.597	.	.	.	0.0133	.	.	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	595484	115960	0.852	.	.	.	0.0204	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	595680	118131	0.117	.	.	.	0.00182	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	595680	118131	0.978	.	.	.	0.0198	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	595680	118131	0.121	.	.	.	0.00187	.	.	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	595680	118131	0.106	.	.	.	0.00141	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	595680	118131	0.473	.	.	.	0.00936	.	.	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	595680	118131	0.421	.	.	.	0.00661	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	584875	139836	0.263	.	.	.	0.0036	.	0.05	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	595629	121373	.	.	.	.	0.0109	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	595629	121373	0.604	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	595629	121373	0.39	.	.	.	0.00442	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	595629	121373	0.785	.	.	.	0.0149	.	.	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	595629	121373	0.102	.	.	.	0.000381	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	572395	145209	0.336	.	.	.	0.0063	.	0.119	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	595972	123008	0.227	.	.	.	0.028	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	595972	123008	0.284	.	.	.	0.00443	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	595972	123008	1.25	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	595453	132524	1.02	.	.	.	0.0168	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	595453	132524	1.78	.	.	.	0.0331	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	595453	132524	1.72	.	.	.	0.0289	.	.	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	595453	132524	0.583	.	.	.	0.0112	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	595453	132524	0.726	.	.	.	0.0183	.	.	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	595453	132524	0.947	.	.	.	0.0214	.	.	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	538418	109402	0.434	.	.	.	0.009	.	0.098	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	589664	156984	0.31	.	.	.	0.00612	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	589664	156984	0.347	.	.	.	0.0083	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	589664	156984	0.453	.	.	.	0.00914	.	.	.

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Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
DOE-RL-95-55	Background		1990	Soil		Soil	available	589664	156984	0.637	.	.	.	0.0124	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	567941	156552	0.159	.	.	.	0.00286	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	567941	156552	0.222	.	.	.	0.00673	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	567941	156552	0.25	.	.	.	0.00526	.	.	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	567941	156552	0.224	.	.	.	0.00711	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	594261	199910	0.009	.	.	.	0.0003	.	0.008	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	559492	146069	.	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	559492	146069	0.191	.	.	.	0.00324	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	559492	146069	0.66	.	.	.	0.0131	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	581721	138436	0.0806	.	.	.	0.00151	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	581721	138436	0.0784	.	.	.	0.00271	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	581721	138436	0.539	.	.	.	0.0114	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	581721	138436	0.362	.	.	.	0.00502	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	581721	138436	.	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	562371	130424	0.319	.	.	.	0.00608	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	562371	130424	0.0811	.	.	.	0.00179	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	562371	130424	0.462	.	.	.	0.0107	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	577588	116983	1.08	.	.	.	0.0243	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	577588	116983	0.988	.	.	.	0.0255	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	577588	116983	0.957	.	.	.	0.0212	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	582787	117645	0.332	.	.	.	0.00618	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	582787	117645	0.861	.	.	.	0.0181	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	577455	110498	0.654	.	.	.	0.0143	.	0.24	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	577455	110498	0.91	.	.	.	0.0143	.	0.432	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	577455	110498	0.763	.	.	.	0.0149	.	0.169	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	538395	113107	0.287	.	.	.	0.00606	.	0.254	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	538395	113107	1.04	.	.	.	0.0226	.	0.262	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	538395	113107	0.481	.	.	.	0.0106	.	0.128	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	538395	113107	1.22	.	.	.	0.0291	.	0.348	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	538395	113107	0.0668	.	.	.	0.000885	.	0.0293	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	538395	113107	0.42	.	.	.	0.00766	.	0.0383	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	664943	83724	0.0695	.	.	.	0.00129	.	0.0202	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	664943	83724	0.232	.	.	.	0.003	.	0.0408	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	664943	83724	0.072	.	.	.	0.000347	.	0.0112	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	664943	83724	0.333	.	.	.	0.00306	.	0.0455	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	592947	69233	0.296	.	.	.	0.00576	.	0.0727	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	592947	69233	0.479	.	.	.	0.00893	.	0.127	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	592947	69233	0.54	.	.	.	0.00882	.	0.0882	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	592947	69233	0.276	.	.	.	0.00607	.	0.0789	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	589486	125040	0.115	.	.	.	.	.	0.0452	.

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
DOE-RL-95-55	Background		1988	Soil		Soil	available	589486	125040	0.33	.	.	.	.	.	0.19	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	589486	125040	1.05	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	589486	125040	0.37	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	589486	125040	0.637	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	589486	125040	0.249	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	594261	199910	0.155	.	.	.	0.00249	.	0.0633	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	594261	199910	0.382	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	594261	199910	.	.	.	.	0.00845	.	0.0781	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	594261	199910	0.183	.	.	.	0.00199	.	0.0531	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	594261	199910	0.243	.	.	.	0.00412	.	0.0612	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	594261	199910	-0.0017	.	.	.	0.0000336	.	0.0137	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	591895	127321	0.0346	.	.	.	.	.	0.00797	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	591895	127321	0.031	.	.	.	.	.	0.008	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	591895	127321	0.027	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	591895	127321	0.036	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	591895	127321	0.0355	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	591895	127321	0.00571	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	667933	161642	0.376	.	.	.	0.00562	.	0.115	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	667933	161642	.	.	.	.	.	.	0.25	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	667933	161642	0.969	.	.	.	0.0163	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	667933	161642	0.917	.	.	.	0.0168	.	0.12	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	667933	161642	0.288	.	.	.	0.0026	.	0.0496	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	624888	149477	0.35	.	.	.	0.00675	.	0.121	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	624888	149477	0.456	.	.	.	0.00776	.	0.0931	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	624888	149477	0.668	.	.	.	0.0102	.	0.14	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	624888	149477	1.19	.	.	.	0.0164	.	0.204	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	624888	149477	0.334	.	.	.	0.00399	.	0.094	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	601622	167569	0.763	.	.	.	0.0125	.	0.152	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	601622	167569	0.219	.	.	.	0.00376	.	0.0383	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	601622	167569	0.539	.	.	.	0.00804	.	0.0803	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	601622	167569	0.344	.	.	.	0.00765	.	0.0759	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	499910	143552	0.161	.	.	.	0.00276	.	0.057	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	499910	143552	0.105	.	.	.	0.00116	.	0.0924	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	499910	143552	0.555	.	.	.	0.0103	.	0.102	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	499910	143552	0.599	.	.	.	0.0106	.	0.126	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	499910	143552	0.334	.	.	.	0.00861	.	0.119	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	499910	143552	0.445	.	.	.	0.00776	.	0.0452	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	572395	145209	1.3	.	.	.	0.0165	.	.	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	572395	145209	1.21	.	.	.	0.0267	.	.	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	572395	145209	1.12	.	.	.	0.0262	.	.	.

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Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
DOE-RL-95-55	Background		1991	Soil		Soil	available	572395	145209	0.312	.	.	.	0.00488	.	.	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	538395	113107	0.07	.	.	.	0.0036	.	0.016	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	538395	113107	0.07	.	.	.	0.0023	.	0.024	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	538395	113107	0.09	.	.	.	0.0017	.	0.027	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	538395	113107	0.072	.	.	.	-0.005	.	0.023	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	538395	113107	0.082	.	.	.	0.0014	.	0.024	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	584606	127841	0.087	.	.	.	0.0022	.	0.026	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	584606	127841	0.16	.	.	.	0.0026	.	0.039	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	584606	127841	0.085	.	.	.	0.0015	.	0.034	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	584606	127841	0.14	.	.	.	0.0013	.	0.048	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	584606	127841	1.19	.	.	.	0.013	.	0.164	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	581721	138436	0.36	.	.	.	0.012	.	0.067	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	581721	138436	0.72	.	.	.	0.021	.	0.15	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	581721	138436	0.23	.	.	.	0.0086	.	0.051	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	581721	138436	0.13	.	.	.	0.0014	.	0.042	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	581721	138436	0.377	.	.	.	0.0071	.	0.11	.
DOE-RL-95-55	Background		1987	Soil		Soil	available	595000	125000	0.169	.	.	.	.	.	0.0508	.
DOE-RL-95-55	Background		1988	Soil		Soil	available	595000	125000	0.32	.	.	.	.	.	0.14	.
DOE-RL-95-55	Background		1989	Soil		Soil	available	595000	125000	0.7	.	.	.	0.025	.	.	.
DOE-RL-95-55	Background		1990	Soil		Soil	available	595000	125000	0.34	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1991	Soil		Soil	available	595000	125000	0.617	.	.	.	.	.	.	.
DOE-RL-95-55	Background		1992	Soil		Soil	available	595000	125000	0.666	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2W4	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2W5	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2W6	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2W7	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2W8	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2W9	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2X0	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2X1	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2X2	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2X3	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2X4	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2X5	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2X6	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2X7	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2X8	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2X9	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2Y0	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2Y1	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
DOE-RL-96-12	Background	B0C2Y2	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2Y3	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2Y4	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2Y5	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2Y6	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C2Y7	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C372	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C374	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C375	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C376	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C377	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C378	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C379	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C380	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C381	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C382	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C383	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C384	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C385	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C386	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C387	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C388	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C389	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C390	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C391	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C392	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C393	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C394	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C395	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C396	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-96-12	Background	B0C397	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01411	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01412	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01413	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01414	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01417	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01418	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01419	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01420	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01421	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
DOE-RL-92-24	Background	B01422	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01423	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01425	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01426	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01427	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01429	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01430	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01431	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01433	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01434	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01435	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01436	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01438	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01439	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01440	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01442	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01443	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01444	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01445	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01446	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01447	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01448	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01449	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01450	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01451	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01452	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01453	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01454	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01456	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01457	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01458	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01459	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01460	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01462	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01463	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01464	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01465	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01467	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01468	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01469	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
DOE-RL-92-24	Background	B01470	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01471	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01472	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01473	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01480	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01482	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01483	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01484	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01485	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01486	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01487	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01488	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01489	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01490	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01491	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01492	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01493	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01494	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01495	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01496	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01497	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01498	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01499	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014B0	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014B3	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014B4	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014B5	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014B6	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014B7	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014B9	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014C0	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014C1	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014C2	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014C3	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014C4	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014C5	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014C6	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014C7	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014C8	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014C9	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
DOE-RL-92-24	Background	B014D0	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014D3	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014D4	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014D5	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014D6	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014D7	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014D8	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014D9	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014F0	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014F1	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014F2	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014F5	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014F6	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014F7	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014G0	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014G1	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014G2	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014G3	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014G4	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014G5	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014G6	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014G8	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014G9	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014H9	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014J0	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014J1	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014J2	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014J3	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014J4	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014J5	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014J8	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014K0	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014K1	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014K2	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014K3	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014K4	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014K5	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014K6	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014K7	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014K8	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
DOE-RL-92-24	Background	B014K9	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B014L0	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B57	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B58	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B59	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B60	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B61	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B62	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B63	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B64	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B67	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B71	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B72	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B73	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B74	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B75	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B76	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B77	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B78	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B01B79	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B06137	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B06141	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B06146	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
DOE-RL-92-24	Background	B06153	.	Soil		Soil	available	.	.	.	.	.	.	.	.	.	.
ESR	SILVER LAKE, OR - MOUNTAINS	B0BT26	1994	SURF_SOIL	SURFACE	Soil	yes	.	.	1.67	1	.	.	.	.	0.665	1
ESR	SILVER LAKE, OR - MOUNTAINS	B0BT27	1994	SURF_SOIL	SURFACE	Soil	yes	.	.	1.72	1	.	.	.	.	0.689	1
ESR	SILVER LAKE, OR - MOUNTAINS	B0BT28	1994	SURF_SOIL	SURFACE	Soil	yes	.	.	1.7	1	.	.	.	.	0.537	1
ESR	SILVER LAKE, OR - WINTER AREA	B0BT29	1994	SURF_SOIL	SURFACE	Soil	yes	.	.	0.293	1	.	.	.	.	0.18	1
ESR	SILVER LAKE, OR - WINTER AREA	B0BT30	1994	SURF_SOIL	SURFACE	Soil	yes	.	.	0.431	1	.	.	.	.	0.233	1
ESR	SILVER LAKE, OR - WINTER AREA	B0BT31	1994	SURF_SOIL	SURFACE	Soil	yes	.	.	0.331	1	.	.	.	.	0.136	1
ESR	NE OF 100 N AREA	B0BYY3	1994	SURF_SOIL	SURFACE	Soil	yes	572614	151144	0.208	1	0.000123	-1	0.00506	1	0.0679	1
ESR	E OF 100 N AREA	B0BYY4	1994	SURF_SOIL	SURFACE	Soil	yes	573359	149413	0.188	1	0.000168	-1	0.00703	1	0.179	1
ESR	ABOVE 100D PUMPHOUSE	B0BYY7	1994	SURF_SOIL	SURFACE	Soil	yes	572983	151148	0.202	1	0.000251	-1	0.0049	1	0.0554	1
ESR	100 AREA FIRE STAT	B0BYY8	1994	SURF_SOIL	SURFACE	Soil	yes	572045	145123	0.285	1	0.000415	-1	0.0101	1	0.0303	1
ESR	200 ENC	B0BYY9	1994	SURF_SOIL	SURFACE	Soil	yes	573687	137776	12.3	1	0.000565	1	0.0243	1	0.703	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	E OF 200 E	B0BYZ0	1994	SURF_SOIL	SURFACE	Soil	yes	576879	135736	1.14	1	0.000254		0.0119	1	0.281	1
ESR	200 ESE	B0BYZ1	1994	SURF_SOIL	SURFACE	Soil	yes	576340	134597	0.424	1	0.000429		0.0136	1	0.183	1
ESR	S OF 200 E	B0BYZ2	1994	SURF_SOIL	SURFACE	Soil	yes	575241	131780	0.14	1	0.000103	-1	0.00218	1	0.123	1
ESR	SW OF B/C CRIBS	B0BYZ3	1994	SURF_SOIL	SURFACE	Soil	yes	572473	131024	0.207	1	-0.000457	-1	0.000379	-1	0.245	1
ESR	E OF 200 W GATE	B0BYZ4	1994	SURF_SOIL	SURFACE	Soil	yes	568455	136068	0.937	1	0.00329		0.391	1	0.0779	1
ESR	S OF 200 W	B0BYZ5	1994	SURF_SOIL	SURFACE	Soil	yes	568340	131239	0.281	1	0.000814	-1	0.0308	1	0.0839	1
ESR	400 E	B0BYZ6	1994	SURF_SOIL	SURFACE	Soil	yes	587922	123300	0.0779	1	0.0000854	-1	0.0019	1	0.0401	1
ESR	SE SIDE OF FFTF	B0BYZ7	1994	SURF_SOIL	SURFACE	Soil	yes	587865	122735	0.00312	-1	0.000785		0.000777	1	0.0275	1
ESR	NORTH 300 AREA	B0BYZ8	1994	SURF_SOIL	SURFACE	Soil	yes	594235	117644	0.366	1	0.000317		0.00823	1	0.105	1
ESR	SOUTH 300 AREA	B0BYZ9	1994	SURF_SOIL	SURFACE	Soil	yes	593984	113854	0.254	1	0.000219		0.00607	1	0.0736	1
ESR	RINGOLD AREA	B0BZ00	1994	SURF_SOIL	SURFACE	Soil	yes	595854	129776	0.123	1	0.000148	-1	0.00177	1	0.0367	1
ESR	SAGEMOOR FARM	B0BZ01	1994	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.323	1	-0.000696	-1	0.00605	1	0.0662	1
ESR	BYERS LANDING	B0BZ02	1994	SURF_SOIL	SURFACE	Soil	yes	596516	114703	0.158	1	-0.0000604	-1	0.003	1	0.146	1
ESR	RIVRVIEW-HARRIS	B0BZ03	1994	SURF_SOIL	SURFACE	Soil	yes	597113	104439	0.167	1	-0.0000321	-1	0.00355	1	0.0535	1
ESR	YAKIMA	B0BZ05	1994	SURF_SOIL	SURFACE	Soil	yes	.	.	0.463	1	0.000451		0.0107	1	0.0937	1
ESR	600 I	B0BZ07	1994	SURF_SOIL	SURFACE	Soil	yes	585135	128250	0.219	1	0.000224		0.0055	1	0.0966	1
ESR	BASIN FARM A	B0BZ08	1994	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.526	1	-0.000501	-1	0.00971	1	0.0877	1
ESR	BASIN FARM B	B0BZ09	1994	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.507	1	0.00109	-1	0.00924	1	0.0792	1
ESR	STEVENS COUNTY	B0D610	1994	SURF_SOIL	SURFACE	Soil	yes	.	.	0.82	1	0.00109		0.0293	1	0.393	1
ESR	W. 300 AREA CLEANUP	B0LVQ0	1997	SURF_SOIL	SURFACE	Soil	yes	.	.	0.614	1	.	.	.	.	0.171	1
ESR	NORTH 300 AREA	B0LVQ2	1997	SURF_SOIL	SURFACE	Soil	yes	594235	117644	0.563	1	.	.	.	.	0.155	1
ESR	RIVERSHORE ROAD	B0LVQ4	1997	SURF_SOIL	SURFACE	Soil	yes	.	.	0.0387	1	.	.	.	.	0.0126	1
ESR	BYERS LANDING	B0LVQ6	1997	SURF_SOIL	SURFACE	Soil	yes	596516	114703	0.147	1	.	.	.	.	0.0328	1
ESR	SAGEMOOR SPUR/COL.RIV. RD INTERSECTION	B0LVQ8	1997	SURF_SOIL	SURFACE	Soil	yes	.	.	0.869	1	.	.	.	.	0.15	1
ESR	SAGEMOOR FARM	B0P9M5	1998	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.32	1	0.00044	1	0.0117	1	0.056	1
ESR	BYERS LANDING	B0P9M6	1998	SURF_SOIL	SURFACE	Soil	yes	596516	114703	0.162	1	0.000363	1	0.0111	1	0.0511	1
ESR	RIVRVIEW-HARRIS	B0P9M8	1998	SURF_SOIL	SURFACE	Soil	yes	597113	104439	0.246	1	0.000153	1	0.00657	1	0.0427	1
ESR	SUNNYSIDE	B0P9N1	1998	SURF_SOIL	SURFACE	Soil	yes	542329	118863	0.177	1	0.000141	-1	0.00641	1	0.0809	1
ESR	600 I	B0P9N6	1998	SURF_SOIL	SURFACE	Soil	yes	585135	128250	0.0185	1	-0.0000296	-1	0.000893	1	0.0118	1
ESR	BASIN FARM A	B0P9N7	1998	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.343	1	0.000332	1	0.0103	1	0.0672	1
ESR	BASIN FARM B	B0P9N8	1998	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.202	1	0.000267	1	0.00567	1	0.0327	1
ESR	E OF 200 E	B0P9P0	1998	SURF_SOIL	SURFACE	Soil	yes	576879	135736	1.07	1	0.000353	1	0.0147	1	0.312	1
ESR	200 ESE	B0P9P1	1998	SURF_SOIL	SURFACE	Soil	yes	576340	134597	0.238	1	0.000382	1	0.0109	1	0.131	1
ESR	S OF 200 E	B0P9P2	1998	SURF_SOIL	SURFACE	Soil	yes	575241	131780	0.278	1	0.000289	1	0.011	1	0.0922	1
ESR	SW OF B/C CRIBS	B0P9P3	1998	SURF_SOIL	SURFACE	Soil	yes	572473	131024	0.0271	1	0.0000179	-1	0.00115	1	0.0135	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	E OF 200 W GATE	B0P9P4	1998	SURF_SOIL	SURFACE	Soil	yes	568455	136068	1.77	1	0.0081	1	0.525	1	0.376	1
ESR	S OF 200 W	B0P9P6	1998	SURF_SOIL	SURFACE	Soil	yes	568340	131239	0.139	1	0.000224	1	0.00887	1	0.0621	1
ESR	400 E	B0P9P9	1998	SURF_SOIL	SURFACE	Soil	yes	587922	123300	0.119	1	0.0000807	-1	0.00425	1	0.0411	1
ESR	SE SIDE OF FFTF	B0P9R0	1998	SURF_SOIL	SURFACE	Soil	yes	587865	122735	0.0453	1	0.0000901	1	0.00194	1	0.0224	1
ESR	NORTH 300 AREA	B0P9R1	1998	SURF_SOIL	SURFACE	Soil	yes	594235	117644	0.237	1	0.000146	-1	0.0231	1	0.0917	1
ESR	SOUTH 300 AREA	B0P9R2	1998	SURF_SOIL	SURFACE	Soil	yes	593984	113854	0.00519	-1	0.0000716	-1	0.00043	1	0.0276	1
ESR	RINGOLD AREA	B0P9T0	1998	SURF_SOIL	SURFACE	Soil	yes	595854	129776	0.162	1	0.000251	1	0.00655	1	0.0601	1
ESR	NE OF 100 N AREA	B0P9W2	1998	SURF_SOIL	SURFACE	Soil	yes	572614	151144	0.138	1	0.000159	1	0.0048	1	0.0646	1
ESR	E OF 100 N AREA	B0P9W3	1998	SURF_SOIL	SURFACE	Soil	yes	573359	149413	0.133	1	0.000182	1	0.00516	1	0.0687	1
ESR	ABOVE 100D PUMPHOUSE	B0P9W7	1998	SURF_SOIL	SURFACE	Soil	yes	572983	151148	0.0994	1	0.000107	1	0.0035	1	0.0525	1
ESR	1100 AREA	B0VYC5	1999	SURF_SOIL	SURFACE	Soil	yes	592769	113302	0.55	1	0.000511	1	0.025	1	0.115	1
ESR	1100 AREA	B0VYC7	1999	SURF_SOIL	SURFACE	Soil	yes	592769	113302	0.274	1	0.000237	1	0.00564	1	0.0462	1
ESR	1100 AREA	B0VYC9	1999	SURF_SOIL	SURFACE	Soil	yes	592769	113302	0.411	1	0.000356	1	0.0111	1	0.11	1
ESR	1100 AREA	B0VYD2	1999	SURF_SOIL	SURFACE	Soil	yes	592769	113302	0.336	1	0.000439	1	0.0074	1	0.0617	1
ESR	1100 AREA	B0VYD4	1999	SURF_SOIL	SURFACE	Soil	yes	592769	113302	0.345	1	0.000347	1	0.00792	1	0.0749	1
ESR	1100 AREA	B0VYD5	1999	SURF_SOIL	SURFACE	Soil	yes	592769	113302	0.143	1	0.000342	1	0.00333	1	0.0312	1
ESR	BACKGROUND	B0VYD6	1999	SURF_SOIL	SURFACE	Soil	yes	593772	111903	0.664	1	0.000598	1	0.0161	1	0.129	1
ESR	BACKGROUND	B0VYD8	1999	SURF_SOIL	SURFACE	Soil	yes	593772	111903	0.106	1	0.000108	-1	0.00127	1	0.0198	1
ESR	ICE HARBOR DAM	B0WFK5	1999	MEDIUM SAND	SUB_SURFACE	Soil	yes	.	.	0.0288	-1	.	.	.	.	0.00084	-1
ESR	ICE HARBOR DAM	B0WFK6	1999	FINE SAND	SUB_SURFACE	Soil	yes	.	.	0.0367	-1	.	.	.	.	0.0197	-1
ESR	ICE HARBOR DAM	B0WFK7	1999	VERY FINE SAND	SUB_SURFACE	Soil	yes	.	.	0.125	-1	.	.	.	.	0.0106	-1
ESR	ICE HARBOR DAM	B0WFK8	1999	SILT_CLAY	SUB_SURFACE	Soil	yes	.	.	0.186	-1	.	.	.	.	0.0218	-1
ESR	PRIEST RAPIDS DAM	B0WFK9	1999	COARSE SAND	SUB_SURFACE	Soil	yes	.	.	0.191	1	.	.	.	.	0.000558	-1
ESR	PRIEST RAPIDS DAM	B0WFL0	1999	MEDIUM SAND	SUB_SURFACE	Soil	yes	.	.	0.168	1	.	.	.	.	-0.00071	-1
ESR	PRIEST RAPIDS DAM	B0WFL1	1999	FINE SAND	SUB_SURFACE	Soil	yes	.	.	0.367	-1	.	.	.	.	0.00105	-1
ESR	PRIEST RAPIDS DAM	B0WFL2	1999	VERY FINE SAND	SUB_SURFACE	Soil	yes	.	.	0.377	1	.	.	.	.	0.000393	-1
ESR	PRIEST RAPIDS DAM	B0WFL3	1999	SILT_CLAY	SUB_SURFACE	Soil	yes	.	.	0.494	1	.	.	.	.	0.00485	-1
ESR	MC NARY DAM	B0WFL6	1999	FINE SAND	SUB_SURFACE	Soil	yes	593617	66538	0.297	1	.	.	.	.	0.00951	-1
ESR	MC NARY DAM	B0WFL7	1999	VERY FINE SAND	SUB_SURFACE	Soil	yes	593617	66538	0.37	1	.	.	.	.	0.0124	-1
ESR	MC NARY DAM	B0WFL8	1999	SILT_CLAY	SUB_SURFACE	Soil	yes	593617	66538	0.324	1	.	.	.	.	0.0148	-1
ESR	WHITE BLUFFS SLOUGH	B0WFM0	1999	MEDIUM SAND	SUB_SURFACE	Soil	yes	580000	150500	0.452	1	.	.	.	.	0.0146	-1
ESR	WHITE BLUFFS SLOUGH	B0WFM1	1999	FINE SAND	SUB_SURFACE	Soil	yes	580000	150500	0.212	1	.	.	.	.	-0.0078	-1

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Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	WHITE BLUFFS SLOUGH	B0WFM2	1999	VERY FINE SAND	SUB_SURFACE	Soil	yes	580000	150500	0.281	1	.	.	.	.	0.00758	-1
ESR	WHITE BLUFFS SLOUGH	B0WFM3	1999	SILT_CLAY	SUB_SURFACE	Soil	yes	580000	150500	0.782	1	.	.	.	.	0.0102	-1
ESR	100 F SLOUGH	B0WFM5	1999	MEDIUM SAND	SUB_SURFACE	Soil	yes	582602	145717	0.26	1	.	.	.	.	-0.000614	-1
ESR	100 F SLOUGH	B0WFM6	1999	FINE SAND	SUB_SURFACE	Soil	yes	582602	145717	0.143	1	.	.	.	.	-0.0162	-1
ESR	100 F SLOUGH	B0WFM7	1999	VERY FINE SAND	SUB_SURFACE	Soil	yes	582602	145717	0.42	1	.	.	.	.	-0.0061	-1
ESR	100 F SLOUGH	B0WFM8	1999	SILT_CLAY	SUB_SURFACE	Soil	yes	582602	145717	0.536	1	.	.	.	.	-0.0188	-1
ESR	HANFORD SLOUGH	B0WFN0	1999	MEDIUM SAND	SUB_SURFACE	Soil	yes	584550	145000	0.27	1	.	.	.	.	0.0012	-1
ESR	HANFORD SLOUGH	B0WFN1	1999	FINE SAND	SUB_SURFACE	Soil	yes	584550	145000	0.111	-1	.	.	.	.	-0.00848	-1
ESR	HANFORD SLOUGH	B0WFN2	1999	VERY FINE SAND	SUB_SURFACE	Soil	yes	584550	145000	0.134	-1	.	.	.	.	-0.00305	-1
ESR	HANFORD SLOUGH	B0WFN3	1999	SILT_CLAY	SUB_SURFACE	Soil	yes	584550	145000	0.287	1	.	.	.	.	0.009	-1
ESR	RICHLAND-RIVER	B0WFN5	1999	MEDIUM SAND	SUB_SURFACE	Soil	yes	.	.	0.368	1	.	.	.	.	0.0199	-1
ESR	RICHLAND-RIVER	B0WFN6	1999	FINE SAND	SUB_SURFACE	Soil	yes	.	.	0.15	1	.	.	.	.	0.00174	-1
ESR	RICHLAND-RIVER	B0WFN7	1999	VERY FINE SAND	SUB_SURFACE	Soil	yes	.	.	0.171	1	.	.	.	.	-0.0139	-1
ESR	RICHLAND-RIVER	B0WFN8	1999	SILT_CLAY	SUB_SURFACE	Soil	yes	.	.	0.625	1	.	.	.	.	0.187	1
ESR	FINLEY RR TRACK	B103R1	2000	SURF_SOIL	SURFACE	Soil	yes	614936	90643	-0.0111	-1	0.0000219	-1	0.00088	1	0.0135	-1
ESR	FINLEY RR TRACK	B103R2	2000	BIOTIC CRUST	SURFACE	Soil	yes	614936	90643	0.0804	-1	0.0000237	-1	0.00115	1	0.014	-1
ESR	GEORGE	B103R3	2000	BIOTIC CRUST	SURFACE	Soil	yes	539389	187859	0.0721	1	0.0000228	-1	0.00189	1	0.0152	-1
ESR	OTHELLO	B103R4	2000	BIOTIC CRUST	SURFACE	Soil	yes	599772	163648	0.253	1	0.000243	1	0.00601	1	0.0357	-1
ESR	BASIN CITY	B103R6	2000	BIOTIC CRUST	SURFACE	Soil	yes	601212	142280	0.16	1	0.0000235	-1	0.00316	1	0.0332	-1
ESR	PASCO	B103R8	2000	SURF_SOIL	SURFACE	Soil	yes	605873	102134	0.364	1	0.000296	-1	0.0101	1	0.145	1
ESR	PASCO AIRPORT	B103T0	2000	BIOTIC CRUST	SURFACE	Soil	yes	607075	103528	0.00672	-1	-0.0000076	-1	0.000307	1	-0.00265	-1
ESR	BROADMOOR, PASCO	B103T2	2000	BIOTIC CRUST	SURFACE	Soil	yes	598175	105886	0.17	1	0.000274	1	0.00557	1	0.0458	1
ESR	YAKIMA DELTA	B103T4	2000	BIOTIC CRUST	SURFACE	Soil	yes	595639	103220	0.0129	-1	0.000241	1	0.000452	1	0.00297	-1
ESR	TRI-CITY COLISEUM	B103T6	2000	BIOTIC CRUST	SURFACE	Soil	yes	598931	99208	0.129	1	0.00019	1	0.00397	1	0.0309	-1
ESR	KENNEWICK	B103T8	2000	BIOTIC CRUST	SURFACE	Soil	yes	604220	97328	0.031	-1	-0.0000348	-1	0.000712	1	0.0085	-1
ESR	WANAPUM	B103V1	2000	BIOTIC CRUST	SURFACE	Soil	yes	547864	171076	0.218	1	0.0000812	1	0.00517	1	0.0479	1
ESR	GEORGE	B103V3	2000	SURF_SOIL	SURFACE	Soil	yes	539389	187859	0.172	1	0.0000882	-1	0.00404	1	0.0758	1
ESR	MESA	B103V4	2000	SURF_SOIL	SURFACE	Soil	yes	613659	125037	0.105	1	0.0000166	-1	0.00225	1	0.0239	-1
ESR	PASCO	B103V6	2000	BIOTIC CRUST	SURFACE	Soil	yes	605873	102134	0.37	1	0.000379	1	0.00907	1	0.068	1
ESR	PASCO AIRPORT	B103V7	2000	SURF_SOIL	SURFACE	Soil	yes	607075	103528	0.00284	-1	0.0000623	-1	0.000162	1	0.00905	-1
ESR	BROADMOOR, PASCO	B103V8	2000	SURF_SOIL	SURFACE	Soil	yes	598175	105886	0.571	1	0.000337	1	0.0144	1	0.0658	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	YAKIMA DELTA	B103V9	2000	SURF_SOIL	SURFACE	Soil	yes	595639	103220	0.0302	-1	0.000107	-1	0.000462	1	0.00288	-1
ESR	TRI-CITY COLISEUM	B103W0	2000	SURF_SOIL	SURFACE	Soil	yes	598931	99208	0.347	1	0.000295	1	0.0104	1	0.0696	1
ESR	KENNEWICK	B103W1	2000	SURF_SOIL	SURFACE	Soil	yes	604220	97328	0.00136	-1	0.0000684	-1	0.000667	1	0.00802	-1
ESR	WANAPUM	B103W2	2000	SURF_SOIL	SURFACE	Soil	yes	547864	171076	0.231	1	0.000135	-1	0.00583	1	0.0837	1
ESR	OTHELLO	B103W3	2000	SURF_SOIL	SURFACE	Soil	yes	599772	163648	0.313	1	0.00031	1	0.00777	1	0.0815	1
ESR	BASIN CITY	B103W4	2000	SURF_SOIL	SURFACE	Soil	yes	601212	142280	0.132	1	0.000061	-1	0.00225	1	0.00388	-1
ESR	MESA	B103W5	2000	BIOTIC CRUST	SURFACE	Soil	yes	613659	125037	0.109	1	0.0000739	-1	0.00219	1	0.0207	-1
ESR	SUNNYSIDE	B108V3	2000	SURF_SOIL	SURFACE	Soil	yes	540081	113246	0.174	1	0.0000205	-1	0.00544	1	0.0256	-1
ESR	SUNNYSIDE	B108V4	2000	BIOTIC CRUST	SURFACE	Soil	yes	540081	113246	0.106	1	0.0000356	-1	0.00242	1	0.0295	-1
ESR	WSU	B10999	2000	SURF_SOIL	SURFACE	Soil	yes	595053	111937	0.712	1	0.000782	1	0.0183	1	0.0855	1
ESR	WSU	B109B0	2000	BIOTIC CRUST	SURFACE	Soil	yes	595053	111937	0.454	1	0.000416	1	0.0084	1	0.0899	1
ESR	100 F SLOUGH	B11246	2000	COARSE SAND	SURFACE	Soil	yes	582602	145717	0.0645	-1	0.0000142	-1	0.000444	1	.	.
ESR	TOPPENISH	B11J76	2001	SURF_SOIL	SURFACE	Soil	yes	485013	154201	0.0194	1	0.0000339	-1	0.00126	1	0.0124	-1
ESR	W END OF FIR ROAD	B11J77	2001	SURF_SOIL	SURFACE	Soil	yes	596047	124424	0.131	1	0.0000977	-1	0.00354	1	0.0495	1
ESR	TAYLOR FLATS NO. 2	B11J78	2001	SURF_SOIL	SURFACE	Soil	yes	595154	117863	0.48	1	0.000349	1	0.0139	1	0.0629	1
ESR	SAGEMOOR FARM	B11J79	2001	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.0262	1	0.000244	1	0.00127	1	-0.00938	-1
ESR	BYERS LANDING	B11J80	2001	SURF_SOIL	SURFACE	Soil	yes	596516	114703	0.093	1	0.0000204	-1	0.00369	1	0.0149	-1
ESR	RIVRVIEW-HARRIS	B11J81	2001	SURF_SOIL	SURFACE	Soil	yes	597113	104439	0.0395	1	0.0000242	-1	0.00269	1	0.0153	-1
ESR	BENTON CITY	B11J82	2001	SURF_SOIL	SURFACE	Soil	yes	577999	111908	0.362	1	0.00043	1	0.0125	1	0.0795	1
ESR	SUNNYSIDE	B11J84	2001	SURF_SOIL	SURFACE	Soil	yes	542329	118863	0.386	1	0.000398	1	0.0143	1	0.0877	1
ESR	MC NARY DAM	B11J85	2001	SURF_SOIL	SURFACE	Soil	yes	593617	66538	0.0513	1	0.0000321	-1	0.0017	1	0.0142	-1
ESR	WALLA WALLA	B11J86	2001	SURF_SOIL	SURFACE	Soil	yes	.	.	0.0427	1	0.000104	1	0.000699	1	0.0119	-1
ESR	WASHTUCNA	B11J87	2001	SURF_SOIL	SURFACE	Soil	yes	667290	160899	0.252	1	0.000466	1	0.00979	1	0.136	1
ESR	600 H	B11J88	2001	SURF_SOIL	SURFACE	Soil	yes	585135	128250	0.514	1	0.000346	1	0.0113	1	0.0622	1
ESR	600 I	B11J89	2001	SURF_SOIL	SURFACE	Soil	yes	585135	128250	0.507	1	0.000234	1	0.0101	1	0.0488	1
ESR	BASIN FARM A	B11J90	2001	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.014	-1	0.0000089	-1	0.00188	1	-0.00273	-1
ESR	BASIN FARM B	B11J91	2001	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.0366	1	0.0000361	-1	0.00165	1	0.00383	-1
ESR	200 ENC	B11J92	2001	SURF_SOIL	SURFACE	Soil	yes	573687	137776	11.8	1	0.000482	1	0.0387	1	3.06	1
ESR	E OF 200 E	B11J93	2001	SURF_SOIL	SURFACE	Soil	yes	576879	135736	1.13	1	0.000339	1	0.0202	1	0.208	1
ESR	200 ESE	B11J94	2001	SURF_SOIL	SURFACE	Soil	yes	576340	134597	0.618	1	0.00077	1	0.0172	1	0.102	1
ESR	S OF 200 E	B11J96	2001	SURF_SOIL	SURFACE	Soil	yes	575241	131780	0.186	1	0.000153	1	0.00717	1	0.145	1
ESR	SW OF B/C CRIBS	B11J97	2001	SURF_SOIL	SURFACE	Soil	yes	572473	131024	0.0844	1	0.0000964	1	0.00379	1	0.0285	-1
ESR	E OF 200 W GATE	B11J99	2001	SURF_SOIL	SURFACE	Soil	yes	568455	136068	0.603	1	0.00141	1	0.0809	1	0.158	1
ESR	S OF 200 W	B11JB1	2001	SURF_SOIL	SURFACE	Soil	yes	568340	131239	0.381	1	0.00055	1	0.0212	1	0.0817	1
ESR	RATTLESNAKE SPRINGS	B11JB3	2001	SURF_SOIL	SURFACE	Soil	yes	562774	131376	0.243	1	0.000307	1	0.014	1	0.0836	1

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ESR	YAKIMA BARRICADE	B11JB5	2001	SURF_SOIL	SURFACE	Soil	yes	559317	138652	0.229	1	0.0000775	-1	0.00632	1	0.0346	-1
ESR	400 E	B11JB6	2001	SURF_SOIL	SURFACE	Soil	yes	587922	123300	0.0926	1	0.00121	1	0.132	1	0.0107	-1
ESR	SE SIDE OF FFTF	B11JB7	2001	SURF_SOIL	SURFACE	Soil	yes	587865	122735	0.0759	1	0.0000628	-1	0.00221	1	0.0151	-1
ESR	NORTH 300 AREA	B11JB9	2001	SURF_SOIL	SURFACE	Soil	yes	594235	117644	0.127	1	0.000338	1	0.0278	1	0.0525	1
ESR	SOUTH 300 AREA	B11JC1	2001	SURF_SOIL	SURFACE	Soil	yes	593984	113854	0.435	1	0.000516	1	0.0176	1	0.108	1
ESR	HANFORD TOWNSITE	B11JC3	2001	SURF_SOIL	SURFACE	Soil	yes	584212	139885	0.632	1	0.000411	1	0.0167	1	0.092	1
ESR	WYE BARRICADE	B11JC4	2001	SURF_SOIL	SURFACE	Soil	yes	585135	128250	0.485	1	0.000535	1	0.0116	1	0.0852	1
ESR	PROSSER BARRICADE	B11JC5	2001	SURF_SOIL	SURFACE	Soil	yes	583671	118284	0.424	1	0.000506	1	0.00951	1	0.11	1
ESR	ALE FIELD LAB	B11JC7	2001	SURF_SOIL	SURFACE	Soil	yes	574723	118247	0.267	1	0.000447	1	0.00931	1	0.0708	1
ESR	N END VERNITA BRIDGE	B11JC8	2001	SURF_SOIL	SURFACE	Soil	yes	558951	146398	0.357	1	0.000343	1	0.0301	1	0.0688	1
ESR	WAHLUKE SLOPE	B11JC9	2001	SURF_SOIL	SURFACE	Soil	yes	565651	156361	0.114	1	0.00048	1	0.00388	1	0.0371	1
ESR	BERG RANCH	B11JD0	2001	SURF_SOIL	SURFACE	Soil	yes	527258	127698	0.269	1	0.000439	1	0.0109	1	0.0957	1
ESR	RINGOLD AREA	B11JD1	2001	SURF_SOIL	SURFACE	Soil	yes	595854	129776	0.31	1	0.000255	1	0.00768	1	0.0559	1
ESR	100 K AREA	B11JF8	2001	SURF_SOIL	SURFACE	Soil	yes	569532	146746	1.8	1	0.00684	1	0.0928	1	0.228	1
ESR	NE OF 100 N AREA	B11JF9	2001	SURF_SOIL	SURFACE	Soil	yes	572614	151144	0.402	1	0.000305	1	0.0131	1	0.12	1
ESR	E OF 100 N AREA	B11JH0	2001	SURF_SOIL	SURFACE	Soil	yes	573359	149413	0.337	1	0.000372	1	0.0125	1	0.0922	1
ESR	100N SHORE ABOVE HGP	B11JH2	2001	SURF_SOIL	SURFACE	Soil	yes	570697	149066	0.319	1	0.000382	1	0.00762	1	0.0645	-1
ESR	100N SPRING SHORELIN	B11JH3	2001	SURF_SOIL	SURFACE	Soil	yes	571423	150007	0.0805	1	0.0000392	-1	0.00187	1	0.0396	-1
ESR	ABOVE 100D PUMPHOUSE	B11JH4	2001	SURF_SOIL	SURFACE	Soil	yes	572983	151148	0.464	1	0.000431	1	0.0188	1	0.0888	1
ESR	100 AREA FIRE STAT	B11JH5	2001	SURF_SOIL	SURFACE	Soil	yes	572045	145123	0.525	1	0.00056	1	0.02	1	0.148	1
ESR	ENERGY NW-1	B151F3	2002	SURF_SOIL	SURFACE	Soil	yes	591278	126821	0.0134	-1	0.0000391	-1	0.000115	-1	0.00252	-1
ESR	ENERGY NW-2	B151F4	2002	SURF_SOIL	SURFACE	Soil	yes	591260	126246	0.0237	1	0.0000918	-1	0.000372	1	-0.0038	-1
ESR	ENERGY NW-3	B151F5	2002	SURF_SOIL	SURFACE	Soil	yes	591648	127519	0.0411	1	0.000105	1	0.00116	1	0.00772	-1
ESR	ENERGY NW-4	B151F7	2002	SURF_SOIL	SURFACE	Soil	yes	592980	127254	0.38	1	0.000429	1	0.0119	1	0.0761	1
ESR	ENERGY NW-5	B151F8	2002	SURF_SOIL	SURFACE	Soil	yes	593609	127556	0.45	1	0.000748	1	0.0136	1	0.109	1
ESR	ENERGY NW-6	B151F9	2002	SURF_SOIL	SURFACE	Soil	yes	590526	126150	0.145	1	0.00007	-1	0.00369	1	0.0195	-1
ESR	ENERGY NW-7	B151H0	2002	SURF_SOIL	SURFACE	Soil	yes	590354	126279	0.09	1	0.000362	1	0.00225	1	0.0247	-1
ESR	ENERGY NW-8	B151H2	2002	SURF_SOIL	SURFACE	Soil	yes	590953	128055	0.05	1	0.000154	-1	0.00145	1	-0.0206	-1
ESR	ENERGY NW-9	B151H3	2002	SURF_SOIL	SURFACE	Soil	yes	598825	128137	0.0238	-1	0.000341	1	0.00259	1	-0.0277	-1
ESR	ENERGY NW-10	B151H4	2002	SURF_SOIL	SURFACE	Soil	yes	591194	127878	0.0501	1	0.00304	1	0.00121	1	0.00378	-1
ESR	TIETON	B15DV6	2002	ORGANIC SOIL	SURFACE	Soil	yes	.	.	0.535	1	0.0000957	-1	0.0053	1	0.12	1
ESR	TIETON	B15DV7	2002	ORGANIC SOIL	SURFACE	Soil	yes	.	.	1.43	1	0.000943	1	0.022	1	0.335	1
ESR	TIETON	B15DW0	2002	MINERAL SOIL	SURFACE	Soil	yes	.	.	0.314	1	.	1	.	1	0.279	1

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ESR	TIETON	B15DW1	2002	MINERAL SOIL	SURFACE	Soil	yes	.	.	0.353	1	.	1	.	1	0.348	1
ESR	LEECH LAKE	B15DX6	2002	ORGANIC SOIL	SURFACE	Soil	yes	432117	146166	3.39	1	0.00165	1	0.0533	1	0.427	1
ESR	LEECH LAKE	B15DX7	2002	ORGANIC SOIL	SURFACE	Soil	yes	432117	146166	3.56	1	0.00196	1	0.0529	1	0.535	1
ESR	LEECH LAKE	B15DY0	2002	MINERAL SOIL	SURFACE	Soil	yes	432117	146166	0.405	1	0.000444	1	0.0148	1	0.313	1
ESR	LEECH LAKE	B15DY1	2002	MINERAL SOIL	SURFACE	Soil	yes	432117	146166	0.334	1	0.000619	1	0.00991	1	0.329	1
ESR	KNUPPENBURG LAKE	B15F06	2002	ORGANIC SOIL	SURFACE	Soil	yes	429634	150126	3.82	1	0.00084	1	0.0298	1	0.321	1
ESR	KNUPPENBURG LAKE	B15F07	2002	ORGANIC SOIL	SURFACE	Soil	yes	429634	150126	4.59	1	0.0193	1	0.042	1	0.248	1
ESR	KNUPPENBURG LAKE	B15F10	2002	MINERAL SOIL	SURFACE	Soil	yes	429634	150126	0.214	1	0.000235	1	0.00786	1	0.144	1
ESR	KNUPPENBURG LAKE	B15F11	2002	MINERAL SOIL	SURFACE	Soil	yes	429634	150126	1.56	1	0.000514	1	0.03	1	0.1	1
ESR	LA WIS WIS	B15F46	2002	ORGANIC SOIL	SURFACE	Soil	yes	417291	149649	1.37	1	0.000719	1	0.018	1	0.0907	1
ESR	LA WIS WIS	B15F47	2002	ORGANIC SOIL	SURFACE	Soil	yes	417291	149649	0.853	1	0.000486	1	0.0267	1	0.133	1
ESR	LA WIS WIS	B15F50	2002	MINERAL SOIL	SURFACE	Soil	yes	417291	149649	0.185	1	-0.0000076	-1	-0.000008	-1	0.0929	-1
ESR	LA WIS WIS	B15F51	2002	MINERAL SOIL	SURFACE	Soil	yes	417291	149649	0.134	1	0.000261	1	0.00661	1	-0.016	-1
ESR	100 B/C AREA UR	B17H17	2003	SURF_SOIL	SURFACE	Soil	yes	558504	145317	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B17H18	2003	SURF_SOIL	SURFACE	Soil	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 39-2	B17H19	2003	SURF_SOIL	SURFACE	Soil	yes	564914	145337	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B17H20	2003	SURF_SOIL	SURFACE	Soil	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B17H21	2003	SURF_SOIL	SURFACE	Soil	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B17H22	2003	SURF_SOIL	SURFACE	Soil	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA DR	B17H23	2003	SURF_SOIL	SURFACE	Soil	yes	566809	145865	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UR	B17HB2	2003	ROOTING ZONE	SURFACE	Soil	yes	558504	145317	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B17HB3	2003	ROOTING ZONE	SURFACE	Soil	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 39-2	B17HB4	2003	ROOTING ZONE	SURFACE	Soil	yes	564914	145337	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B17HB5	2003	ROOTING ZONE	SURFACE	Soil	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B17HB6	2003	ROOTING ZONE	SURFACE	Soil	yes	565485	145464	.	.	.	.	.	.	.	.

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ESR	100 B/C AREA OUTFL3	B17HB7	2003	ROOTING ZONE	SURFACE	Soil	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA DR	B17HB8	2003	ROOTING ZONE	SURFACE	Soil	yes	566809	145865	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UR	B17HT9	2003	ROOTING ZONE	SURFACE	Soil	yes	558504	145317	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B18XY2	2004	ROOTING ZONE	SURFACE	Soil	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B18XY3	2004	ROOTING ZONE	SURFACE	Soil	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B18XY4	2004	ROOTING ZONE	SURFACE	Soil	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B18XY5	2004	ROOTING ZONE	SURFACE	Soil	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B192D0	2004	ROOTING ZONE	SURFACE	Soil	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B192D1	2004	ROOTING ZONE	SURFACE	Soil	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B192D9	2004	ROOTING ZONE	SURFACE	Soil	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B192F7	2004	ROOTING ZONE	SURFACE	Soil	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	ALE 1	B193K2	2004	SURF_SOIL	SURFACE	Soil	yes	556695	130107	0.00515	-1	-0.000207	-1	-0.0000136	-1	0.0000055	-1
ESR	ALE 2	B193K4	2004	SURF_SOIL	SURFACE	Soil	yes	558805	122933	0.0502	1	0.0000536	-1	0.00115	1	0.00622	-1
ESR	ALE W1	B193K6	2004	SURF_SOIL	SURFACE	Soil	yes	557951	136881	0.218	1	0.000353	1	0.00762	1	0.0938	1
ESR	ALE W2	B193K8	2004	SURF_SOIL	SURFACE	Soil	yes	555611	133936	0.0798	1	0.0000609	-1	0.00199	1	0.0401	1
ESR	ALE W3	B193L0	2004	SURF_SOIL	SURFACE	Soil	yes	557785	134602	0.314	1	0.00105	1	0.0112	1	0.153	1
ESR	ALE W5	B193L2	2004	SURF_SOIL	SURFACE	Soil	yes	556696	130107	0.113	1	0.00475	1	0.00515	1	0.0485	1
ESR	ALE W6	B193L4	2004	SURF_SOIL	SURFACE	Soil	yes	560776	130938	0.425	1	0.00096	1	0.0137	1	0.144	1
ESR	ALE W8	B193L6	2004	SURF_SOIL	SURFACE	Soil	yes	554746	127959	0.15	1	0.000217	-1	0.00558	1	0.0419	-1
ESR	ALE W9	B193L8	2004	SURF_SOIL	SURFACE	Soil	yes	559486	127550	0.13	1	0.000142	-1	0.00578	1	0.0423	-1
ESR	ALE W11	B193M0	2004	SURF_SOIL	SURFACE	Soil	yes	556445	125264	0.0825	1	-0.0000303	-1	0.00299	1	0.0443	-1
ESR	ALE W12	B193M2	2004	SURF_SOIL	SURFACE	Soil	yes	559774	125479	0.103	1	0.00215	1	0.0032	1	0.0504	1
ESR	ALE W14	B193M4	2004	SURF_SOIL	SURFACE	Soil	yes	558851	122808	0.141	1	0.000173	-1	0.00466	1	0.0785	1
ESR	ALE E2	B193M6	2004	SURF_SOIL	SURFACE	Soil	yes	570586	128430	0.203	1	0.00214	1	0.00737	1	0.0632	1
ESR	ALE E3	B193M8	2004	SURF_SOIL	SURFACE	Soil	yes	568245	123523	0.106	1	0.0031	1	0.00895	1	0.026	-1
ESR	ALE E4	B193N0	2004	SURF_SOIL	SURFACE	Soil	yes	573776	124453	0.214	1	0.000503	1	0.00716	1	0.0559	1
ESR	ALE E5	B193N2	2004	SURF_SOIL	SURFACE	Soil	yes	576522	123781	0.376	1	0.000709	-1	0.0138	1	0.173	1
ESR	ALE E7	B193N4	2004	SURF_SOIL	SURFACE	Soil	yes	570930	121566	0.166	1	0.000124	-1	0.00512	1	0.059	1
ESR	ALE E8	B193N6	2004	SURF_SOIL	SURFACE	Soil	yes	574266	121884	0.0667	1	0.000224	-1	0.00235	1	0.0282	-1
ESR	ALE E10	B193N8	2004	SURF_SOIL	SURFACE	Soil	yes	570603	120666	0.176	1	0.00247	1	0.00681	1	0.094	1
ESR	ALE E14	B193P0	2004	SURF_SOIL	SURFACE	Soil	yes	574134	115952	0.155	1	0.000174	-1	0.00448	1	0.0301	-1
ESR	ALE E15	B193P2	2004	SURF_SOIL	SURFACE	Soil	yes	577777	116087	0.412	1	0.00113	1	0.0138	1	0.143	1
ESR	ALE W4	B193P4	2004	SURF_SOIL	SURFACE	Soil	yes	562275	134577	0.0793	1	0.000651	1	0.00281	1	0.136	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	ALE 3	B193P6	2004	SURF_SOIL	SURFACE	Soil	yes	563106	130031	0.0749	1	-0.000142	-1	0.00375	1	0.0256	-1
ESR	ALE 4	B193P8	2004	SURF_SOIL	SURFACE	Soil	yes	566178	124718	0.324	1	0.000908	-1	0.0142	1	-0.00631	-1
ESR	ALE E1	B193R0	2004	SURF_SOIL	SURFACE	Soil	yes	567812	128487	0.115	1	0.000286	-1	0.00613	1	0.0514	1
ESR	ALE W7	B193R2	2004	SURF_SOIL	SURFACE	Soil	yes	564170	131463	0.114	1	0.00122	1	0.00681	1	0.0869	1
ESR	ALE W10	B193R4	2004	SURF_SOIL	SURFACE	Soil	yes	562464	129070	0.135	1	0.000201	-1	0.00595	1	0.0393	1
ESR	ALE W13	B193R6	2004	SURF_SOIL	SURFACE	Soil	yes	564734	125391	0.466	1	0.0009	1	0.0298	1	0.0775	1
ESR	ALE W15	B193R8	2004	SURF_SOIL	SURFACE	Soil	yes	563711	122330	0.0493	1	-0.0000304	-1	0.00133	1	0.0181	-1
ESR	ALE W16	B193T0	2004	SURF_SOIL	SURFACE	Soil	yes	564937	122812	0.0227	1	0.000452	-1	0.000598	-1	0.0315	-1
ESR	SNIVELY Lysimeter 1	B193T2	2004	SURF_SOIL	SURFACE	Soil	yes	559906	127034	0.325	1	0.00164	1	0.0134	1	0.0762	1
ESR	SNIVELY Lysimeter 2	B193T4	2004	SURF_SOIL	SURFACE	Soil	yes	559894	126957	0.16	1	0.00128	-1	0.00439	1	0.0428	-1
ESR	SNIVELY Lysimeter 3	B193T6	2004	SURF_SOIL	SURFACE	Soil	yes	559906	126929	0.241	1	0.000759	-1	0.00657	1	0.101	1
ESR	SNIVELY Lysimeter 4	B193T8	2004	SURF_SOIL	SURFACE	Soil	yes	559918	126900	0.267	1	0.000768	-1	0.0123	1	0.163	1
ESR	SNIVELY Lysimeter 5	B193V0	2004	SURF_SOIL	SURFACE	Soil	yes	559846	126795	0.109	1	0.000623	1	0.00307	1	0.0767	1
ESR	ALE 5	B193V2	2004	SURF_SOIL	SURFACE	Soil	yes	568722	119676	0.587	1	0.00643	1	0.0159	1	0.224	1
ESR	ALE 6	B193V4	2004	SURF_SOIL	SURFACE	Soil	yes	569551	118347	0.282	1	0.0015	-1	0.0087	1	0.107	1
ESR	ALE 7	B193V6	2004	SURF_SOIL	SURFACE	Soil	yes	581183	118007	0.265	1	0.00191	1	0.00784	1	0.0587	1
ESR	ALE 8	B193V8	2004	SURF_SOIL	SURFACE	Soil	yes	571014	118292	0.111	1	0.00371	1	0.00332	1	0.107	1
ESR	ALE 9	B193W0	2004	SURF_SOIL	SURFACE	Soil	yes	579559	121482	0.256	1	0.000987	-1	0.00857	1	0.128	1
ESR	ALE E6	B193W2	2004	SURF_SOIL	SURFACE	Soil	yes	567460	120158	0.468	1	0.000729	1	0.0353	1	0.145	1
ESR	ALE E9	B193W4	2004	SURF_SOIL	SURFACE	Soil	yes	575709	123120	0.0863	1	-0.0000302	-1	0.00228	1	0.0675	1
ESR	ALE E11	B193W6	2004	SURF_SOIL	SURFACE	Soil	yes	572581	118432	0.0721	1	0.00208	1	0.00186	1	0.0392	1
ESR	ALE E12	B193W8	2004	SURF_SOIL	SURFACE	Soil	yes	574937	118079	0.191	1	0.000807	-1	0.0067	1	0.0439	1
ESR	ALE E13	B193X0	2004	SURF_SOIL	SURFACE	Soil	yes	580636	117553	0.197	1	0.00474	1	0.00731	1	0.075	1
ESR	ALE HQ Lysimeter 1	B193X2	2004	SURF_SOIL	SURFACE	Soil	yes	574195	117843	0.0513	1	0.000214	-1	0.00147	1	0.0418	1
ESR	ALE HQ Lysimeter 2	B193X4	2004	SURF_SOIL	SURFACE	Soil	yes	574195	117843	0.0501	1	0.00434	1	0.00202	1	0.0509	1
ESR	ALE HQ Lysimeter 3	B193X6	2004	SURF_SOIL	SURFACE	Soil	yes	574195	117843	0.0565	1	0.0000869	-1	0.00148	1	0.0347	1
ESR	ALE HQ Lysimeter 4	B193X8	2004	SURF_SOIL	SURFACE	Soil	yes	574195	117843	0.0626	1	0.00297	1	0.00147	1	0.0623	1
ESR	ALE HQ Lysimeter 5	B193Y0	2004	SURF_SOIL	SURFACE	Soil	yes	574195	117843	0.0472	1	0.000125	-1	0.00134	1	0.0196	-1
ESR	100 B/C AREA UPLAND1	B19468	2004	ROOTING ZONE	SURFACE	Soil	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND2	B19470	2004	ROOTING ZONE	SURFACE	Soil	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND3	B19472	2004	ROOTING ZONE	SURFACE	Soil	yes	.	.	.	.	.	.	.	.	.	.
ESR	116-C-1 N	B19474	2004	ROOTING ZONE	SURFACE	Soil	yes	565880	145343	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND4	B19491	2004	ROOTING ZONE	SURFACE	Soil	yes	.	.	.	.	.	.	.	.	.	.

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100 B/C AREA UPLAND5	B19493	2004	ROOTING ZONE	SURFACE	Soil	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND5	B19494	2004	ROOTING ZONE	SURFACE	Soil	yes	.	.	.	.	.	.	.	.	.	.
ESR	116-C-1 S	B19496	2004	ROOTING ZONE	SURFACE	Soil	yes	565880	145240	.	.	.	.	.	.	.	.
ESR	116-C-5 S	B19498	2004	ROOTING ZONE	SURFACE	Soil	yes	565423	145101	.	.	.	.	.	.	.	.
ESR	116-B-11 N	B194B0	2004	ROOTING ZONE	SURFACE	Soil	yes	565377	145258	.	.	.	.	.	.	.	.
ESR	TOPPENISH	B199C4	2004	SURF_SOIL	SURFACE	Soil	yes	485013	154201	0.111	1	0.0000691	-1	0.00461	1	0.0223	-1
ESR	W END OF FIR ROAD	B199C5	2004	SURF_SOIL	SURFACE	Soil	yes	596047	124424	0.0817	1	0.00194	-1	0.00117	-1	0.0199	-1
ESR	TAYLOR FLATS NO. 2	B199C6	2004	SURF_SOIL	SURFACE	Soil	yes	595154	117863	0.0652	1	0.000221	1	0.000118	-1	-0.0122	-1
ESR	SAGEMOOR FARM	B199C7	2004	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.0541	1	0.0000387	-1	0.00115	1	-0.0262	-1
ESR	BYERS LANDING	B199C8	2004	SURF_SOIL	SURFACE	Soil	yes	596516	114703	0.0413	1	.	.	.	.	-0.000000256	-1
ESR	RIVRVIEW-HARRIS	B199C9	2004	SURF_SOIL	SURFACE	Soil	yes	597113	104439	0.0555	1	0.0000795	-1	0.00117	1	0.0106	-1
ESR	BENTON CITY	B199D0	2004	SURF_SOIL	SURFACE	Soil	yes	577999	111908	0.014	-1	-0.00233	-1	0.000339	-1	-0.00576	-1
ESR	SUNNYSIDE	B199D1	2004	SURF_SOIL	SURFACE	Soil	yes	542329	118863	0.21	1	0.000958	-1	0.00839	1	0.0735	1
ESR	MC NARY DAM	B199D2	2004	SURF_SOIL	SURFACE	Soil	yes	593617	66538	-0.00332	-1	0.00108	-1	0.000825	-1	-0.0138	-1
ESR	WALLA WALLA	B199D3	2004	SURF_SOIL	SURFACE	Soil	yes	.	.	0.146	1	0.000118	-1	0.00453	1	0.0301	-1
ESR	WASHTUCNA	B199D4	2004	SURF_SOIL	SURFACE	Soil	yes	667290	160899	0.173	1	0.00291	1	0.00439	-1	0.0506	1
ESR	600 H	B199D5	2004	SURF_SOIL	SURFACE	Soil	yes	585135	128250	0.0985	1	.	-1	.	-1	0.05	-1
ESR	600 I	B199D6	2004	SURF_SOIL	SURFACE	Soil	yes	585135	128250	0.11	1	.	-1	.	-1	0.00587	-1
ESR	BASIN FARM A	B199D7	2004	SURF_SOIL	SURFACE	Soil	yes	596363	116036	-0.014	-1	0.0000324	-1	0.00168	1	0.00368	-1
ESR	BASIN FARM B	B199D8	2004	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.0534	1	-0.000153	-1	0.00134	1	-0.0128	-1
ESR	200 ENC	B199D9	2004	SURF_SOIL	SURFACE	Soil	yes	573687	137776	0.533	1	-0.000624	-1	0.00394	1	0.21	1
ESR	E OF 200 E	B199F0	2004	SURF_SOIL	SURFACE	Soil	yes	576879	135736	0.356	1	-0.000142	-1	0.00752	1	0.108	1
ESR	200 ESE	B199F2	2004	SURF_SOIL	SURFACE	Soil	yes	576340	134597	0.0304	1	0.000699	-1	0.00087	-1	-0.00193	-1
ESR	S OF 200 E	B199F3	2004	SURF_SOIL	SURFACE	Soil	yes	575241	131780	0.148	1	-0.000142	-1	0.0023	-1	0.0817	1
ESR	SW OF B/C CRIBS	B199F4	2004	SURF_SOIL	SURFACE	Soil	yes	572473	131024	0.0755	1	0.000135	-1	0.00317	1	0.0183	-1
ESR	E OF 200 W GATE	B199F6	2004	SURF_SOIL	SURFACE	Soil	yes	568455	136068	0.994	1	0.00592	1	0.523	1	0.313	1
ESR	S OF 200 W	B199F8	2004	SURF_SOIL	SURFACE	Soil	yes	568340	131239	0.0774	1	0.000266	1	0.00919	1	0.0409	-1
ESR	RATTLESNAKE SPRINGS	B199H0	2004	SURF_SOIL	SURFACE	Soil	yes	562774	131376	0.139	1	0.000205	-1	0.00149	1	-0.0118	-1
ESR	YAKIMA BARRICADE	B199H2	2004	SURF_SOIL	SURFACE	Soil	yes	559317	138652	0.213	1	-0.00075	-1	0.0105	1	0.0534	1
ESR	400 E	B199H3	2004	SURF_SOIL	SURFACE	Soil	yes	587922	123300	0.0341	1	-0.000142	-1	0.00205	-1	-0.00489	-1
ESR	SE SIDE OF FFTF	B199H4	2004	SURF_SOIL	SURFACE	Soil	yes	587865	122735	0.0255	1	0.0000755	-1	0.00155	1	0.0222	-1
ESR	NORTH 300 AREA	B199H6	2004	SURF_SOIL	SURFACE	Soil	yes	594235	117644	0.148	1	0.000659	-1	0.00361	1	0.00281	-1
ESR	SOUTH 300 AREA	B199H8	2004	SURF_SOIL	SURFACE	Soil	yes	593984	113854	-0.00559	-1	-0.000146	-1	0.00456	1	-0.0137	-1

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ESR	HANFORD TOWNSITE	B199J0	2004	SURF_SOIL	SURFACE	Soil	yes	584212	139885	0.0842	1	0.000422	-1	0.00439	1	0.0393	1
ESR	WYE BARRICADE	B199J1	2004	SURF_SOIL	SURFACE	Soil	yes	585135	128250	0.0973	1	0.000313	-1	0.00583	1	0.051	-1
ESR	PROSSER BARRICADE	B199J2	2004	SURF_SOIL	SURFACE	Soil	yes	583671	118284	0.397	1	0.00142	-1	0.0105	1	0.0605	1
ESR	ALE FIELD LAB	B199J3	2004	SURF_SOIL	SURFACE	Soil	yes	574723	118247	.	-1	.	-1	.	-1	.	-1
ESR	N END VERNITA BRIDGE	B199J4	2004	SURF_SOIL	SURFACE	Soil	yes	558951	146398	0.0718	1	0.000122	-1	0.00143	1	-0.0158	-1
ESR	WAHLUKE SLOPE	B199J5	2004	SURF_SOIL	SURFACE	Soil	yes	565651	156361	0.13	1	0.000576	-1	0.00391	1	0.03	-1
ESR	BERG RANCH	B199J6	2004	SURF_SOIL	SURFACE	Soil	yes	527258	127698	0.148	1	0.000382	-1	0.00275	-1	0.043	-1
ESR	RINGOLD AREA	B199J7	2004	SURF_SOIL	SURFACE	Soil	yes	595854	129776	0.25	1	.	-1	.	-1	0.0597	1
ESR	100 K AREA	B199L5	2004	SURF_SOIL	SURFACE	Soil	yes	569532	146746	0.352	1	-0.00014	-1	0.013	1	0.0586	1
ESR	NE OF 100 N AREA	B199L7	2004	SURF_SOIL	SURFACE	Soil	yes	572614	151144	0.274	1	-0.000142	-1	0.00626	1	0.0693	1
ESR	E OF 100 N AREA	B199L8	2004	SURF_SOIL	SURFACE	Soil	yes	573359	149413	0.0761	1	0.00024	-1	0.00381	1	0.0196	-1
ESR	100N SHORE ABOVE HGP	B199M0	2004	SURF_SOIL	SURFACE	Soil	yes	570697	149066	0.226	1	0.000817	-1	0.0087	1	-0.0133	-1
ESR	100N SPRING SHORELIN	B199M1	2004	SURF_SOIL	SURFACE	Soil	yes	571423	150007	0.128	1	0.000408	-1	0.00126	-1	0.0316	-1
ESR	ABOVE 100D PUMPHOUSE	B199M2	2004	SURF_SOIL	SURFACE	Soil	yes	572983	151148	0.00993	-1	-0.0000076	-1	0.000917	1	-0.00157	-1
ESR	100 AREA FIRE STAT	B199M3	2004	SURF_SOIL	SURFACE	Soil	yes	572045	145123	0.545	1	0.00198	1	0.0205	1	0.0906	1
ESR	GEORGE	B199N5	2004	SURF_SOIL	SURFACE	Soil	yes	539389	187859	0.0454	1	-0.000142	-1	0.0000968	-1	0.0229	-1
ESR	OTHELLO	B199N7	2004	SURF_SOIL	SURFACE	Soil	yes	599772	163648	0.273	1	0.000257	1	0.00583	1	0.0347	-1
ESR	WANAPUM	B199N9	2004	SURF_SOIL	SURFACE	Soil	yes	547864	171076	0.0237	1	-0.000141	-1	0.000448	-1	0.0165	-1
ESR	100 B/C AREA INTERMEDIATE 2	B19W09	2004	ROOTING ZONE	SURFACE	Soil	yes	565993	145593	.	.	.	.	.	.	.	.
ESR	100 B/C AREA INTERMEDIATE 2	B19W10	2004	ROOTING ZONE	SURFACE	Soil	yes	565993	145593	.	.	.	.	.	.	.	.
ESR	100 B/C AREA INTERMEDIATE 2	B19W11	2004	ROOTING ZONE	SURFACE	Soil	yes	565993	145593	.	.	.	.	.	.	.	.
ESR	100 B/C AREA INTERMEDIATE 2	B19W12	2004	ROOTING ZONE	SURFACE	Soil	yes	565993	145593	.	.	.	.	.	.	.	.
ESR	100 B/C AREA INTERMEDIATE 2	B19W13	2004	ROOTING ZONE	SURFACE	Soil	yes	565993	145593	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B1C7X8	2005	ROOTING ZONE	SURFACE	Soil	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B1C7X8-L	2005	ROOTING ZONE	SURFACE	Soil	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B1C7X9	2005	ROOTING ZONE	SURFACE	Soil	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B1C7X9-L	2005	ROOTING ZONE	SURFACE	Soil	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B1C7Y0	2005	ROOTING ZONE	SURFACE	Soil	yes	558844	145558	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	VERNITA BRIDGE -2	B1C7Y0-L	2005	ROOTING ZONE	SURFACE	Soil	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B1C7Y1	2005	ROOTING ZONE	SURFACE	Soil	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B1C7Y1-L	2005	ROOTING ZONE	SURFACE	Soil	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -4	B1C7Y2	2005	ROOTING ZONE	SURFACE	Soil	yes	559347	145849	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -4	B1C7Y2-L	2005	ROOTING ZONE	SURFACE	Soil	yes	559347	145849	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B1C7Y3	2005	ROOTING ZONE	SURFACE	Soil	yes	559606	145999	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B1C7Y3-L	2005	ROOTING ZONE	SURFACE	Soil	yes	559606	145999	.	.	.	.	.	.	.	.
ESR	HRNM NS-1	B1D0H7	2005	SURF_SOIL	SURFACE	Soil	yes	591980	135884	0.186	1	.	.	.	.	.	.
ESR	HRNM NS-2	B1D0H8	2005	SURF_SOIL	SURFACE	Soil	yes	588573	139236	0.0382	1	.	.	.	.	.	.
ESR	HRNM NS-4	B1D0H9	2005	SURF_SOIL	SURFACE	Soil	yes	556313	148206	0.0667	1	.	.	.	.	.	.
ESR	HRNM NS-5	B1D0J0	2005	SURF_SOIL	SURFACE	Soil	yes	561141	147577	0.0179	-1	.	.	.	.	.	.
ESR	HRNM NS-13	B1D0J1	2005	SURF_SOIL	SURFACE	Soil	yes	565764	155855	0.166	1	.	.	.	.	.	.
ESR	HRNM NS-14	B1D0J2	2005	SURF_SOIL	SURFACE	Soil	yes	570325	156495	0.0188	-1	.	.	.	.	.	.
ESR	HRNM NS-15	B1D0J3	2005	SURF_SOIL	SURFACE	Soil	yes	574800	156573	0.22	1	.	.	.	.	.	.
ESR	HRNM NS-16	B1D0J4	2005	SURF_SOIL	SURFACE	Soil	yes	579501	156649	0.347	1	.	.	.	.	.	.
ESR	HRNM NS-17	B1D0J5	2005	SURF_SOIL	SURFACE	Soil	yes	584556	156648	0.0671	1	.	.	.	.	.	.
ESR	HRNM NS-24	B1D0J6	2005	SURF_SOIL	SURFACE	Soil	yes	558562	145943	0.00452	-1	.	.	.	.	.	.
ESR	HRNM NS-27	B1D0J7	2005	SURF_SOIL	SURFACE	Soil	yes	588280	156795	0.283	1	.	.	.	.	.	.
ESR	HRNM NS-28	B1D0J8	2005	SURF_SOIL	SURFACE	Soil	yes	558945	146402	0.027	1	.	.	.	.	.	.
ESR	HRNM NS-45	B1D0J9	2005	SURF_SOIL	SURFACE	Soil	yes	593449	134331	0.00523	-1	.	.	.	.	.	.
ESR	HRNM NS-47	B1D0K0	2005	SURF_SOIL	SURFACE	Soil	yes	591390	137607	-0.0109	-1	.	.	.	.	.	.
ESR	HRNM NS-48	B1D0K1	2005	SURF_SOIL	SURFACE	Soil	yes	592517	135674	0.658	1	.	.	.	.	.	.
ESR	HRNM NS-26	B1D0K3	2005	SURF_SOIL	SURFACE	Soil	yes	578416	157857	0.112	1	.	.	.	.	.	.
ESR	HRNM NS-9	B1D0K4	2005	SURF_SOIL	SURFACE	Soil	yes	562473	152143	0.0932	1	.	.	.	.	.	.
ESR	HRNM NS-18	B1D0K6	2005	SURF_SOIL	SURFACE	Soil	yes	574061	158163	0.292	1	.	.	.	.	0.0691	1
ESR	HRNM NS-19	B1D0K7	2005	SURF_SOIL	SURFACE	Soil	yes	577658	159760	0.387	1	.	.	.	.	0.0825	1
ESR	HRNM NS-20	B1D0K8	2005	SURF_SOIL	SURFACE	Soil	yes	582095	159770	0.294	1	.	.	.	.	0.0552	1
ESR	HRNM NS-21	B1D0K9	2005	SURF_SOIL	SURFACE	Soil	yes	578889	162207	0.271	1	.	.	.	.	0.189	1
ESR	HRNM NS-31	B1D0L0	2005	SURF_SOIL	SURFACE	Soil	yes	557964	145496	0.188	1	.	.	.	.	-0.0297	-1
ESR	HRNM NS-32	B1D0L1	2005	SURF_SOIL	SURFACE	Soil	yes	562459	146574	0.0726	1	.	.	.	.	-0.0208	-1
ESR	HRNM NS-33	B1D0L2	2005	SURF_SOIL	SURFACE	Soil	yes	565081	145867	0.34	1	.	.	.	.	0.0249	-1
ESR	HRNM NS-34	B1D0L3	2005	SURF_SOIL	SURFACE	Soil	yes	568745	147755	0.101	1	.	.	.	.	-0.015	-1
ESR	HRNM NS-35	B1D0L4	2005	SURF_SOIL	SURFACE	Soil	yes	571460	150982	0.107	1	.	.	.	.	-0.0119	-1
ESR	HRNM NS-36	B1D0L5	2005	SURF_SOIL	SURFACE	Soil	yes	573966	154723	0.0221	1	.	.	.	.	-0.0192	-1
ESR	HRNM NS-37	B1D0L6	2005	SURF_SOIL	SURFACE	Soil	yes	580766	151401	-0.000484	-1	.	.	.	.	-0.0261	-1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	HRNM NS-38	B1D0L7	2005	SURF_SOIL	SURFACE	Soil	yes	581694	148497	0.00159	-1	.	.	.	.	-0.0184	-1
ESR	HRNM NS-39	B1D0L8	2005	SURF_SOIL	SURFACE	Soil	yes	585047	141969	0.0202	-1	.	.	.	.	-0.00485	-1
ESR	HRNM NS-40	B1D0L9	2005	SURF_SOIL	SURFACE	Soil	yes	588453	138637	-0.0125	-1	.	.	.	.	0.00353	-1
ESR	HRNM NS-41	B1D0M0	2005	SURF_SOIL	SURFACE	Soil	yes	591490	135417	0.144	1	.	.	.	.	-0.00322	-1
ESR	HRNM NS-42	B1D0M1	2005	SURF_SOIL	SURFACE	Soil	yes	594258	133403	0.0234	1	.	.	.	.	-0.0217	-1
ESR	HRNM NS-43	B1D0M2	2005	SURF_SOIL	SURFACE	Soil	yes	589993	137701	0.0587	1	.	.	.	.	-0.00857	-1
ESR	HRNM NS-44	B1D0M3	2005	SURF_SOIL	SURFACE	Soil	yes	590242	137302	0.0995	1	.	.	.	.	-0.0167	-1
ESR	HRNM NS-46	B1D0M4	2005	SURF_SOIL	SURFACE	Soil	yes	593658	133796	0.0338	1	.	.	.	.	-0.0284	-1
ESR	HRNM MCG-1	B1D0M5	2005	SURF_SOIL	SURFACE	Soil	yes	554294	138506	0.0363	1	.	.	.	.	0.0109	-1
ESR	HRNM MCG-2	B1D0M6	2005	SURF_SOIL	SURFACE	Soil	yes	557633	138278	0.0442	1	.	.	.	.	-0.00171	-1
ESR	HRNM MCG-3	B1D0M7	2005	SURF_SOIL	SURFACE	Soil	yes	554653	142711	0.0545	1	.	.	.	.	0.0182	-1
ESR	HRNM MCG-4	B1D0M8	2005	SURF_SOIL	SURFACE	Soil	yes	559179	141075	0.122	1	.	.	.	.	-0.00834	-1
ESR	HRNM MCG-5	B1D0M9	2005	SURF_SOIL	SURFACE	Soil	yes	554678	142717	0.0254	1	.	.	.	.	-0.0326	-1
ESR	HRNM MCG-6	B1D0N0	2005	SURF_SOIL	SURFACE	Soil	yes	557407	142967	0.216	1	.	.	.	.	0.0495	1
ESR	HRNM MCG-7	B1D0N1	2005	SURF_SOIL	SURFACE	Soil	yes	558827	145237	0.254	1	.	.	.	.	0.0814	1
ESR	HRNM MCG-8	B1D0N2	2005	SURF_SOIL	SURFACE	Soil	yes	554918	144502	0.0931	1	.	.	.	.	-0.0144	-1
ESR	HRNM MCG-9	B1D0N3	2005	SURF_SOIL	SURFACE	Soil	yes	555662	143369	0.126	1	.	.	.	.	0.00725	-1
ESR	HRNM MCG-10	B1D0N4	2005	SURF_SOIL	SURFACE	Soil	yes	554382	143434	0.183	1	0.000715	1	0.00648	1	0.0278	-1
ESR	HRNM MCG-11	B1D0N5	2005	SURF_SOIL	SURFACE	Soil	yes	556152	142248	0.135	1	0.000209	-1	0.00362	1	0.047	-1
ESR	HRNM MCG-12	B1D0N6	2005	SURF_SOIL	SURFACE	Soil	yes	558793	145425	0.179	1	0.0014	1	0.0068	1	-0.0121	-1
ESR	HRNM MCG-13	B1D0N7	2005	SURF_SOIL	SURFACE	Soil	yes	558714	143492	0.499	1	-0.000164	-1	0.0106	1	0.0541	1
ESR	HRNM MCG-14	B1D0N8	2005	SURF_SOIL	SURFACE	Soil	yes	558688	143515	0.461	1	0.000212	1	0.0108	1	0.037	-1
ESR	HRNM MCG-15	B1D0N9	2005	SURF_SOIL	SURFACE	Soil	yes	558664	143498	0.55	1	0.000334	1	0.0185	1	0.0547	1
ESR	HRNM MCG-16	B1D0P0	2005	SURF_SOIL	SURFACE	Soil	yes	558653	143525	0.443	1	-0.0000422	-1	0.0117	1	0.0662	1
ESR	HRNM MCG-17	B1D0P1	2005	SURF_SOIL	SURFACE	Soil	yes	558628	143490	0.15	1	0.000356	-1	0.00396	1	0.0241	-1
ESR	HRNM MCG-18	B1D0P2	2005	SURF_SOIL	SURFACE	Soil	yes	558582	143480	0.0142	-1	0.0000497	-1	0.00124	1	-0.0258	-1
ESR	HRNM MCG-19	B1D0P3	2005	SURF_SOIL	SURFACE	Soil	yes	558682	143478	0.0876	1	0.0000806	-1	0.00247	1	0.00795	-1
ESR	HRNM NS-3	B1D0P4	2005	SURF_SOIL	SURFACE	Soil	yes	586130	143210	0.119	1	.	.	.	.	0.0306	-1
ESR	HRNM NS-7	B1D0P5	2005	SURF_SOIL	SURFACE	Soil	yes	584552	147920	0.199	1	.	.	.	.	0.0149	-1
ESR	HRNM NS-8	B1D0P6	2005	SURF_SOIL	SURFACE	Soil	yes	588482	146921	0.00432	-1	.	.	.	.	-0.0207	-1
ESR	HRNM NS-11	B1D0P7	2005	SURF_SOIL	SURFACE	Soil	yes	582459	151847	0.0387	1	.	.	.	.	-0.0167	-1
ESR	HRNM NS-12	B1D0P8	2005	SURF_SOIL	SURFACE	Soil	yes	585785	151803	0.0959	1	.	.	.	.	0.00563	-1
ESR	HRNM NS-22	B1D0P9	2005	SURF_SOIL	SURFACE	Soil	yes	585904	150536	0.139	1	.	.	.	.	0.0355	-1
ESR	HRNM NS-23	B1D0R0	2005	SURF_SOIL	SURFACE	Soil	yes	580125	149725	0.112	1	.	.	.	.	0.0198	-1
ESR	HRNM NS-25	B1D0R1	2005	SURF_SOIL	SURFACE	Soil	yes	587877	140962	0.369	1	.	.	.	.	0.0717	1
ESR	HRNM NS-29	B1D0R2	2005	SURF_SOIL	SURFACE	Soil	yes	584992	146517	0.23	1	.	.	.	.	0.0418	-1
ESR	HRNM NS-30	B1D0R3	2005	SURF_SOIL	SURFACE	Soil	yes	584533	144945	0.18	1	.	.	.	.	0.0391	-1
ESR	200 AREA BRMaP 6	B1D3J7	2005	ROOTING ZONE	SURFACE	Soil	yes	574492	127555	0.0238	1	.	.	.	.	.	.
ESR	200 AREA BRMaP 6	B1D3J8	2005	ROOTING ZONE	SURFACE	Soil	yes	574492	127555	-0.00169	-1	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	200 AREA BRMaP 6	B1D3J9	2005	SURF_SOIL	SURFACE	Soil	yes	574492	127555	0.162	1	.	.	.	.	.	.
ESR	200 AREA BRMaP 10	B1D3K3	2005	ROOTING ZONE	SURFACE	Soil	yes	568648	132881	0.012	-1	.	.	.	.	.	.
ESR	200 AREA BRMaP 10	B1D3K4	2005	ROOTING ZONE	SURFACE	Soil	yes	568648	132881	-0.00298	-1	.	.	.	.	.	.
ESR	200 AREA BRMaP 10	B1D3K5	2005	SURF_SOIL	SURFACE	Soil	yes	568648	132881	0.0454	1	.	.	.	.	.	.
ESR	200 AREA BRMaP 19	B1D3K9	2005	ROOTING ZONE	SURFACE	Soil	yes	559765	140344	0.0048	-1	.	.	.	.	.	.
ESR	200 AREA BRMaP 19	B1D3L0	2005	ROOTING ZONE	SURFACE	Soil	yes	559765	140344	0.0671	1	.	.	.	.	.	.
ESR	200 AREA BRMaP 19	B1D3L1	2005	SURF_SOIL	SURFACE	Soil	yes	559765	140344	0.0914	1	.	.	.	.	.	.
ESR	100N-NR-2 SDA	B1D3P2	2005	SURF_SOIL	SURFACE	Soil	yes	571087	149620	.	.	.	.	.	.	-0.0186	-1
ESR	100N-NR-2 SDA	B1D3P3	2005	SURF_SOIL	SURFACE	Soil	yes	571087	149620	.	.	.	.	.	.	0.0424	-1
ESR	100N-NR-2 SDA	B1D3P4	2005	SURF_SOIL	SURFACE	Soil	yes	571087	149620	.	.	.	.	.	.	-0.0224	-1
ESR	100N-NR-2 SDA	B1D3P5	2005	SURF_SOIL	SURFACE	Soil	yes	571087	149620	.	.	.	.	.	.	-0.000528	-1
ESR	100N-NR-2 SP	B1D3P6	2005	SURF_SOIL	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	0.0942	1
ESR	100N-NR-2 SP	B1D3P7	2005	SURF_SOIL	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	-0.0284	-1
ESR	100N-NR-2 SP	B1D3P8	2005	SURF_SOIL	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	-0.0293	-1
ESR	100N-NR-2 SP	B1D3P9	2005	SURF_SOIL	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	0.0211	-1
ESR	100N-NR-2 SP	B1D3R0	2005	SURF_SOIL	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	0.00715	-1
ESR	100N-NR-2 EMA	B1D3R1	2005	SURF_SOIL	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	-0.0182	-1
ESR	100N-NR-2 EMA	B1D3R2	2005	SURF_SOIL	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	-0.0343	-1
ESR	100N-NR-2 EMA	B1D3R3	2005	SURF_SOIL	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	0.0286	-1
ESR	100N-NR-2 EMA	B1D3R4	2005	SURF_SOIL	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	-0.0212	-1
ESR	VERNITA	B1D3R5	2005	SURF_SOIL	SURFACE	Soil	yes	559486	145899	.	.	.	.	.	.	-0.0194	-1
ESR	VERNITA	B1D3R6	2005	SURF_SOIL	SURFACE	Soil	yes	559486	145899	.	.	.	.	.	.	-0.0205	-1
ESR	100N-NR-2 SDA	B1D3R7	2005	SURF_SOIL	SURFACE	Soil	yes	571087	149620	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SDA	B1D3R8	2005	SURF_SOIL	SURFACE	Soil	yes	571087	149620	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SDA	B1D3R9	2005	SURF_SOIL	SURFACE	Soil	yes	571087	149620	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SDA	B1D3T0	2005	SURF_SOIL	SURFACE	Soil	yes	571087	149620	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D3T5	2005	SURF_SOIL	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D3T6	2005	SURF_SOIL	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D3T7	2005	SURF_SOIL	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D3T8	2005	SURF_SOIL	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D3T9	2005	SURF_SOIL	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D3V4	2005	SURF_SOIL	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D3V5	2005	SURF_SOIL	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D3V6	2005	SURF_SOIL	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D3V7	2005	SURF_SOIL	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	VERNITA	B1D3W2	2005	SURF_SOIL	SURFACE	Soil	yes	559486	145899	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	VERNITA	B1D3W3	2005	SURF_SOIL	SURFACE	Soil	yes	559486	145899	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D3W6	2005	ROOTING ZONE	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	0.0984	1
ESR	100N-NR-2 SP	B1D3W7	2005	ROOTING ZONE	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	0.0366	-1
ESR	100N-NR-2 SP	B1D3W8	2005	ROOTING ZONE	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	0.01	-1
ESR	100N-NR-2 SP	B1D3W9	2005	ROOTING ZONE	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	-0.00617	-1
ESR	100N-NR-2 SP	B1D3X0	2005	ROOTING ZONE	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	5.37	1
ESR	100N-NR-2 EMA	B1D3X2	2005	ROOTING ZONE	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	-0.00494	-1
ESR	100N-NR-2 EMA	B1D3X3	2005	ROOTING ZONE	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	-0.0187	-1
ESR	100N-NR-2 EMA	B1D3X4	2005	ROOTING ZONE	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	0.0322	-1
ESR	100N-NR-2 EMA	B1D3X7	2005	ROOTING ZONE	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	-0.00372	-1
ESR	100N-NR-2 EMA	B1D3X8	2005	ROOTING ZONE	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	-0.0503	-1
ESR	VERNITA	B1D3X9	2005	ROOTING ZONE	SURFACE	Soil	yes	559486	145899	.	.	.	.	.	.	-0.0344	-1
ESR	VERNITA	B1D3Y0	2005	ROOTING ZONE	SURFACE	Soil	yes	559486	145899	.	.	.	.	.	.	-0.0123	-1
ESR	VERNITA	B1D3Y1	2005	ROOTING ZONE	SURFACE	Soil	yes	559486	145899	.	.	.	.	.	.	0.0127	-1
ESR	VERNITA	B1D3Y2	2005	ROOTING ZONE	SURFACE	Soil	yes	559486	145899	.	.	.	.	.	.	0.00997	-1
ESR	100N-NR-2 SP	B1D3Y3	2005	ROOTING ZONE	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D3Y4	2005	ROOTING ZONE	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D3Y5	2005	ROOTING ZONE	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D3Y6	2005	ROOTING ZONE	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D3Y7	2005	ROOTING ZONE	SURFACE	Soil	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D3Y9	2005	ROOTING ZONE	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D400	2005	ROOTING ZONE	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D401	2005	ROOTING ZONE	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D404	2005	ROOTING ZONE	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100N-NR-2 EMA	B1D405	2005	ROOTING ZONE	SURFACE	Soil	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	VERNITA	B1D406	2005	ROOTING ZONE	SURFACE	Soil	yes	559486	145899	.	.	.	.	.	.	.	.
ESR	VERNITA	B1D407	2005	ROOTING ZONE	SURFACE	Soil	yes	559486	145899	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SDA	B1DYH3	2005	SURF_SOIL	SURFACE	Soil	yes	571087	149620	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SDA	B1DYH4	2005	SURF_SOIL	SURFACE	Soil	yes	571087	149620	.	.	.	.	.	.	.	.
ESR	OTHELLO	E033248	1990	SURF_SOIL	SURFACE	Soil	yes	.	.	0.344	1	0.0000842	-1	0.00765	1	0.0759	1
ESR	MOSES LAKE AREA	E033293	1990	SURF_SOIL	SURFACE	Soil	yes	.	.	0.243	1	0.000263	1	0.00412	1	0.0612	1
ESR	WASHTUCNA	E033294	1990	SURF_SOIL	SURFACE	Soil	yes	667290	160899	0.288	1	-0.000016	-1	0.0026	1	0.0496	1
ESR	WALLA WALLA	E033295	1990	SURF_SOIL	SURFACE	Soil	yes	672372	113292	0.333	1	0.00244	1	0.00306	1	0.0455	1
ESR	CONNELL	E033296	1990	SURF_SOIL	SURFACE	Soil	yes	.	.	1.19	1	0.00106	1	0.0164	1	0.204	1
ESR	MC NARY DAM	E033297	1990	SURF_SOIL	SURFACE	Soil	yes	593617	66538	0.276	1	0.000262	1	0.00607	1	0.0789	1
ESR	YAKIMA	E033298	1990	SURF_SOIL	SURFACE	Soil	yes	.	.	0.599	1	0.000449	1	0.0106	1	0.126	1
ESR	SE SIDE OF FFTF	E114479	1990	SURF_SOIL	SURFACE	Soil	yes	587865	122735	.	1	.	1	.	1	.	1
ESR	TAYLOR FLATS NO. 2	E115994	1990	SURF_SOIL	SURFACE	Soil	yes	595154	117863	0.102	1	0.0000579	-1	0.000381	1	0.0229	1
ESR	WAHLUKE SLOPE	E115995	1990	SURF_SOIL	SURFACE	Soil	yes	565651	156361	0.224	1	0.000593	1	0.00711	1	0.0628	1
ESR	BERG RANCH	E115996	1990	SURF_SOIL	SURFACE	Soil	yes	527258	127698	0.637	1	0.0011	1	0.0124	1	0.138	1
ESR	RINGOLD AREA	E115997	1990	SURF_SOIL	SURFACE	Soil	yes	595854	129776	0.583	1	0.00251	1	0.0112	1	0.121	1
ESR	BYERS LANDING	E115998	1990	SURF_SOIL	SURFACE	Soil	yes	596516	114703	0.623	1	0.00111	1	0.00901	1	0.122	1
ESR	NORTH 300 AREA	E117684	1991	SURF_SOIL	SURFACE	Soil	yes	594235	117644	0.709	1	0.000498	1	0.0173	1	0.167	1
ESR	SOUTH 300 AREA	E117685	1991	SURF_SOIL	SURFACE	Soil	yes	593984	113854	0.751	1	0.00039	1	0.0201	1	0.326	1
ESR	RINGOLD AREA	E117686	1991	SURF_SOIL	SURFACE	Soil	yes	595854	129776	0.726	1	0.0015	1	0.0183	1	0.203	1
ESR	SAGEMOOR FARM	E117687	1991	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.473	1	0.000187	1	0.00936	1	0.135	1
ESR	BYERS LANDING	E117688	1991	SURF_SOIL	SURFACE	Soil	yes	596516	114703	0.597	1	0.000417	1	0.0133	1	0.121	1
ESR	RIVRVIEW-HARRIS	E117689	1991	SURF_SOIL	SURFACE	Soil	yes	597113	104439	1.78	1	0.000326	1	0.0197	1	0.145	1
ESR	NE OF 100 N AREA	E117702	1991	SURF_SOIL	SURFACE	Soil	yes	572614	151144	0.652	1	0.000732	1	0.0129	1	0.152	1
ESR	E OF 100 N AREA	E117703	1991	SURF_SOIL	SURFACE	Soil	yes	573359	149413	0.768	1	0.000368	1	0.0177	1	0.16	1
ESR	WYE BARRICADE	E117705	1991	SURF_SOIL	SURFACE	Soil	yes	585135	128250	0.66	1	0.000523	1	0.0168	1	0.231	1
ESR	YAKIMA BARRICADE	E117706	1991	SURF_SOIL	SURFACE	Soil	yes	559317	138652	0.362	1	0.000184	-1	0.00502	1	0.143	1
ESR	200 ESE	E117707	1991	SURF_SOIL	SURFACE	Soil	yes	576340	134597	0.408	1	0.000213	1	0.00799	1	0.173	1
ESR	E OF 200 E	E117708	1991	SURF_SOIL	SURFACE	Soil	yes	576879	135736	1.13	1	0.000213	1	0.00895	1	0.345	1
ESR	100 AREA FIRE STAT	E117709	1991	SURF_SOIL	SURFACE	Soil	yes	572045	145123	0.312	1	0.000112	-1	0.00488	1	0.131	1
ESR	HANFORD TOWNSITE	E117710	1991	SURF_SOIL	SURFACE	Soil	yes	584212	139885	0.271	1	0.000016	-1	0.00368	1	0.0574	1
ESR	CONNELL	E117711	1991	SURF_SOIL	SURFACE	Soil	yes	.	.	0.334	1	0.000146	-1	0.00399	1	0.094	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	MOSES LAKE AREA	E117712	1991	SURF_SOIL	SURFACE	Soil	yes	.	.	-0.0017	-1	0.00011	-1	0.0000336	-1	0.0137	1
ESR	YAKIMA	E117713	1991	SURF_SOIL	SURFACE	Soil	yes	.	.	0.334	1	0.000426	1	0.00861	1	0.119	1
ESR	SUNNYSIDE	E117714	1991	SURF_SOIL	SURFACE	Soil	yes	542329	118863	0.0668	1	0.0000983	-1	0.000885	1	0.0293	1
ESR	100N SPRING SHORELIN	E117715	1991	SURF_SOIL	SURFACE	Soil	yes	571423	150007	0.11	1	0.0000975	-1	0.000769	-1	1.97	1
ESR	SUNNYSIDE	E117772	1990	SURF_SOIL	SURFACE	Soil	yes	542329	118863	1.22	1	0.00616	1	0.0291	1	0.348	1
ESR	E OF 200 W GATE	E117773	1990	SURF_SOIL	SURFACE	Soil	yes	568455	136068	3.86	1	0.0396	1	0.656	1	2.7	1
ESR	SAGEMOOR FARM	E117774	1990	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.106	1	0.00224	1	0.00141	1	0.0378	1
ESR	S OF 200 E	E117777	1991	SURF_SOIL	SURFACE	Soil	yes	575241	131780	0.357	1	0.00044	1	0.0104	1	0.214	1
ESR	SW OF B/C CRIBS	E117778	1991	SURF_SOIL	SURFACE	Soil	yes	572473	131024	0.346	1	0.000521	1	0.00844	1	0.102	1
ESR	S OF 200 W	E117779	1991	SURF_SOIL	SURFACE	Soil	yes	568340	131239	0.496	1	0.000663	1	0.0214	1	0.157	1
ESR	E OF 200 W GATE	E117780	1991	SURF_SOIL	SURFACE	Soil	yes	568455	136068	1.6	1	0.00307	1	0.286	1	0.374	1
ESR	200 ENC	E117781	1991	SURF_SOIL	SURFACE	Soil	yes	573687	137776	0.295	1	0.000439	1	0.017	1	0.409	1
ESR	SE SIDE OF FFTF	E117782	1991	SURF_SOIL	SURFACE	Soil	yes	587865	122735	0.142	1	0.000136	-1	0.00395	1	0.0506	1
ESR	400 E	E117783	1991	SURF_SOIL	SURFACE	Soil	yes	587922	123300	0.387	1	0.000392	1	0.0085	1	0.0959	1
ESR	SAGEMOOR FARM	E119953	1992	SURF_SOIL	SURFACE	Soil	yes	596363	116036	.	.	.	.	.	.	.	.
ESR	SAGEMOOR FARM	E119954	1992	SURF_SOIL	SURFACE	Soil	yes	596363	116036	.	.	.	.	.	.	.	.
ESR	SAGEMOOR FARM	E119955	1992	SURF_SOIL	SURFACE	Soil	yes	596363	116036	.	.	.	.	.	.	.	.
ESR	SAGEMOOR FARM	E119956	1992	SURF_SOIL	SURFACE	Soil	yes	596363	116036	.	.	.	.	.	.	.	.
ESR	SAGEMOOR FARM	E119957	1992	SURF_SOIL	SURFACE	Soil	yes	596363	116036	.	.	.	.	.	.	.	.
ESR	BYERS LANDING	E120946	1992	SURF_SOIL	SURFACE	Soil	yes	596516	114703	0.852	1	0.000854	1	0.0204	1	0.146	1
ESR	SUNNYSIDE	E120992	1992	SURF_SOIL	SURFACE	Soil	yes	542329	118863	0.42	1	0.000169	-1	0.00766	1	0.0383	1
ESR	YAKIMA	E120993	1992	SURF_SOIL	SURFACE	Soil	yes	.	.	0.445	1	0.000651	1	0.00776	1	0.0452	1
ESR	100N SHORE ABOVE HGP	E120994	1992	SURF_SOIL	SURFACE	Soil	yes	570697	149066	0.37	1	0.000547	1	0.00434	1	0.0311	1
ESR	100N SPRING SHORELIN	E120995	1992	SURF_SOIL	SURFACE	Soil	yes	571423	150007	1.04	1	0.000738	1	0.0204	1	0.235	1
ESR	ABOVE 100D PUMPHOUSE	E120996	1992	SURF_SOIL	SURFACE	Soil	yes	572983	151148	0.764	1	0.000558	1	0.0133	1	0.0866	1
ESR	SAGEMOOR FARM	E121239	1992	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.421	1	0.000249	1	0.00661	1	0.0851	1
ESR	RIVRVIEW-HARRIS	E121240	1992	SURF_SOIL	SURFACE	Soil	yes	597113	104439	0.197	1	0.0000851	-1	0.00427	1	0.0623	1
ESR	RINGOLD AREA	E121241	1992	SURF_SOIL	SURFACE	Soil	yes	595854	129776	0.947	1	0.000844	1	0.0214	1	0.137	1
ESR	RATTLESNAKE SPRINGS	E123928	1993	SURF_SOIL	SURFACE	Soil	yes	562774	131376	0.292	1	0.000158	1	0.00728	1	0.0735	1
ESR	PROSSER BARRICADE	E123929	1993	SURF_SOIL	SURFACE	Soil	yes	583671	118284	0.269	1	0.00027	1	0.00711	1	0.103	1
ESR	ALE FIELD LAB	E123930	1993	SURF_SOIL	SURFACE	Soil	yes	574723	118247	0.219	1	0.00024	1	0.00587	1	0.105	1
ESR	BENTON CITY	E123964	1993	SURF_SOIL	SURFACE	Soil	yes	577999	111908	1.08	1	0.000689	1	0.0251	1	0.178	1
ESR	100 AREA FIRE STAT	E123965	1993	SURF_SOIL	SURFACE	Soil	yes	572045	145123	1.15	1	0.00044	1	0.0271	1	0.217	1
ESR	SOUTH 300 AREA	E123966	1993	SURF_SOIL	SURFACE	Soil	yes	593984	113854	0.159	1	0.000216	1	0.00359	1	0.076	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	S OF 200 W	E123967	1993	SURF_SOIL	SURFACE	Soil	yes	568340	131239	0.159	1	0.0000593	-1	0.00592	1	0.0406	1
ESR	S OF 200 E	E123968	1993	SURF_SOIL	SURFACE	Soil	yes	575241	131780	0.168	1	0.000183	1	0.00348	1	0.183	1
ESR	E OF 200 E	E123969	1993	SURF_SOIL	SURFACE	Soil	yes	576879	135736	2.29	1	0.000615	1	0.023	1	0.349	1
ESR	200 ENC	E123970	1993	SURF_SOIL	SURFACE	Soil	yes	573687	137776	10.9	1	0.000488	1	0.0201	1	0.538	1
ESR	400 E	E123971	1993	SURF_SOIL	SURFACE	Soil	yes	587922	123300	0.0845	1	0.0000645	-1	0.00271	1	0.04	1
ESR	200 ESE	E123972	1993	SURF_SOIL	SURFACE	Soil	yes	576340	134597	0.52	1	0.00041	1	0.0108	1	0.17	1
ESR	SE SIDE OF FFTF	E123973	1993	SURF_SOIL	SURFACE	Soil	yes	587865	122735	0.185	1	0.000142	-1	0.00322	1	0.0492	1
ESR	NORTH 300 AREA	E123974	1993	SURF_SOIL	SURFACE	Soil	yes	594235	117644	0.395	1	0.000506	1	0.01	1	0.0942	1
ESR	SW OF B/C CRIBS	E123975	1993	SURF_SOIL	SURFACE	Soil	yes	572473	131024	0.39	1	0.000304	1	0.00958	1	0.103	1
ESR	WYE BARRICADE	E123976	1993	SURF_SOIL	SURFACE	Soil	yes	585135	128250	0.354	1	0.00029	1	0.00827	1	0.0967	1
ESR	E OF 200 W GATE	E123979	1993	SURF_SOIL	SURFACE	Soil	yes	568455	136068	1.47	1	0.00386	1	0.283	1	0.577	1
ESR	HANFORD TOWNSITE	E123980	1993	SURF_SOIL	SURFACE	Soil	yes	584212	139885	0.675	1	0.000715	1	0.0148	1	0.119	1
ESR	YAKIMA BARRICADE	E123982	1993	SURF_SOIL	SURFACE	Soil	yes	559317	138652	0.3	1	0.00027	1	0.00918	1	0.0954	1
ESR	N END VERNITA BRIDGE	E123983	1993	SURF_SOIL	SURFACE	Soil	yes	558951	146398	0.5	1	0.000453	1	0.0113	1	0.0916	1
ESR	BERG RANCH	E123984	1993	SURF_SOIL	SURFACE	Soil	yes	527258	127698	0.617	1	0.000291	1	0.0125	1	0.14	1
ESR	WAHLUKE SLOPE	E123985	1993	SURF_SOIL	SURFACE	Soil	yes	565651	156361	0.201	1	0.000147	-1	0.004	1	0.0507	1
ESR	W END OF FIR ROAD	E124024	1993	SURF_SOIL	SURFACE	Soil	yes	596047	124424	0.0143	-1	0.000279	1	0.000566	1	0.0202	1
ESR	RIVRVIEW-HARRIS	E124025	1993	SURF_SOIL	SURFACE	Soil	yes	597113	104439	0.118	1	0.000478	1	0.00197	1	0.0314	1
ESR	SAGEMOOR FARM	E124026	1993	SURF_SOIL	SURFACE	Soil	yes	596363	116036	0.412	1	0.000803	1	0.0106	1	0.0729	1
ESR	TAYLOR FLATS NO. 2	E124029	1993	SURF_SOIL	SURFACE	Soil	yes	595154	117863	0.139	1	0.00083	1	0.0052	1	0.0458	1
ESR	100 K AREA	E124059	1993	SURF_SOIL	SURFACE	Soil	yes	569532	146746	0.537	1	0.000896	1	0.00814	1	0.15	1
ESR	RINGOLD AREA	E124060	1993	SURF_SOIL	SURFACE	Soil	yes	595854	129776	0.446	1	0.000637	1	0.00627	1	0.0595	1
ESR	BYERS LANDING	E124061	1993	SURF_SOIL	SURFACE	Soil	yes	596516	114703	0.581	1	0.000436	1	0.0131	1	0.0874	1
ESR	SUNNYSIDE	E124062	1993	SURF_SOIL	SURFACE	Soil	yes	542329	118863	0.742	1	0.000588	1	0.0168	1	0.1	1
ESR	YAKIMA	E124073	1993	SURF_SOIL	SURFACE	Soil	yes	.	.	0.487	1	0.000285	1	0.00199	1	0.24	1
ESR	NE OF 100 N AREA	E124419	1993	SURF_SOIL	SURFACE	Soil	yes	572614	151144	0.449	1	0.000342	1	0.00974	1	0.083	1
ESR	E OF 100 N AREA	E124425	1993	SURF_SOIL	SURFACE	Soil	yes	573359	149413	0.337	1	0.000405	1	0.00806	1	0.0782	1
ESR	ABOVE 100D PUMPHOUSE	E124427	1993	SURF_SOIL	SURFACE	Soil	yes	572983	151148	0.52	1	0.000439	1	0.00972	1	0.0703	1
ESR	100N SHORE ABOVE HGP	E124428	1993	SURF_SOIL	SURFACE	Soil	yes	570697	149066	0.448	1	0.000321	1	0.0113	1	0.116	1
ESR	100N SPRING SHORELIN	E124899	1993	SURF_SOIL	SURFACE	Soil	yes	571423	150007	0.649	1	0.000553	1	0.0155	1	0.194	1
ESR	N. 300 AREA CLEANUP SITE	S0LVP8	1997	SURF_SOIL	SURFACE	Soil	yes	.	.	0.324	1	.	.	.	.	0.0882	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	POTHOLES CANAL RD/COL.RIV. RD. INTERSECT	S0LVR0	1997	SURF_SOIL	SURFACE	Soil	yes	.	.	0.143	1	.	.	.	.	0.0243	1
ESR	GULLY E. OF COL.RIV. RD.	S0LVR2	1997	SURF_SOIL	SURFACE	Soil	yes	.	.	0.323	1	.	.	.	.	0.0923	1
ESR	ALE 1200 FT. RD.	B0BW61	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.0082	-1	.	.	.	.	0.081	1
ESR	ALE 1200 FT. RD.	B0BW62	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.0481	1	.	.	.	.	0.688	1
ESR	ALE 1200 FT. RD.	B0BW63	1994	LEAVES	LOMATION	Vegetation	yes	.	.	-0.0136	-1	.	.	.	.	0.498	1
ESR	ALE 1200 FT. RD.	B0BW64	1994	LEAVES	LOMATION	Vegetation	yes	.	.	-0.00199	-1	.	.	.	.	0.0737	1
ESR	ALE 1200 FT. RD.	B0BW65	1994	LEAVES	LOMATION	Vegetation	yes	.	.	0.00343	-1	.	.	.	.	0.053	1
ESR	ALE 1200 FT. RD.	B0BW66	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.0321	1	.	.	.	.	0.338	1
ESR	ALE 1200 FT. RD.	B0BW67	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.00292	-1	.	.	.	.	.	1
ESR	ALE 1200 FT. RD.	B0BW68	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.00937	1	.	.	.	.	0.0961	1
ESR	ALE 1200 FT. RD.	B0BW69	1994	STEM	BALSAM ROOT	Vegetation	yes	.	.	0.00473	-1	.	.	.	.	.	1
ESR	200 AREA PLATEAU	B0BW70	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.0104	-1	.	.	.	.	0.0296	1
ESR	200 AREA PLATEAU	B0BW71	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.114	1	.	.	.	.	0.207	1
ESR	200 AREA PLATEAU	B0BW72	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.0227	-1	.	.	.	.	0.0342	1
ESR	200 AREA PLATEAU	B0BW73	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.0659	1	.	.	.	.	0.0451	1
ESR	200 AREA PLATEAU	B0BW74	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	-0.0148	-1	.	.	.	.	.	1
ESR	200 AREA PLATEAU	B0BW75	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.0316	1	.	.	.	.	0.0296	1
ESR	200 AREA PLATEAU	B0BW76	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.369	1	.	.	.	.	0.235	1
ESR	200 AREA PLATEAU	B0BW77	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.0459	1	.	.	.	.	0.0641	1
ESR	100 KE TO 100 N	B0BWP3	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.0404	-1	.	.	.	.	0.0444	1
ESR	100 KE TO 100 N	B0BWP4	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.087	1	.	.	.	.	0.037	1
ESR	100 KE TO 100 N	B0BWP5	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	-0.00784	-1	.	.	.	.	0.0304	1
ESR	100 KE TO 100 N	B0BWP6	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.034	1	.	.	.	.	0.0303	1
ESR	100 KE TO 100 N	B0BWP7	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.0503	1	.	.	.	.	0.0317	1

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Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100 KE TO 100 N	B0BWP8	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.0335	1	.	.	.	.	0.00745	1
ESR	100 KE TO 100 N	B0BWP9	1994	LEAVES	CYMOPTERIS	Vegetation	yes	.	.	-0.00372	-1	.	.	.	.	0.00737	1
ESR	100-N - 100-D	B0BWQ0	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.0468	-1	.	.	.	.	0.0217	1
ESR	100-N - 100-D	B0BWQ1	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.0755	1	.	.	.	.	0.0578	1
ESR	100-N - 100-D	B0BWQ2	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.00215	-1	.	.	.	.	0.00685	1
ESR	100-N - 100-D	B0BWQ3	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.0461	1	.	.	.	.	0.0268	1
ESR	100-D TO 100-H	B0BWQ4	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.0114	-1	.	.	.	.	0.0293	1
ESR	100-D TO 100-H	B0BWQ5	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.06	1	.	.	.	.	0.0847	1
ESR	100 F AREA	B0BWQ6	1994	LEAVES	BALSAM ROOT	Vegetation	yes	.	.	0.00854	-1	.	.	.	.	0.0124	1
ESR	100 F AREA	B0BWQ7	1994	ROOT	BALSAM ROOT	Vegetation	yes	.	.	0.0355	1	.	.	.	.	0.0097	1
ESR	E OF 100 N AREA	B0BYX1	1994	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	573359	149413	0.0202	1	-0.0000286	-1	-0.0000154	-1	0.0419	1
ESR	E OF 200 W GATE	B0BYX3	1994	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	568455	136068	0.0273	1	0.00733	1	0.00662	1	0.167	1
ESR	300 AREA SHORELINE	B0BYX4	1994	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.0107	1	-0.00063	-1	0.000265	-1	0.0247	1
ESR	HANFRD TWNSITE HRM28	B0BYX5	1994	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.0047	-1	0.0000573	-1	-0.0000013	-1	0.037	1
ESR	RINGOLD AREA	B0BYX6	1994	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	595854	129776	0.00392	-1	0.000641	-1	-0.0000102	-1	0.0489	1
ESR	SAGEMOOR FARM	B0BYX7	1994	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	596363	116036	0.00427	-1	-0.000059	-1	0.000379	1	0.0692	1
ESR	BYERS LANDING	B0BYX8	1994	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	596516	114703	0.011	-1	-0.000255	-1	0.000315	-1	0.0379	1
ESR	RIVRVIEW-HARRIS	B0BYX9	1994	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	597113	104439	-0.00601	-1	0.000211	-1	0.000214	-1	0.0366	1
ESR	YAKIMA	B0BYY1	1994	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.00722	-1	0.00000574	-1	0.000184	1	0.0162	1
ESR	HANFORD TOWNSITE	B0LNH3	1997	FRUIT	QUINCE	Vegetation	yes	584212	139885	-0.0023	-1	.	.	.	.	0.00421	-1
ESR	HANFORD TOWNSITE	B0LNH4	1997	FRUIT	QUINCE	Vegetation	yes	584212	139885	.	.	.	.	.	.	.	.
ESR	HANFORD TOWNSITE	B0LNH6	1997	LEAVES	QUINCE	Vegetation	yes	584212	139885	.	.	.	.	.	.	.	.
ESR	100 D AREA	B0LNH9	1997	LEAVES	APRICOTS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 D AREA	B0LNJ0	1997	LEAVES	APRICOTS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	HANFORD TOWNSITE	B0LVM9	1997	LEAVES	QUINCE	Vegetation	yes	584212	139885	-0.00795	-1	.	.	.	.	0.0941	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100 D AREA	B0LVN0	1997	LEAVES	APRICOTS	Vegetation	yes	.	.	-0.000955	-1	.	.	.	.	0.0153	1
ESR	100 D AREA	B0LVN1	1997	LEAVES	APRICOTS	Vegetation	yes	.	.	0	-1	.	.	.	.	0.0113	1
ESR	100 F AREA	B0LVR5	1997	LEAVES	APRICOTS	Vegetation	yes	.	.	0.00463	-1	.	.	.	.	0.16	1
ESR	100 F AREA	B0LVR6	1997	LEAVES	APRICOTS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 N SPRING-1	B0LWG1	1997	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 N SPRING-3	B0LWG2	1997	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 N SPRING-5	B0LWG3	1997	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B0LWG4	1997	STM-LV	REED CANARY GRASS	Vegetation	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	HANFORD TOWNSITE	B0P8C5	1998	FRUIT	APPLES	Vegetation	yes	584212	139885	-0.0266	-1	.	.	.	.	0.00775	1
ESR	HANFORD TOWNSITE	B0P8C7	1998	LEAVES	APPLES	Vegetation	yes	584212	139885	0.00142	-1	.	.	.	.	0.0364	1
ESR	TOPPENISH	B0P9M1	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	485013	154201	0.0303	-1	0.0000446	-1	0.0000155	-1	0.00909	1
ESR	100 K AREA	B0P9T1	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	569532	146746	0.00913	-1	-0.0000265	-1	0.000113	-1	0.00533	-1
ESR	NE OF 100 N AREA	B0P9T2	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	572614	151144	-0.0171	-1	0.0000386	-1	0.0000956	-1	0.00119	-1
ESR	E OF 100 N AREA	B0P9T3	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	573359	149413	0.00109	-1	0.0000939	-1	0.000187	-1	0.0207	1
ESR	100N SPRING SHORELIN	B0P9T5	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	571423	150007	-0.0124	-1	-0.0000089	-1	0.0000205	-1	0.0194	1
ESR	E OF 200 W GATE	B0P9T7	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	568455	136068	0.0152	-1	0.0000433	-1	0.00385	1	0.0344	1
ESR	300 AREA SHORELINE	B0P9T9	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.0741	1	0.000048	-1	0.0000912	-1	0.256	1
ESR	HANFORD TOWNSITE	B0P9V1	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	584212	139885	0.00682	-1	0.0000492	-1	0.000112	-1	0.0372	1
ESR	HANFORD SLOUGH	B0P9V2	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	584550	145000	0.0234	-1	0.000114	-1	-0.0000678	-1	0.541	1
ESR	RINGOLD AREA	B0P9V4	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	595854	129776	0.0272	-1	0.0000893	-1	0.0000433	-1	0.0138	1
ESR	SAGEMOOR FARM	B0P9V5	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	596363	116036	0.00441	-1	0.0000184	-1	0.000316	1	0.0167	1
ESR	BYERS LANDING	B0P9V6	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	596516	114703	0.00513	-1	0.0000556	-1	0.000168	1	0.0258	1
ESR	RIVRVIEW-HARRIS	B0P9V8	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	597113	104439	0.00555	-1	0.000091	-1	0.000062	-1	0.0367	1
ESR	SUNNYSIDE	B0P9W0	1998	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	542329	118863	0.00848	-1	-0.0000089	-1	-0.0000058	-1	0.0445	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100 F AREA	B0PBF3	1998	FRUIT	APRICOTS	Vegetation	yes	.	.	-0.00243	-1	.	.	.	.	0.0175	1
ESR	100 F AREA	B0PBF5	1998	LEAVES	APRICOTS	Vegetation	yes	.	.	0.00353	-1	.	.	.	.	0.128	1
ESR	100 N AREA	B0R4V2	1998	STM-LV	MULBERRY	Vegetation	yes	.	.	0.0175	-1	-0.000009	-1	0.000101	-1	2	1
ESR	100 N AREA	B0R4V3	1998	STM-LV	MULBERRY	Vegetation	yes	.	.	0.00637	-1	-0.0000578	-1	0.000111	-1	28.2	1
ESR	100 N AREA	B0R4V4	1998	STM-LV	MULBERRY	Vegetation	yes	.	.	0.00852	-1	0.00000734	-1	0.000168	-1	0.197	1
ESR	HANFRD TWNSITE HRM28	B0T690	1998	WHOLEORG	ROUGH BUGLE WEED	Vegetation	yes	.	.	0.253	1	0.000262	-1	0.00594	1	.	1
ESR	100 F AREA	B0VW55	1999	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	0.0137	-1	.	.	.	.	0.0389	1
ESR	HANFORD RR TRACK	B0VW56	1999	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	0.0104	-1	.	.	.	.	0.0522	1
ESR	100 H AREA	B0VW57	1999	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	0.00264	-1	.	.	.	.	0.0605	1
ESR	100 D AREA	B0VW58	1999	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	0.0133	-1	.	.	.	.	0.0339	1
ESR	100 B/C AREA	B0VW59	1999	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	0.0178	-1	.	.	.	.	0.134	1
ESR	100 N AREA	B0VW60	1999	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	0.0151	-1	.	.	.	.	11.1	1
ESR	100 K AREA	B0VW61	1999	STM-LV	REED CANARY GRASS	Vegetation	yes	569532	146746	0.0125	-1	.	.	.	.	3.36	1
ESR	100 F AREA	B0VW69	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	-0.00688	-1	.	.	.	.	0.719	1
ESR	HANFORD RR TRACK	B0VW70	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	0.0000423	-1	.	.	.	.	0.118	1
ESR	100 H AREA	B0VW71	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	-0.0117	-1	.	.	.	.	2.78	1
ESR	100 D AREA	B0VW72	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	-0.0112	-1	.	.	.	.	0.0441	1
ESR	100 B/C AREA	B0VW73	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	0.0245	-1	.	.	.	.	2.61	1
ESR	100 N AREA	B0VW74	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	-0.0111	-1	.	.	.	.	19.2	1
ESR	100 K AREA	B0VW75	1999	LEAVES	MULBERRY	Vegetation	yes	569532	146746	0.0136	-1	.	.	.	.	0.0778	1
ESR	300 AREA	B0VWV0	1999	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	0.0295	-1	.	.	.	.	0.0636	1
ESR	WSU-RICHLAND	B0VWV1	1999	STM-LV	REED CANARY GRASS	Vegetation	yes	.	.	0.00346	-1	.	.	.	.	0.0569	1
ESR	VERNITA	B0VWV5	1999	LEAVES	MULBERRY	Vegetation	yes	559486	145899	0.0101	-1	.	.	.	.	0.145	1
ESR	300 AREA	B0VWV6	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	0.0081	-1	.	.	.	.	0.157	1
ESR	WSU-RICHLAND	B0VWV7	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	0.019	-1	.	.	.	.	0.0775	1
ESR	600 AREA	B0W5R1	1999	STM-LV	MISC VEGETATION	Vegetation	yes	.	.	0.0313	-1	-0.0000287	-1	0.00022	-1	0.0396	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	600 AREA	B0W5R2	1999	STM-LV	MISC VEGETATION	Vegetation	yes	.	.	0.0243	-1	0.0000372	-1	0.000143	-1	0.0227	1
ESR	600 AREA	B0W5R3	1999	STM-LV	MISC VEGETATION	Vegetation	yes	.	.	-0.0121	-1	-0.0000236	-1	-0.0000191	-1	0.014	1
ESR	600 AREA	B0W5R4	1999	STM-LV	MISC VEGETATION	Vegetation	yes	.	.	0.0268	-1	-0.0000066	-1	0.000164	-1	0.0142	1
ESR	600 AREA	B0W5R5	1999	STM-LV	MISC VEGETATION	Vegetation	yes	.	.	-0.0185	-1	0.0000726	-1	0.000106	1	0.0203	1
ESR	300 AREA	B0WKN9	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	.	.	.	.	.	.	0.129	1
ESR	WSU-RICHLAND	B0WKP0	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	0.0155	-1	.	.	.	.	0.0549	1
ESR	100 H AREA	B0WNW0	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	0.0618	-1	.	.	.	.	5.34	1
ESR	100 B/C AREA	B0WNW1	1999	LEAVES	MULBERRY	Vegetation	yes	.	.	-0.00109	-1	.	.	.	.	7.86	1
ESR	VERNITA	B0WNW4	1999	LEAVES	MULBERRY	Vegetation	yes	559486	145899	0.02	-1	.	.	.	.	0.547	1
ESR	ARMY LOOP CENTRAL LANDFILL	B0YNW9	2000	ASH	MISC VEGETATION	Vegetation	yes	.	.	0.934	1	0.000961	1	0.026	1	0.668	1
ESR	216-S-19 POND	B0YNX0	2000	ASH	MISC VEGETATION	Vegetation	yes	.	.	0.746	1	0.00773	1	0.46	1	0.209	1
ESR	FINLEY RR TRACK	B103R0	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	614936	90643	-0.0121	-1	0.0000522	-1	0.0000742	-1	0.0041	-1
ESR	OTHELLO	B103R5	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	599772	163648	0.00868	-1	0.000014	-1	0.000255	1	.	-1
ESR	BASIN CITY	B103R7	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	601212	142280	0.0195	-1	0.0000457	-1	0.000218	1	0.0574	-1
ESR	PASCO	B103R9	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	605873	102134	0.0174	-1	-0.0000559	-1	0.000192	-1	0.000393	-1
ESR	PASCO AIRPORT	B103T1	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	607075	103528	0.011	-1	-0.000009	-1	0.000156	1	-0.0138	-1
ESR	BROADMOOR, PASCO	B103T3	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	598175	105886	-0.00298	-1	0.0000522	-1	0.000388	1	-0.00495	-1
ESR	YAKIMA DELTA	B103T5	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	595639	103220	0.0265	-1	0.0000198	-1	0.00085	1	0.0642	1
ESR	TRI-CITY COLISEUM	B103T7	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	598931	99208	0.0031	-1	0.0000292	-1	0.000331	1	0.0352	-1
ESR	KENNEWICK	B103T9	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	604220	97328	0.0102	-1	-6.33E-07	-1	0.000177	-1	0.0254	-1
ESR	WANAPUM	B103V0	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	547864	171076	0.00439	-1	-0.0000341	-1	0.000177	1	0.038	-1
ESR	GEORGE	B103V2	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	539389	187859	-0.0014	-1	0.00000609	-1	0.0000488	-1	0.035	-1
ESR	MESA	B103V5	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	613659	125037	0.00426	-1	0.0000361	-1	0.000348	1	0.0155	-1
ESR	MULE DRY FIRE-MABTON	B106C0	2000	ASH	MISC VEGETATION	Vegetation	yes	.	.	.	.	0.000559	-1	0.00656	1	0.267	1
ESR	MULE DRY FIRE-MABTON	B106C1	2000	ASH	MISC VEGETATION	Vegetation	yes	.	.	.	.	0.000575	-1	0.0157	1	0.413	1
ESR	PROSSER	B108M8	2000	FLOWER	HOPS	Vegetation	yes	.	.	-0.0084	-1	-0.000009	-1	0.0000531	-1	0.0192	-1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	MOXEE	B108N0	2000	FLOWER	HOPS	Vegetation	yes	.	.	0.00528	-1	-0.000139	-1	-0.0000372	-1	0.0178	-1
ESR	SUNNYSIDE	B108V5	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	540081	113246	0.0108	-1	0.0000088	-1	0.0000586	-1	0.00111	-1
ESR	WSU	B10998	2000	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	595053	111937	0.0227	-1	0.0000829	-1	0.000229	-1	0.00402	-1
ESR	TOPPENISH	B11J75	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	485013	154201	-0.00986	-1	0.00000835	-1	0.000225	1	0.045	-1
ESR	100 K AREA	B11JD2	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	569532	146746	0.0187	-1	0.00000395	-1	0.00126	1	0.0102	-1
ESR	NE OF 100 N AREA	B11JD3	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	572614	151144	0.000111	-1	-0.000009	-1	0.000359	1	0.0943	1
ESR	100N SPRING SHORELIN	B11JD6	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	571423	150007	-0.00495	-1	0.0000047	-1	0.00047	1	0.0369	-1
ESR	E OF 200 W GATE	B11JD8	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	568455	136068	0.055	1	0.0000474	-1	0.0069	1	0.0417	-1
ESR	300 AREA SHORELINE	B11JD9	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.00594	-1	0.0000291	-1	0.00369	1	0.0526	-1
ESR	HANFORD TOWNSITE	B11JF0	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	584212	139885	0.0132	-1	0.0000739	-1	0.00206	1	-0.032	-1
ESR	HANFRD TWNSITE HRM28	B11JF1	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	-0.0123	-1	0.00000637	-1	0.000754	1	0.0262	-1
ESR	RINGOLD AREA	B11JF3	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	595854	129776	0.00937	-1	0.000051	-1	0.00116	1	0.0549	-1
ESR	SAGEMOOR FARM	B11JF4	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	596363	116036	0.0141	-1	0.0000861	-1	0.000903	1	0.0148	-1
ESR	BYERS LANDING	B11JF5	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	596516	114703	0.00709	-1	-0.0000398	-1	0.000512	1	0.0315	-1
ESR	RIVRVIEW-HARRIS	B11JF6	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	597113	104439	0.00605	-1	0.00027	1	0.00117	1	0.06	-1
ESR	SUNNYSIDE	B11JF7	2001	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	542329	118863	0.0142	-1	0.0000236	-1	0.00134	1	0.0868	-1
ESR	300 AREA SPRING 42-2	B12WB3	2001	STM-LV	RIPARIAN VEGETATION	Vegetation	yes	.	.	0.00601	-1	.	.	.	.	0.0935	1
ESR	300 AREA SPR DR 42-2	B12WB4	2001	STM-LV	RIPARIAN VEGETATION	Vegetation	yes	.	.	0.271	1	.	.	.	.	0.0594	-1
ESR	VERNITA BRIDGE -1	B12WB5	2001	STM-LV	RIPARIAN VEGETATION	Vegetation	yes	558823	145536	0.0804	-1	.	.	.	.	0.176	1
ESR	300 SPR 11	B12WB6	2001	STM-LV	RIPARIAN VEGETATION	Vegetation	yes	.	.	0.246	1	.	.	.	.	0.0942	1
ESR	300 SPR 14	B12WB7	2001	STM-LV	RIPARIAN VEGETATION	Vegetation	yes	.	.	0.0616	-1	.	.	.	.	0.058	1
ESR	300 AREA SPRING 42-2	B12WB8	2001	LEAVES	MULBERRY	Vegetation	yes	.	.	0.00113	-1	.	.	.	.	0.0771	1
ESR	300 AREA SPR DR 42-2	B12WB9	2001	LEAVES	MULBERRY	Vegetation	yes	.	.	0.00236	-1	.	.	.	.	0.167	1
ESR	VERNITA BRIDGE -1	B12WC0	2001	LEAVES	MULBERRY	Vegetation	yes	558823	145536	0.00688	-1	.	.	.	.	0.149	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	300 SPR 11	B12WC1	2001	LEAVES	MULBERRY	Vegetation	yes	.	.	0.0343	-1	.	.	.	.	0.0553	1
ESR	300 SPR 14	B12WC2	2001	LEAVES	MULBERRY	Vegetation	yes	.	.	-0.0218	-1	.	.	.	.	0.0485	1
ESR	TIETON	B15DT4	2002	LEAVES	MISC VEGETATION	Vegetation	yes	.	.	0.0398	-1	0.00004	-1	0.000136	-1	.	1
ESR	TIETON	B15DT8	2002	FOREST LITTER	MISC VEGETATION	Vegetation	yes	.	.	0.135	1	0.000788	1	0.00144	1	.	1
ESR	TIETON	B15DT9	2002	FOREST LITTER	MISC VEGETATION	Vegetation	yes	.	.	0.145	1	0.00068	1	0.00164	1	.	1
ESR	TIETON	B15DV2	2002	FOREST LITTER	MISC VEGETATION	Vegetation	yes	.	.	0.0147	-1	0.00027	1	0.000506	1	0.0771	1
ESR	TIETON	B15DV3	2002	FOREST LITTER	MISC VEGETATION	Vegetation	yes	.	.	0.0571	1	0.0000569	-1	0.00134	1	.	1
ESR	LEECH LAKE	B15DW4	2002	LEAVES	MISC VEGETATION	Vegetation	yes	432117	146166	0.528	1	0.00157	1	0.000206	1	0.309	1
ESR	LEECH LAKE	B15DX2	2002	FOREST LITTER	MISC VEGETATION	Vegetation	yes	432117	146166	2.95	1	0.00247	1	0.0502	1	0.665	1
ESR	LEECH LAKE	B15DX3	2002	FOREST LITTER	MISC VEGETATION	Vegetation	yes	432117	146166	2.44	1	0.000754	1	0.0135	1	0.397	1
ESR	KNUPPENBURG LAKE	B15DY5	2002	LEAVES	MISC VEGETATION	Vegetation	yes	429634	150126	0.777	1	0.0000813	-1	0.000214	-1	0.422	1
ESR	KNUPPENBURG LAKE	B15F02	2002	FOREST LITTER	MISC VEGETATION	Vegetation	yes	429634	150126	2.55	1	0.000785	1	0.015	1	0.387	1
ESR	KNUPPENBURG LAKE	B15F03	2002	FOREST LITTER	MISC VEGETATION	Vegetation	yes	429634	150126	1.58	1	0.000735	1	0.0105	1	0.595	1
ESR	LA WIS WIS	B15F34	2002	LEAVES	MISC VEGETATION	Vegetation	yes	417291	149649	1.03	1	-0.0000089	-1	0.000125	-1	.	1
ESR	LA WIS WIS	B15F38	2002	MOSS	MISC VEGETATION	Vegetation	yes	417291	149649	0.442	1	0.000228	1	0.00111	1	0.533	1
ESR	LA WIS WIS	B15F39	2002	MOSS	MISC VEGETATION	Vegetation	yes	417291	149649	0.671	1	0.000152	-1	0.000643	1	.	1
ESR	LA WIS WIS	B15F42	2002	FOREST LITTER	MISC VEGETATION	Vegetation	yes	417291	149649	0.816	1	0.000353	1	0.00171	1	0.715	1
ESR	LA WIS WIS	B15F43	2002	FOREST LITTER	MISC VEGETATION	Vegetation	yes	417291	149649	1.04	1	0.000586	1	0.00411	1	0.681	1
ESR	100 B/C AREA	B17262	2003	ROOT_SHOOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA	B17263	2003	ROOT_SHOOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA	B17264	2003	ROOT_SHOOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA	B17265	2003	ROOT_SHOOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA	B17266	2003	ROOT_SHOOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UR	B17H38	2003	SHOOT	MULBERRY	Vegetation	yes	558504	145317	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B17H39	2003	SHOOT	MULBERRY	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 39-2	B17H40	2003	SHOOT	MULBERRY	Vegetation	yes	564914	145337	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B17H41	2003	SHOOT	MULBERRY	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B17H42	2003	SHOOT	MULBERRY	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100 B/C AREA OUTFL3	B17H43	2003	SHOOT	MULBERRY	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA DR	B17H44	2003	SHOOT	MULBERRY	Vegetation	yes	566809	145865	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UR	B17H45	2003	ROOT_SHOOT	REED CANARY GRASS	Vegetation	yes	558504	145317	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B17H46	2003	ROOT_SHOOT	REED CANARY GRASS	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 39-2	B17H47	2003	ROOT_SHOOT	REED CANARY GRASS	Vegetation	yes	564914	145337	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B17H48	2003	ROOT_SHOOT	REED CANARY GRASS	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B17H49	2003	ROOT_SHOOT	REED CANARY GRASS	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B17H50	2003	ROOT_SHOOT	REED CANARY GRASS	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA DR	B17H51	2003	ROOT_SHOOT	REED CANARY GRASS	Vegetation	yes	566809	145865	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UR	B17HV9	2003	ROOT_SHOOT	RUSSIAN THISTLE	Vegetation	yes	558504	145317	.	.	.	.	.	.	.	.
ESR	116-C-5 S	B17HW0	2003	ROOT_SHOOT	RUSSIAN THISTLE	Vegetation	yes	565423	145101	.	.	.	.	.	.	.	.
ESR	116-B-11 N	B17HW1	2003	ROOT_SHOOT	RUSSIAN THISTLE	Vegetation	yes	565377	145258	.	.	.	.	.	.	.	.
ESR	116-C-1 S	B17HW2	2003	ROOT_SHOOT	RUSSIAN THISTLE	Vegetation	yes	565880	145240	.	.	.	.	.	.	.	.
ESR	116-C-1 N	B17HW3	2003	ROOT_SHOOT	RUSSIAN THISTLE	Vegetation	yes	565880	145343	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UR	B17HW9	2003	SHOOT	GRAY RABBITBRUSH	Vegetation	yes	558504	145317	.	.	.	.	.	.	.	.
ESR	116-C-5 S	B17HX0	2003	SHOOT	GRAY RABBITBRUSH	Vegetation	yes	565423	145101	.	.	.	.	.	.	.	.
ESR	116-B-11 N	B17HX1	2003	SHOOT	GRAY RABBITBRUSH	Vegetation	yes	565377	145258	.	.	.	.	.	.	.	.
ESR	116-C-1 S	B17HX2	2003	SHOOT	GRAY RABBITBRUSH	Vegetation	yes	565880	145240	.	.	.	.	.	.	.	.
ESR	116-C-1 N	B17HX3	2003	SHOOT	GRAY RABBITBRUSH	Vegetation	yes	565880	145343	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B18XX0	2004	ROOT_SHOOT	MISC VEGETATION	Vegetation	yes	593772	111903	0.0733	-1	.	.	.	.	0.0694	1
ESR	BACKGROUND	B18XX1	2004	ROOT	MISC VEGETATION	Vegetation	yes	593772	111903	.	.	.	.	.	.	.	.

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	BACKGROUND	B18XX2	2004	ROOT	MISC VEGETATION	Vegetation	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B18XX3	2004	ROOT	MISC VEGETATION	Vegetation	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B18XX4	2004	ROOT	MISC VEGETATION	Vegetation	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B18XX5	2004	ROOT	MISC VEGETATION	Vegetation	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B18XX6	2004	SHOOT	MISC VEGETATION	Vegetation	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B18XX7	2004	ROOT	MISC VEGETATION	Vegetation	yes	593772	111903	.	.	.	.	.	.	.	.
ESR	BACKGROUND	B19264	2004	ROOT	MISC VEGETATION	Vegetation	yes	593772	111903	.	.	.	.	.	.	0.113	-1
ESR	100 B/C AREA OUTFL1	B192C4	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B192C6	2004	ROOT	MISC VEGETATION	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B192C8	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B192D3	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B192D5	2004	ROOT	MISC VEGETATION	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B192D7	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B192F1	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B192F3	2004	ROOT	MISC VEGETATION	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B192F5	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND1	B19455	2004	ROOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND2	B19457	2004	ROOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND3	B19458	2004	ROOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	116-C-1 N	B19459	2004	ROOT	CHEATGRASS	Vegetation	yes	565880	145343	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND1	B19460	2004	SHOOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND2	B19462	2004	SHOOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND3	B19464	2004	SHOOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	116-C-1 N	B19466	2004	SHOOT	CHEATGRASS	Vegetation	yes	565880	145343	.	.	.	.	.	.	.	.

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100 B/C AREA UPLAND4	B19476	2004	ROOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND5	B19477	2004	ROOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	116-C-1 S	B19478	2004	ROOT	CHEATGRASS	Vegetation	yes	565880	145240	.	.	.	.	.	.	.	.
ESR	116-C-5 S	B19479	2004	ROOT	CHEATGRASS	Vegetation	yes	565423	145101	.	.	.	.	.	.	.	.
ESR	116-B-11 N	B19480	2004	ROOT	CHEATGRASS	Vegetation	yes	565377	145258	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND4	B19481	2004	SHOOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND5	B19483	2004	SHOOT	CHEATGRASS	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	116-C-1 S	B19485	2004	SHOOT	CHEATGRASS	Vegetation	yes	565880	145240	.	.	.	.	.	.	.	.
ESR	116-C-5 S	B19487	2004	SHOOT	CHEATGRASS	Vegetation	yes	565423	145101	.	.	.	.	.	.	.	.
ESR	116-B-11 N	B19489	2004	SHOOT	CHEATGRASS	Vegetation	yes	565377	145258	.	.	.	.	.	.	.	.
ESR	TOPPENISH	B199C3	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	485013	154201	-0.00262	-1	-0.0000711	-1	0.0000509	-1	0.0131	-1
ESR	100 K AREA	B199J8	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	569532	146746	0.00364	-1	0.0000439	-1	0.0000837	-1	0.00783	-1
ESR	NE OF 100 N AREA	B199K0	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	572614	151144	0.0154	-1	.	-1	.	-1	.	.
ESR	E OF 100 N AREA	B199K2	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	573359	149413	-0.00531	-1	-0.000083	-1	0.000162	-1	-0.00898	-1
ESR	100N SPRING SHORELIN	B199K3	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	571423	150007	0.0135	-1	0.000111	-1	0.000168	-1	0.045	-1
ESR	E OF 200 W GATE	B199K4	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	568455	136068	0.0146	-1	0.000136	1	0.00766	1	0.0419	-1
ESR	300 AREA SHORELINE	B199K5	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	-0.000558	-1	0.000172	-1	0.00014	-1	0.021	-1
ESR	HANFORD TOWNSITE	B199K7	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	584212	139885	-0.000582	-1	-0.0000729	-1	0.0000527	-1	-0.0135	-1
ESR	HANFRD TWNSITE HRM28	B199K8	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	-0.0112	-1	-0.000009	-1	0.000204	1	0.00492	-1
ESR	RINGOLD AREA	B199L0	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	595854	129776	0.0238	-1	.	-1	.	-1	-0.0035	-1
ESR	SAGEMOOR FARM	B199L1	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	596363	116036	0.0125	-1	0.0000686	-1	-0.0000112	-1	-0.0129	-1
ESR	BYERS LANDING	B199L2	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	596516	114703	0.00874	-1	0.0000153	-1	0.000013	-1	-0.0185	-1
ESR	RIVRVIEW-HARRIS	B199L3	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	597113	104439	-0.0000887	-1	0.0000438	-1	0.000147	-1	0.00309	-1
ESR	SUNNYSIDE	B199L4	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	542329	118863	-0.00345	-1	0.0000493	-1	0.000396	1	0.0104	-1
ESR	GEORGE	B199P1	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	539389	187859	0.011	-1	0.0000923	-1	0.0000899	-1	0.00347	-1
ESR	OTHELLO	B199P3	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	599772	163648	0.0161	-1	-0.000009	-1	0.00307	1	0.0122	-1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	WANAPUM	B199P5	2004	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	547864	171076	0.00254	-1	0.000106	-1	0.000218	1	-0.00148	-1
ESR	100 B/C AREA UPLAND1	B19VW5	2004	ROOT	RUSSIAN THISTLE	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND1	B19VW6	2004	SHOOT	RUSSIAN THISTLE	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND2	B19VW7	2004	ROOT	RUSSIAN THISTLE	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND2	B19VW8	2004	SHOOT	RUSSIAN THISTLE	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND3	B19VW9	2004	ROOT	RUSSIAN THISTLE	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND3	B19VX0	2004	SHOOT	RUSSIAN THISTLE	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND4	B19VX1	2004	ROOT	RUSSIAN THISTLE	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND4	B19VX2	2004	SHOOT	RUSSIAN THISTLE	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND5	B19VX3	2004	ROOT	RUSSIAN THISTLE	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	100 B/C AREA UPLAND5	B19VX4	2004	SHOOT	RUSSIAN THISTLE	Vegetation	yes	.	.	.	.	.	.	.	.	.	.
ESR	116-C-5 S	B19VX5	2004	ROOT	RUSSIAN THISTLE	Vegetation	yes	565423	145101	.	.	.	.	.	.	.	.
ESR	116-C-5 S	B19VX6	2004	SHOOT	RUSSIAN THISTLE	Vegetation	yes	565423	145101	.	.	.	.	.	.	.	.
ESR	116-B-11 N	B19VX7	2004	ROOT	RUSSIAN THISTLE	Vegetation	yes	565377	145258	.	.	.	.	.	.	.	.
ESR	116-B-11 N	B19VX8	2004	SHOOT	RUSSIAN THISTLE	Vegetation	yes	565377	145258	.	.	.	.	.	.	.	.
ESR	116-C-1 S	B19VX9	2004	ROOT	RUSSIAN THISTLE	Vegetation	yes	565880	145240	.	.	.	.	.	.	.	.
ESR	116-C-1 S	B19VY0	2004	SHOOT	RUSSIAN THISTLE	Vegetation	yes	565880	145240	.	.	.	.	.	.	.	.
ESR	116-C-1 N	B19VY1	2004	ROOT	RUSSIAN THISTLE	Vegetation	yes	565880	145343	.	.	.	.	.	.	.	.
ESR	116-C-1 N	B19VY2	2004	SHOOT	RUSSIAN THISTLE	Vegetation	yes	565880	145343	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B19W14	2004	SHOOT	MULBERRY	Vegetation	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B19W15	2004	SHOOT	MULBERRY	Vegetation	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B19W16	2004	SHOOT	MULBERRY	Vegetation	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -4	B19W17	2004	SHOOT	MULBERRY	Vegetation	yes	559347	145849	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B19W18	2004	SHOOT	MULBERRY	Vegetation	yes	559606	145999	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100-B SPRING 38-3	B19W19	2004	SHOOT	MULBERRY	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 39-2	B19W20	2004	SHOOT	MULBERRY	Vegetation	yes	564914	145337	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B19W21	2004	SHOOT	MULBERRY	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B19W22	2004	SHOOT	MULBERRY	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B19W23	2004	SHOOT	MULBERRY	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA DR	B19W24	2004	SHOOT	MULBERRY	Vegetation	yes	566809	145865	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B19W47	2004	ROOT	REED CANARY GRASS	Vegetation	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B19W48	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B19W49	2004	ROOT	REED CANARY GRASS	Vegetation	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B19W50	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B19W51	2004	ROOT	REED CANARY GRASS	Vegetation	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B19W52	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -4	B19W53	2004	ROOT	REED CANARY GRASS	Vegetation	yes	559347	145849	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -4	B19W54	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	559347	145849	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B19W55	2004	ROOT	REED CANARY GRASS	Vegetation	yes	559606	145999	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B19W56	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	559606	145999	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B19W57	2004	ROOT	REED CANARY GRASS	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B19W58	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 39-2	B19W59	2004	ROOT	REED CANARY GRASS	Vegetation	yes	564914	145337	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100-B SPRING 39-2	B19W60	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	564914	145337	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B19W61	2004	ROOT	REED CANARY GRASS	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B19W62	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B19W63	2004	ROOT	REED CANARY GRASS	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B19W64	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B19W65	2004	ROOT	REED CANARY GRASS	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B19W66	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA DR	B19W67	2004	ROOT	REED CANARY GRASS	Vegetation	yes	566809	145865	.	.	.	.	.	.	.	.
ESR	100 B/C AREA DR	B19W68	2004	SHOOT	REED CANARY GRASS	Vegetation	yes	566809	145865	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B1B5J3	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B1B5J4	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B1B5J5	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B1B5J6	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B1B5K1	2004	ROOT	MISC VEGETATION	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL1	B1B5K2	2004	ROOT	MISC VEGETATION	Vegetation	yes	565280	145410	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B1B5K5	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B1B5K6	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B1B5K7	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B1B5K8	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL2	B1B5L3	2004	ROOT	MISC VEGETATION	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100 B/C AREA OUTFL2	B1B5L4	2004	ROOT	MISC VEGETATION	Vegetation	yes	565485	145464	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B1B5L7	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B1B5L8	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B1B5L9	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B1B5M0	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B1B5M2	2004	SHOOT	MISC VEGETATION	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B1B5M9	2004	ROOT	MISC VEGETATION	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	100 B/C AREA OUTFL3	B1B5N0	2004	ROOT	MISC VEGETATION	Vegetation	yes	565725	145537	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B1B5N3	2004	SHOOT	MISC VEGETATION	Vegetation	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B1B5N4	2004	SHOOT	MISC VEGETATION	Vegetation	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B1B5N5	2004	SHOOT	MISC VEGETATION	Vegetation	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B1B5N6	2004	SHOOT	MISC VEGETATION	Vegetation	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B1B5P1	2004	ROOT	MISC VEGETATION	Vegetation	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -1	B1B5P2	2004	ROOT	MISC VEGETATION	Vegetation	yes	558823	145536	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B1B5P5	2004	SHOOT	MISC VEGETATION	Vegetation	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B1B5P6	2004	SHOOT	MISC VEGETATION	Vegetation	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B1B5P7	2004	SHOOT	MISC VEGETATION	Vegetation	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B1B5R1	2004	ROOT	MISC VEGETATION	Vegetation	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -2	B1B5R2	2004	ROOT	MISC VEGETATION	Vegetation	yes	558844	145558	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B1B5R5	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B1B5R6	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B1B5R7	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B1B5R8	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B1B5R9	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559089	145707	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	VERNITA BRIDGE -3	B1B5T5	2004	ROOT	MISC VEGETATION	Vegetation	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -3	B1B5T6	2004	ROOT	MISC VEGETATION	Vegetation	yes	559089	145707	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -4	B1B5T9	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559347	145849	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -4	B1B5V0	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559347	145849	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -4	B1B5V1	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559347	145849	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -4	B1B5V3	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559347	145849	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -4	B1B5V9	2004	ROOT	MISC VEGETATION	Vegetation	yes	559347	145849	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B1B5W3	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559606	145999	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B1B5W4	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559606	145999	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B1B5W5	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559606	145999	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B1B5W6	2004	SHOOT	MISC VEGETATION	Vegetation	yes	559606	145999	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B1B5X1	2004	ROOT	MISC VEGETATION	Vegetation	yes	559606	145999	.	.	.	.	.	.	.	.
ESR	VERNITA BRIDGE -5	B1B5X2	2004	ROOT	MISC VEGETATION	Vegetation	yes	559606	145999	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B1B5X5	2004	SHOOT	MISC VEGETATION	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B1B5X6	2004	SHOOT	MISC VEGETATION	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B1B5X7	2004	SHOOT	MISC VEGETATION	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B1B5X8	2004	SHOOT	MISC VEGETATION	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B1B5X9	2004	SHOOT	MISC VEGETATION	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B1B5Y5	2004	ROOT	MISC VEGETATION	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100-B SPRING 38-3	B1B5Y6	2004	ROOT	MISC VEGETATION	Vegetation	yes	564677	145274	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D410	2005	SHOOT	ELM	Vegetation	yes	571252	149861	.	.	.	.	.	.	13.4	1
ESR	100N-NR-2 SP	B1D411	2005	SHOOT	BIG SAGEBRUSH	Vegetation	yes	571252	149861	.	.	.	.	.	.	2.88	1
ESR	100N-NR-2 SP	B1D412	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571252	149861	.	.	.	.	.	.	6.17	1
ESR	100N-NR-2 EMA	B1D413	2005	SHOOT	MULBERRY	Vegetation	yes	571647	150391	.	.	.	.	.	.	1.6	1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100N-NR-2 EMA	B1D414	2005	SHOOT	MULBERRY	Vegetation	yes	571647	150391	.	.	.	.	.	.	0.446	1
ESR	100N-NR-2 EMA	B1D415	2005	SHOOT	MULBERRY	Vegetation	yes	571647	150391	.	.	.	.	.	.	0.321	1
ESR	VERNITA	B1D416	2005	SHOOT	MULBERRY	Vegetation	yes	559486	145899	.	.	.	.	.	.	0.0106	-1
ESR	VERNITA	B1D417	2005	SHOOT	MULBERRY	Vegetation	yes	559486	145899	.	.	.	.	.	.	0.0254	-1
ESR	100N-NR-2 SP	B1D418	2005	SHOOT	ELM	Vegetation	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D419	2005	SHOOT	BIG SAGEBRUSH	Vegetation	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D420	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D421	2005	SHOOT	MULBERRY	Vegetation	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D422	2005	SHOOT	MULBERRY	Vegetation	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D423	2005	SHOOT	MULBERRY	Vegetation	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	VERNITA	B1D424	2005	SHOOT	MULBERRY	Vegetation	yes	559486	145899	.	.	.	.	.	.	.	.
ESR	VERNITA	B1D425	2005	SHOOT	MULBERRY	Vegetation	yes	559486	145899	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D426	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571252	149861	.	.	.	.	.	.	0.736	1
ESR	100N-NR-2 SP	B1D427	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571252	149861	.	.	.	.	.	.	2.34	1
ESR	100N-NR-2 SP	B1D428	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571252	149861	.	.	.	.	.	.	1.31	1
ESR	100N-NR-2 EMA	B1D429	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571647	150391	.	.	.	.	.	.	0.111	1
ESR	100N-NR-2 EMA	B1D430	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571647	150391	.	.	.	.	.	.	1.7	1
ESR	100N-NR-2 EMA	B1D431	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571647	150391	.	.	.	.	.	.	0.0137	-1
ESR	VERNITA	B1D432	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	559486	145899	.	.	.	.	.	.	0.0199	-1
ESR	VERNITA	B1D433	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	559486	145899	.	.	.	.	.	.	0.00512	-1
ESR	100N-NR-2 SP	B1D434	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D435	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571252	149861	.	.	.	.	.	.	.	.
ESR	100N-NR-2 SP	B1D436	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571252	149861	.	.	.	.	.	.	.	.

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	100N-NR-2 EMA	B1D437	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D438	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	100N-NR-2 EMA	B1D439	2005	SHOOT	REED CANARY GRASS	Vegetation	yes	571647	150391	.	.	.	.	.	.	.	.
ESR	MOSES LAKE AREA	E033309	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.00101	-1	0.000183	1	0.00059	1	0.0638	1
ESR	WASHTUCNA	E033310	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	667290	160899	0.0212	1	0.0000919	-1	0.000924	1	0.0416	1
ESR	WALLA WALLA	E033311	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	672372	113292	-0.00159	-1	0.000117	1	0.000328	1	0.0661	1
ESR	CONNELL	E033312	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.0193	1	0.0000932	-1	0.00037	1	0.0495	1
ESR	MC NARY DAM	E033313	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	593617	66538	0.00905	-1	0.000303	1	0.00134	1	0.0121	1
ESR	OTHELLO	E033314	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.00887	-1	0.000129	-1	0.000274	1	0.0324	1
ESR	YAKIMA	E033315	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.00382	-1	0.00000499	-1	0.000189	1	0.00521	1
ESR	SE SIDE OF FFTF	E114480	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	587865	122735	.	1	.	1	.	1	.	1
ESR	100 AREA FIRE STAT	E116647	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	572045	145123	.	1	.	1	.	1	.	1
ESR	SE SIDE OF FFTF	E116648	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	587865	122735	.	1	.	1	.	1	.	1
ESR	BENTON CITY	E116674	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	577999	111908	0.0283	1	-0.0000104	-1	0.00071	1	0.0393	1
ESR	SUNNYSIDE	E116675	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	542329	118863	0.02	1	0.0000313	-1	0.000405	1	0.0494	1
ESR	WAHLUKE SLOPE	E116716	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	565651	156361	0.0144	-1	0.0000543	-1	0.000175	1	0.218	1
ESR	BERG RANCH	E116717	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	527258	127698	0.0116	-1	0.0000477	-1	0.000373	1	0.118	1
ESR	RINGOLD AREA	E116718	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	595854	129776	0.0333	1	0.000161	1	0.000144	-1	0.0142	1
ESR	BYERS LANDING	E116719	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	596516	114703	0.0239	1	0.00000553	-1	0.000745	1	0.161	1
ESR	NORTH 300 AREA	E116720	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	594235	117644	0.00797	-1	0.000111	-1	0.000125	-1	0.17	1
ESR	SOUTH 300 AREA	E116721	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	593984	113854	0.0385	1	0.0000722	-1	0.000543	1	0.361	1
ESR	SAGEMOOR FARM	E116722	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	596363	116036	0.0447	1	0.000135	1	0.000283	1	0.127	1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	W END OF FIR ROAD	E116723	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	596047	124424	0.015	-1	0.000174	-1	0.00000539	-1	0.0209	1
ESR	RIVRVIEW-HARRIS	E116724	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	597113	104439	0.00546	-1	0.0000302	-1	0.000346	1	0.0295	1
ESR	TAYLOR FLATS NO. 2	E116725	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	595154	117863	0.03	1	0.000149	-1	0.000396	1	0.0204	1
ESR	NE OF 100 N AREA	E117611	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	572614	151144	0.0139	1	-0.0000101	-1	0.0000152	-1	0.0207	1
ESR	E OF 100 N AREA	E117612	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	573359	149413	0.0125	1	-0.0000206	-1	0.000064	-1	0.0152	1
ESR	NORTH 300 AREA	E117640	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	594235	117644	0.0117	-1	-0.0000433	-1	0.0000623	-1	0.0098	1
ESR	SOUTH 300 AREA	E117641	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	593984	113854	0.00948	-1	0.0000405	-1	0.000066	-1	0.118	1
ESR	RINGOLD AREA	E117642	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	595854	129776	-0.0127	-1	0.000017	-1	0.0000987	-1	0.114	1
ESR	SAGEMOOR FARM	E117643	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	596363	116036	0.00664	-1	0.00000578	-1	0.000162	-1	0.0314	1
ESR	BYERS LANDING	E117644	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	596516	114703	-0.00688	-1	-0.0000426	-1	0.000103	-1	0.0355	1
ESR	RIVRVIEW-HARRIS	E117645	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	597113	104439	0.00627	-1	0.00000825	-1	0.000039	-1	0.0219	1
ESR	S OF 200 E	E117716	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	575241	131780	0.0367	1	-0.000016	-1	0.0000288	-1	0.0533	1
ESR	SW OF B/C CRIBS	E117717	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	572473	131024	0.0166	1	0.000144	1	0.000471	1	0.0658	1
ESR	S OF 200 W	E117718	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	568340	131239	0.107	1	0.0000972	-1	0.000527	1	0.0811	1
ESR	E OF 200 W GATE	E117719	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	568455	136068	0.0447	1	0.00000772	-1	0.000167	1	0.0261	1
ESR	200 ENC	E117720	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	573687	137776	0.0533	1	0.0000134	-1	0.00319	1	0.12	1
ESR	400 E	E117721	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	587922	123300	0.0117	1	0.0000271	-1	0.000282	1	0.0767	1
ESR	E OF 200 W GATE	E117752	1990	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	568455	136068	0.105	1	0.000726	1	0.0413	1	0.0299	1
ESR	200 ESE	E117828	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	576340	134597	0.0705	1	0.0000132	-1	0.000116	-1	0.0967	1
ESR	E OF 200 E	E117829	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	576879	135736	0.164	1	-0.0000104	-1	0.00096	1	0.244	1
ESR	HANFRD TWNSITE HRM28	E117830	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	.	.	-0.0192	-1	0.0000656	-1	0.000152	1	0.413	1
ESR	100N SPRING SHORELIN	E117831	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	571423	150007	0.035	1	0.0000783	-1	0.00016	1	0.118	1
ESR	MOSES LAKE AREA	E117832	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.0182	-1	0.000132	-1	0.000132	-1	0.74	1
ESR	YAKIMA	E117833	1991	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.0237	-1	0.000283	1	0.0000555	-1	0.0344	1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	BYERS LANDING	E121118	1992	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	596516	114703	-0.000149	-1	-0.0000104	-1	0.0000254	-1	0.0028	1
ESR	100N SPRING SHORELIN	E121207	1992	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	571423	150007	0.00593	-1	-0.0000104	-1	0.000064	-1	0.0154	1
ESR	SUNNYSIDE	E121208	1992	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	542329	118863	-0.00768	-1	0.0000659	-1	0.000104	-1	0.0144	1
ESR	YAKIMA	E121209	1992	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.00505	-1	0.0000174	-1	0.000101	-1	0.00261	-1
ESR	RIVRVIEW-HARRIS	E121278	1992	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	597113	104439	-0.0135	-1	-0.0000631	-1	0.000131	-1	0.0181	1
ESR	SAGEMOOR FARM	E121279	1992	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	596363	116036	0.0131	1	0.00001	-1	0.000277	1	0.0149	1
ESR	RINGOLD AREA	E121280	1992	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	595854	129776	-0.00197	-1	-0.0000103	-1	0.000101	-1	0.00207	-1
ESR	E OF 200 W GATE	E123890	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	568455	136068	0.0239	1	-0.0000223	-1	0.00065	1	0.0338	1
ESR	HANFORD TOWNSITE	E123891	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	584212	139885	0.00848	-1	-0.0000317	-1	0.000684	1	0.0464	1
ESR	SUNNYSIDE	E123981	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	542329	118863	0.0315	1	-0.0000104	-1	0.0000401	-1	0.016	1
ESR	SAGEMOOR FARM	E123990	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	596363	116036	0.00751	-1	0.0000216	-1	0.000149	1	0.0123	1
ESR	YAKIMA BARRICADE	E123991	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	559317	138652	-0.0262	-1	-0.0000753	-1	0.000217	1	0.0132	1
ESR	RIVRVIEW-HARRIS	E124023	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	597113	104439	0.0217	-1	0.00005	-1	0.000201	1	0.00994	1
ESR	BYERS LANDING	E124063	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	596516	114703	0.00569	-1	-0.0000553	-1	0.000192	-1	0.0105	1
ESR	100 K AREA	E124064	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	569532	146746	-0.00274	-1	0.0000352	-1	0.000194	1	2.21	1
ESR	RINGOLD AREA	E124065	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	595854	129776	0.014	-1	-0.0000268	-1	0.000259	1	0.0163	1
ESR	YAKIMA	E124074	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.00444	-1	-0.0000104	-1	0.000108	-1	0.0143	1
ESR	NE OF 100 N AREA	E124420	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	572614	151144	-0.00138	-1	-0.0000099	-1	0.0000856	-1	0.00988	1
ESR	E OF 100 N AREA	E124421	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	573359	149413	0.00902	-1	0.0000889	-1	0.0000397	-1	0.0148	1
ESR	100N SPRING SHORELIN	E124873	1993	WHOLEORG	PERENNIAL VEGETATION	Vegetation	yes	571423	150007	0.0487	1	0.0000134	-1	0.0000611	-1	0.408	1
ESR	N. 300 AREA CLEANUP SITE	S0LVN2	1997	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	-0.00734	-1	.	.	.	.	0.0142	1
ESR	W. 300 AREA CLEANUP	S0LVN4	1997	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.00544	-1	.	.	.	.	0.00531	1
ESR	NORTH 300 AREA	S0LVN6	1997	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	594235	117644	0.0206	-1	.	.	.	.	0.00932	1
ESR	RIVERSHORE ROAD	S0LVN8	1997	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	-0.00494	-1	.	.	.	.	0.0344	1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
ESR	BYERS LANDING	S0LVP0	1997	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	596516	114703	0.00368	-1	.	.	.	.	0.037	1
ESR	SAGEMOOR SPUR/COL.RIV. RD INTERSECTION	S0LVP2	1997	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	0.0053	-1	.	.	.	.	0.0231	1
ESR	POTHOLES CANAL RD/COL.RIV. RD. INTERSECT	S0LVP4	1997	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	-0.00145	-1	.	.	.	.	0.0058	1
ESR	GULLY E. OF COL.RIV. RD.	S0LVP6	1997	STM-LV	PERENNIAL VEGETATION	Vegetation	yes	.	.	-0.00146	-1	.	.	.	.	0.0228	1
TWRS	19	B0M4T9/B0M4V0	1997			Soil	yes	576401	136031	0.622	1	0.004	1	0.021	1	0.31	1
TWRS	61	B0M4V3/B0M4V4	1997			Soil	yes	576684	135464	0.394	1	0.019	1	0.007	1	0.39	1
TWRS	39	B0M4V5/B0M4V6	1997			Soil	yes	576755	135819	1.23	1	0.004	1	0.011	1	0.31	1
TWRS	48	B0M4V7/B0M4V8	1997			Soil	yes	576330	135678	0.185	1	0.0006	-1	0.004	1	0.62	1
TWRS	27	B0M4V9/B0M4W0	1997			Soil	yes	576755	135960	1.32	1	0.008	1	0.025	1	0.21	1
TWRS	26	B0M4W1/B0M4W2	1997			Soil	yes	576613	135960	1.87	1	0.003	-1	0.003	1	0.53	1
TWRS	54	B0M4W5/B0M4W6	1997			Soil	yes	576543	135605	0.459	1	0	-1	0.008	1	0.44	1
TWRS	52	B0M4W7/BPM4W8	1997			Soil	yes	576260	135605	0.699	1	0.006	1	0.02	1	0.44	1
TWRS	38	B0M4W9/B0M4X0	1997			Soil	yes	576613	135819	3.61	1	0	-1	0.038	1	0.98	1
TWRS	56	B0M4X1/B0M4X2	1997			Soil	yes	576330	135536	0.173	1	0.001	-1	0.006	1	0.26	1
TWRS	57	B0M4X3/B0M4X4	1997			Soil	yes	576471	135536	2.02	1	0.003	1	0.031	1	1	1
TWRS	51	B0M4X5/B0M4X6	1997			Soil	yes	576755	135678	0.787	1	0.005	1	0.019	1	0.42	1
TWRS	53	B0M4X7/B0M4X8	1997			Soil	yes	576401	135605	0.475	1	0	-1	0.009	1	0.91	1
TWRS	37	B0M4X9/B0M4Y0	1997			Soil	yes	576471	135819	0.0006	-1	0.006	1	0.001	-1	0.22	1
TWRS	25	B0M4Y1/B0M4Y2	1997			Soil	yes	576471	135960	3.8	1	0.004	-1	0.033	1	1.3	1
TWRS	44	B0M4Y3/B0M4Y4	1997			Soil	yes	576543	135748	0.202	1	0.006	-1	0.011	1	0.6	1
TWRS	33	B0M4P1/B0M4P2	1997			Soil	yes	576683	135889	0.978	1	0.001	-1	0.022	1	0.12	1
TWRS	40	B0M4P3/B0M4P4	1997			Soil	yes	575977	135748	-0.007	-1	0	-1	0.002	1	0.28	1
TWRS	46	B0M4P5/B0M4P6	1997			Soil	yes	576047	135678	0.21	1	0.001	-1	0.006	1	0.39	1
TWRS	31	B0M4P9/B0M4R0	1997			Soil	yes	576401	135889	-0.005	-1	-0.004	-1	0	-1	0.24	1
TWRS	28	B0M4R1/B0M4R2	1997			Soil	yes	575977	135889	0.052	1	0.001	-1	0.004	1	0.12	1
TWRS	47	B0M4R3/B0M4R4	1997			Soil	yes	576189	135678	0.074	1	0	-1	0.004	1	1.1	1
TWRS	32	B0M4R5/B0M4R6	1997			Soil	yes	576543	135889	0.439	1	-0.001	-1	0.009	1	0.54	1
TWRS	41	B0M4R7/B0M4R8	1997			Soil	yes	576118	135748	0.058	1	0.003	1	0.012	1	-0.2	-1
TWRS	35	B0M4R9/B0M4T0	1997			Soil	yes	576189	135819	0.042	1	0.003	-1	0.002	1	0.2	1
TWRS	36	B0M4T1/B0M4T2	1997			Soil	yes	576330	135819	0.008	-1	0.005	-1	0.002	1	0.047	-1
TWRS	34	B0M4T3/B0M4T4	1997			Soil	yes	576047	135819	0.022	-1	0.001	-1	0.017	1	0.19	1
TWRS	21	B0M4T5/B0M4T6	1997			Soil	yes	576683	136031	1.03	1	0.003	-1	0.018	1	0.49	1
TWRS	20	B0M4T7/B0M4T8	1997			Soil	yes	576543	136031	2.03	1	0.0006	-1	0.04	1	0.93	1
TWRS	55	B0M4Y7/B0M4Y8	1997			Soil	yes	576683	135605	0.461	1	0.003	1	0.013	1	0.49	1
TWRS	45	B0M4Y9/B0M500	1997			Soil	yes	576683	135748	0.553	1	0.0009	-1	0.026	1	0.84	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
TWRS	60	B0M501/B0M502	1997			Soil	yes	576543	135464	0.604	1	0.003	-1	0.012	1	0.35	1
TWRS	58	B0M503/B0M504	1997			Soil	yes	576613	135536	0.287	1	0.001	-1	0.007	1	0.13	1
TWRS	42	B0M505/B0M506	1997			Soil	yes	576260	135748	0.034	1	0.003	-1	0.01	1	0.39	1
TWRS	43	B0M507/B0M508	1997			Soil	yes	576401	135748	0.011	-1	0.002	-1	0.002	1	0.74	1
TWRS	50	B0M509/B0M510	1997			Soil	yes	576613	135678	0.539	1	0.005	1	0.008	1	0.73	1
TWRS	49	B0M511/B0M512	1997			Soil	yes	576471	135678	0.61	1	0.003	-1	0.01	1	0.29	1
TWRS	16	B0M513/B0M514	1997			Soil	yes	576755	136102	0.532	1	0.001	-1	0.009	1	0.49	1
TWRS	11	B0M515/B0M516	1997			Soil	yes	576683	136173	0.103	1	0	-1	0.002	-1	0.24	1
TWRS	10	B0M517/B0M518	1997			Soil	yes	576543	136173	0.381	1	0.006	-1	0.009	1	0.56	1
TWRS	7	B0M519/B0M520	1997			Soil	yes	576755	136243	2.93	1	-0.003	-1	0.028	1	1.2	1
TWRS	3	B0M521/B0M522	1997			Soil	yes	576683	136316	1.18	1	-0.006	-1	0.013	1	0.92	1
TWRS	1	B0M523/B0M524	1997			Soil	yes	576401	136316	0.196	1	0.01	-1	0.004	1	0.62	1
TWRS	2	B0M525/B0M526	1997			Soil	yes	576543	136316	0.445	1	0.004	-1	0.006	1	0.67	1
TWRS	6	B0M527/B0M528	1997			Soil	yes	576613	136243	0.06	1	0.001	-1	0.002	-1	0.77	1
TWRS	15	B0M529/B0M530	1997			Soil	yes	576613	136102	-0.003	-1	0.005	-1	0.002	-1	0.73	1
TWRS	5	B0M533/B0M534	1997			Soil	yes	576471	136243	0.449	1	0.013	1	0.011	1	0.84	1
TWRS	9	B0M537/B0M538	1997			Soil	yes	576401	136173	0.981	1	0	-1	0.014	1	0.38	1
TWRS	13	B0M539/B0M540	1997			Soil	yes	576330	136102	0.206	1	0.005	1	0.008	1	0.25	1
TWRS	4	B0M541/B0M542	1997			Soil	yes	576330	136243	1.12	1	0.006	-1	0.015	1	0.44	1
TWRS	14	B0M543/B0M544	1997			Soil	yes	576471	136102	0.716	1	0.008	1	0.011	1	0.32	1
TWRS	30	B0M545/B0M546	1997			Soil	yes	576260	135889	0.008	-1	0.012	1	0.003	1	0.4	1
TWRS	24	B0M547/B0M548	1997			Soil	yes	576330	135960	0.993	1	0	-1	0.02	1	0.37	1
TWRS	17	B0M549/B0M550	1997			Soil	yes	576118	136031	0.661	1	0	-1	0.017	1	0.32	1
TWRS	12	B0M551/B0M552	1997			Soil	yes	576189	136102	0.874	1	-0.005	-1	0.016	1	0.32	1
TWRS	8	B0M553/B0M554	1997			Soil	yes	576260	136173	0.946	1	-0.002	-1	0.01	1	0.25	1
TWRS	23	B0M555/B0M556	1997			Soil	yes	576189	135960	0.829	1	0	-1	0.014	1	0.25	1
TWRS	63	B0M557/B0M558	1997			Soil	yes	575697	135751	0.161	1	0	-1	0.007	1	0.43	1
TWRS	18	B0M559/B0M560	1997			Soil	yes	576260	136031	2.13	1	0.008	-1	0.025	1	0.38	1
TWRS	64	B0M561/B0M562	1997			Soil	yes	575734	135751	0.154	1	0.008	-1	0.008	1	0.31	1
TWRS	67	B0M563/B0M564	1997			Soil	yes	575845	135751	0.236	1	0.01	-1	0.016	1	0.33	1
TWRS	29	B0M565/B0M566	1997			Soil	yes	576118	135889	0.335	1	-0.001	-1	0.023	1	0.42	1
TWRS	22	B0M567/B0M568	1997			Soil	yes	576047	135960	0.059	1	-0.002	-1	0.004	-1	0.47	1
TWRS	65	B0M569/B0M570	1997			Soil	yes	575771	135751	0.149	1	-0.003	-1	0.004	-1	0.34	1
TWRS	68	B0M571/B0M572	1997			Soil	yes	575882	135729	0.132	1	0.003	-1	0.0052	1	0.1	1
TWRS	66	B0M573/B0M574	1997			Soil	yes	575808	135751	0.244	1	-0.006	-1	0.0046	-1	0.18	1
TWRS	62	B0M575/B0M576	1997			Soil	yes	575660	135751	0.241	1	0.007	-1	0.03	1	0.22	1
TWRS	70	B0M577/B0M578	1997			Soil	yes	577187	134679	0.801	1	-0.001	-1	0.022	1	-0.31	-1
TWRS	71	B0M579/B0M580	1997			Soil	yes	577278	134722	0.285	1	0.005	-1	0.007	1	0.096	1
TWRS	72	B0M581/B0M582	1997			Soil	yes	577362	134754	1.18	1	0	-1	0.024	1	0.23	1
TWRS	76	B0M583/B0M584	1997			Soil	yes	580997	132368	0.46	1	0.002	-1	0.011	1	0.11	1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
TWRS	75	B0M585/B0M/586	1997			Soil	yes	580933	132206	0.348	1	0.006	-1	0.006	-1	0.051	-1
TWRS	74	B0M587/B0M588	1997			Soil	yes	580870	132052	0.25	1	0.001	-1	0.015	1	0.057	-1
TWRS	73	B0M589/B0M590	1997			Soil	yes	577431	134811	0.13	1	0.004	-1	0.001	-1	-0.096	-1
TWRS	69	B0M593/B0M594	1997			Soil	yes	577186	134608	0.378	1	0.007	-1	0.012	1	0.42	1
TWRS	59	B0M597/B0M598	1997			Soil	yes	576755	135536	1.14	1	0.001	-1	0.012	1	-0.081	-1
Near facility	D001	5849	1995			Soil	yes	566439	134401	0.28	1	0.00027	1	0.0094	1	0.093	1
Near facility	D001	S248088	1997			Soil	yes	566439	134401	1	1	0.0061	1	0.018	1	0.28	-1
Near facility	D001	S330249	1999			Soil	yes	566439	134401	0.51	1	0.011	-1	0.021	1	0.27	-1
Near facility	D001	S377321	2001			Soil	yes	566439	134401	0.67	1	0.0018	-1	0.04	1	0.37	1
Near facility	D001	S566188	2003			Soil	yes	566439	134401	0.54	1	0.0033	-1	0.066	1	0.066	-1
Near facility	D002	5498	1994			Soil	yes	566353	134758	3	1	0.0023	1	0.066	1	0.47	1
Near facility	D002	6347	1996			Soil	yes	566353	134758	0.49	1	0.002	1	0.012	1	0.054	1
Near facility	D002	D002	1998			Soil	yes	566353	134758	0.14	1	0.004	-1	0.01	-1	0.0055	-1
Near facility	D002	S336953	2000			Soil	yes	566353	134758	0.14	1	0.0018	-1	0.15	1	1.4	1
Near facility	D002	S423802	2002			Soil	yes	566353	134758	0.15	1	0.0018	-1	0.053	1	0.26	1
Near facility	D003	5850	1995			Soil	yes	566597	134427	1.9	1	0.0021	1	0.056	1	0.39	1
Near facility	D003	S248097	1997			Soil	yes	566597	134427	1.3	1	0.001	-1	0.034	1	0.24	1
Near facility	D003	S330250	1999			Soil	yes	566597	134427	0.78	1	0.0063	-1	0.027	1	0.16	-1
Near facility	D003	S377322	2001			Soil	yes	566597	134427	1.6	1	0.016	-1	0.055	1	0.37	1
Near facility	D003	S566189	2003			Soil	yes	566597	134427	0.86	1	-0.0017	-1	0.038	1	0.21	-1
Near facility	D004	5499	1994			Soil	yes	566604	134712	2	1	0.00058	1	0.029	1	0.095	1
Near facility	D004	6349	1996			Soil	yes	566604	134712	4	1	0.0025	1	0.06	1	0.17	1
Near facility	D004	D004	1998			Soil	yes	566604	134712	0.62	1	0.00097	-1	0.022	1	0.032	-1
Near facility	D004	S336955	2000			Soil	yes	566604	134712	1.6	1	0.0034	-1	0.056	1	0.56	1
Near facility	D004	S423803	2002			Soil	yes	566604	134712	0.72	1	0.013	-1	0.041	1	0.062	-1
Near facility	D005	5851	1995			Soil	yes	566253	135744	0.65	1	0.0035	1	0.024	1	0.44	1
Near facility	D005	S248099	1997			Soil	yes	566253	135744	0.083	1	-0.00061	-1	0.0092	1	0.038	-1
Near facility	D005	S330234	1999			Soil	yes	566253	135744	0.051	1	0.0039	-1	0.0019	-1	0.22	-1
Near facility	D005	S377323	2001			Soil	yes	566253	135744	0.12	1	0.0018	-1	0.0018	-1	0.24	1
Near facility	D005	S566190	2003			Soil	yes	566253	135744	0.11	1	0.0034	-1	0.012	1	-0.19	-1
Near facility	D006	5500	1994			Soil	yes	566366	135347	0.14	1	0.0021	1	0.1	1	0.056	1
Near facility	D006	6351	1996			Soil	yes	566366	135347	0.11	1	0.0016	1	0.045	1	0.04	1
Near facility	D006	D006	1998			Soil	yes	566366	135347	0.13	1	0.0018	-1	0.055	1	-0.044	-1
Near facility	D006	S336957	2000			Soil	yes	566366	135347	0.05	1	0.011	-1	0.036	1	0.92	1
Near facility	D006	S423804	2002			Soil	yes	566366	135347	0.11	1	0.0038	-1	0.032	1	0.075	-1
Near facility	D007	5852	1995			Soil	yes	566379	135532	0.2	1	0.017	1	0.14	1	0.044	1
Near facility	D007	S248106	1997			Soil	yes	566379	135532	0.074	1	0.0013	-1	0.024	1	0.21	1
Near facility	D007	S330246	1999			Soil	yes	566379	135532	0.22	1	0.0012	-1	0.091	1	0.3	-1
Near facility	D007	S377324	2001			Soil	yes	566379	135532	0.34	1	0.021	-1	0.75	1	0.088	-1
Near facility	D007	S566191	2003			Soil	yes	566379	135532	0.51	1	0.0062	-1	0.086	1	-0.27	-1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D008	5501	1994			Soil	yes	566736	135195	0.04	1	0.00091	1	0.035	1	0.011	1
Near facility	D008	6353	1996			Soil	yes	566736	135195	0.052	1	0.011	1	1	1	0.012	1
Near facility	D008	D008	1998			Soil	yes	566736	135195	0.05	1	0.02	-1	1.4	1	-0.1	-1
Near facility	D008	S336959	2000			Soil	yes	566736	135195	0.043	1	0.15	1	8.5	1	0.99	1
Near facility	D008	S423805	2002			Soil	yes	566736	135195	0.094	1	0.025	-1	2.4	1	0.11	-1
Near facility	D009	5853	1995			Soil	yes	566386	135988	0.25	1	0.00098	1	0.032	1	0.15	1
Near facility	D009	S248107	1997			Soil	yes	566386	135988	0.13	1	0.0006	-1	0.0073	1	0.15	1
Near facility	D009	S330239	1999			Soil	yes	566386	135988	0.17	1	-0.0046	-1	0.007	-1	0.15	-1
Near facility	D009	S377325	2001			Soil	yes	566386	135988	0.57	1	-0.013	-1	0.072	1	0.3	1
Near facility	D009	S566192	2003			Soil	yes	566386	135988	0.59	1	-0.01	-1	0.058	1	0.58	1
Near facility	D010	5502	1994			Soil	yes	566650	135929	0.18	1	0.001	1	0.052	1	0.044	1
Near facility	D010	6355	1996			Soil	yes	566650	135929	0.37	1	0.0017	1	0.086	1	0.052	1
Near facility	D010	D010	1998			Soil	yes	566650	135929	0.84	1	0.004	-1	0.098	1	0.032	-1
Near facility	D010	S336961	2000			Soil	yes	566650	135929	0.027	1	0.0016	-1	0.013	1	0.71	1
Near facility	D010	S423806	2002			Soil	yes	566650	135929	0.49	1	0.013	-1	0.066	1	-0.015	-1
Near facility	D011	5854	1995			Soil	yes	566862	135803	4	1	0.0024	1	0.12	1	0.29	1
Near facility	D011	S248113	1997			Soil	yes	566862	135803	2.6	1	0.0019	-1	0.095	1	0.21	1
Near facility	D011	S330237	1999			Soil	yes	566862	135803	2.5	1	0.011	-1	0.12	1	0.2	-1
Near facility	D011	S377326	2001			Soil	yes	566862	135803	2.6	1	-0.0057	-1	0.087	1	0.23	1
Near facility	D011	S566193	2003			Soil	yes	566862	135803	2.6	1	-0.0094	-1	0.33	1	-0.072	-1
Near facility	D012	5503	1994			Soil	yes	566591	136154	8.3	1	0.0019	1	0.065	1	0.56	1
Near facility	D012	6357	1996			Soil	yes	566591	136154	5.9	1	0.0019	1	0.081	1	0.66	1
Near facility	D012	D012	1998			Soil	yes	566591	136154	1.2	1	-0.002	-1	0.022	1	0.0023	-1
Near facility	D012	S336963	2000			Soil	yes	566591	136154	2.8	1	0.018	-1	0.062	1	1.2	1
Near facility	D012	S423807	2002			Soil	yes	566591	136154	2.6	1	0.0072	-1	0.032	1	0.16	-1
Near facility	D013	S248115	1997			Soil	yes	566869	136180	2.4	1	0.00046	-1	0.09	1	2.3	1
Near facility	D013	S330232	1999			Soil	yes	566869	136180	2.1	1	0.018	-1	0.021	1	3.8	1
Near facility	D013	S377327	2001			Soil	yes	566869	136180	1.6	1	0.024	-1	0.017	1	1.7	1
Near facility	D013	S566194	2003			Soil	yes	566869	136180	9	1	0.0055	-1	0.011	1	-0.13	-1
Near facility	D014	5504	1994			Soil	yes	566849	136399	52	1	0.0022	1	0.058	1	2.7	1
Near facility	D014	6359	1996			Soil	yes	566849	136399	6.1	1	0.00043	1	0.006	1	0.3	1
Near facility	D014	D014	1998			Soil	yes	566849	136399	3.4	1	-0.0059	-1	0.0049	-1	0.25	1
Near facility	D014	S336965	2000			Soil	yes	566849	136399	3	1	-0.0053	-1	0.0087	-1	0.42	1
Near facility	D014	S423808	2002			Soil	yes	566849	136399	3.3	1	0.0018	-1	0.029	1	0.11	-1
Near facility	D015	5856	1995			Soil	yes	566736	136597	2.4	1	0.0014	1	0.021	1	0.22	1
Near facility	D015	S248122	1997			Soil	yes	566736	136597	1.3	1	0.0019	-1	0.014	1	0.16	1
Near facility	D015	S330243	1999			Soil	yes	566736	136597	2	1	0.0056	-1	0.022	1	0.5	1
Near facility	D015	S377328	2001			Soil	yes	566736	136597	1.6	1	0.0032	-1	0.024	1	0.28	1
Near facility	D015	S566195	2003			Soil	yes	566736	136597	1.8	1	0.0042	-1	0.013	-1	0.2	-1
Near facility	D016	5505	1994			Soil	yes	566664	136597	4.5	1	0.00088	1	0.027	1	0.25	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D016	6361	1996			Soil	yes	566664	136597	1.3	1	0.00038	1	0.02	1	0.084	1
Near facility	D016	D016	1998			Soil	yes	566664	136597	1.3	1	0.0029	-1	0.011	1	-0.00081	-1
Near facility	D016	S336966	2000			Soil	yes	566664	136597	1.3	1	-0.016	-1	0.016	-1	1.5	1
Near facility	D016	S423809	2002			Soil	yes	566664	136597	1.8	1	-0.02	-1	0.021	1	0.029	-1
Near facility	D017	5857	1995			Soil	yes	566743	136802	1.7	1	0.0012	1	0.024	1	0.23	1
Near facility	D017	5902	1995			Soil	yes	566743	136802	0.084	1	0.00025	1	0.0047	1	0.065	1
Near facility	D017	S248123	1997			Soil	yes	566743	136802	1.4	1	0.0029	1	0.029	1	0.035	-1
Near facility	D017	S330236	1999			Soil	yes	566743	136802	1.6	1	-0.0041	-1	0.049	1	0.053	-1
Near facility	D017	S377329	2001			Soil	yes	566743	136802	2.5	1	-0.012	-1	0.021	1	0.25	1
Near facility	D017	S566196	2003			Soil	yes	566743	136802	2.1	1	0.017	1	0.069	1	0.047	-1
Near facility	D018	5506	1994			Soil	yes	566928	136736	5.4	1	0.0041	1	0.32	1	1.1	1
Near facility	D018	6363	1996			Soil	yes	566928	136736	1.9	1	0.00022	1	0.011	1	0.17	1
Near facility	D018	D018	1998			Soil	yes	566928	136736	3.8	1	0.0034	-1	0.04	1	0.66	1
Near facility	D018	S336968	2000			Soil	yes	566928	136736	0.26	1	0.018	-1	0.41	1	0.78	1
Near facility	D018	S423810	2002			Soil	yes	566928	136736	0.95	1	0.013	-1	0.074	1	0.16	1
Near facility	D019	5858	1995			Soil	yes	567160	137027	1.8	1	0.0022	1	0.042	1	0.22	1
Near facility	D019	S248129	1997			Soil	yes	567160	137027	1.1	1	0.00059	-1	0.018	1	0.16	1
Near facility	D019	S330235	1999			Soil	yes	567160	137027	1.4	1	0.042	-1	0.035	1	0.32	1
Near facility	D019	S377330	2001			Soil	yes	567160	137027	2	1	-0.0036	-1	0.035	1	0.41	1
Near facility	D019	S566197	2003			Soil	yes	567160	137027	1.8	1	0.0018	-1	0.057	1	0.21	-1
Near facility	D020	5507	1994			Soil	yes	567180	137179	0.095	1	0.00018	1	0.0086	1	0.044	1
Near facility	D020	6365	1996			Soil	yes	567180	137179	0.92	1	0.00092	1	0.033	1	0.2	1
Near facility	D020	D020	1998			Soil	yes	567180	137179	0.14	1	-0.00089	-1	0.0098	1	0.019	-1
Near facility	D020	S336969	2000			Soil	yes	567180	137179	0.2	1	0.0062	-1	0.016	1	1.2	1
Near facility	D020	S423811	2002			Soil	yes	567180	137179	0.61	1	-0.0017	-1	0.017	1	0.19	1
Near facility	D021	5859	1995			Soil	yes	567285	137139	3.3	1	0.0033	1	0.25	1	0.32	1
Near facility	D021	S248131	1997			Soil	yes	567285	137139	1.6	1	0.0017	-1	0.43	1	0.21	1
Near facility	D021	S330238	1999			Soil	yes	567285	137139	0.21	1	-0.096	-1	0.02	1	0.19	-1
Near facility	D021	S377331	2001			Soil	yes	567285	137139	0.43	1	0.009	-1	0.031	1	0.22	1
Near facility	D021	S566198	2003			Soil	yes	567285	137139	0.2	1	0.02	-1	0.016	1	0.067	-1
Near facility	D022	5508	1994			Soil	yes	567338	137113	1.2	1	0.0098	1	0.021	1	0.33	1
Near facility	D022	6367	1996			Soil	yes	567338	137113	4.1	1	0.013	1	0.13	1	0.44	1
Near facility	D022	D022	1998			Soil	yes	567338	137113	0.32	1	-0.0035	-1	0.007	-1	-0.0085	-1
Near facility	D022	S336971	2000			Soil	yes	567338	137113	0.36	1	-0.0056	-1	0.024	1	0.63	1
Near facility	D022	S423812	2002			Soil	yes	567338	137113	2	1	0.22	1	0.1	1	0.44	1
Near facility	D023	5860	1995			Soil	yes	567193	136663	4.1	1	0.00063	1	0.057	1	0.23	1
Near facility	D023	S248137	1997			Soil	yes	567193	136663	0.76	1	0.00055	-1	0.028	1	-0.17	-1
Near facility	D023	S330242	1999			Soil	yes	567193	136663	4.9	1	-0.0055	-1	0.077	1	0.53	1
Near facility	D023	S377332	2001			Soil	yes	567193	136663	4.8	1	0.0021	-1	0.11	1	0.36	1
Near facility	D023	S566199	2003			Soil	yes	567193	136663	2.9	1	0.0022	-1	0.04	1	0.069	-1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D024	5509	1994			Soil	yes	567523	136934	0.13	1	0.00032	-1	0.0068	1	0.043	1
Near facility	D024	6369	1996			Soil	yes	567523	136934	7.7	1	0.043	1	2.1	1	3	1
Near facility	D024	D024	1998			Soil	yes	567523	136934	0.28	1	0.0093	-1	0.035	1	0.14	-1
Near facility	D024	S339299	2000			Soil	yes	567523	136934	5.2	1	0.012	-1	0.79	1	1.7	1
Near facility	D024	S423813	2002			Soil	yes	567523	136934	3.6	1	-0.027	-1	0.4	1	0.34	1
Near facility	D025	5861	1995			Soil	yes	567650	136990	0.89	1	0.00094	1	0.023	1	0.17	1
Near facility	D025	S248139	1997			Soil	yes	567650	136990	9.3	1	0.0032	1	0.37	1	0.46	1
Near facility	D025	S330248	1999			Soil	yes	567650	136990	6.2	1	0.0017	-1	0.49	1	0.45	1
Near facility	D025	S377333	2001			Soil	yes	567650	136990	3.5	1	0.032	-1	0.43	1	0.25	1
Near facility	D025	S566200	2003			Soil	yes	567650	136990	6.1	1	-0.012	-1	0.39	1	0.31	-1
Near facility	D026	5510	1994			Soil	yes	567702	136914	0.19	1	0.00051	1	0.051	1	0.32	1
Near facility	D026	6371	1996			Soil	yes	567702	136914	2.6	1	0.012	1	1.2	1	1	1
Near facility	D026	D026	1998			Soil	yes	567702	136914	0.99	1	0.0027	-1	0.33	1	0.19	1
Near facility	D026	S339297	2000			Soil	yes	567702	136914	2.3	1	0.0042	-1	0.5	1	1.4	1
Near facility	D026	S423814	2002			Soil	yes	567702	136914	1.7	1	0.0057	-1	0.75	1	0.58	1
Near facility	D027	5862	1995			Soil	yes	566802	134136	3.9	1	0.0023	1	0.059	1	0.43	1
Near facility	D027	S248145	1997			Soil	yes	566802	134136	1.2	1	0.00053	-1	0.027	1	0.19	1
Near facility	D027	S330230	1999			Soil	yes	566802	134136	0.34	1	0.012	-1	0.022	1	0.27	1
Near facility	D027	S377334	2001			Soil	yes	566802	134136	0.34	1	-0.0057	-1	0.034	1	0.17	-1
Near facility	D027	S566201	2003			Soil	yes	566802	134136	0.95	1	0.0081	-1	0.006	-1	-0.24	-1
Near facility	D028	5511	1994			Soil	yes	566723	134408	1.5	1	0.00096	1	0.018	1	0.81	1
Near facility	D028	6373	1996			Soil	yes	566723	134408	0.47	1	0.00063	1	0.023	1	0.14	1
Near facility	D028	D028	1998			Soil	yes	566723	134408	0.83	1	-0.0051	-1	0.034	1	0.16	1
Near facility	D028	S339301	2000			Soil	yes	566723	134408	3.5	1	0.015	-1	0.0017	-1	1.3	1
Near facility	D028	S423815	2002			Soil	yes	566723	134408	1.8	1	0.0034	-1	0.026	1	0.36	1
Near facility	D029	5863	1995			Soil	yes	566855	134606	1.5	1	0.00091	1	0.036	1	0.5	1
Near facility	D029	S248149	1997			Soil	yes	566855	134606	5.7	1	0.0011	-1	0.066	1	0.43	1
Near facility	D029	S330240	1999			Soil	yes	566855	134606	1.9	1	0.0025	-1	0.38	1	0.58	1
Near facility	D029	S377335	2001			Soil	yes	566855	134606	2.3	1	0.0055	-1	0.07	1	0.056	-1
Near facility	D029	S566202	2003			Soil	yes	566855	134606	1.3	1	0.0018	-1	0.041	1	-0.2	-1
Near facility	D030	5512	1994			Soil	yes	566948	134930	63	1	0.0052	1	0.26	1	1.1	1
Near facility	D030	6375	1996			Soil	yes	566948	134930	10	1	0.0021	1	0.085	1	0.52	1
Near facility	D030	D030	1998			Soil	yes	566948	134930	0.3	1	0.004	-1	0.019	1	-0.027	-1
Near facility	D030	S339303	2000			Soil	yes	566948	134930	2.9	1	-0.002	-1	0.056	1	1.5	1
Near facility	D030	S423816	2002			Soil	yes	566948	134930	0.59	1	0.016	-1	0.055	1	0.068	-1
Near facility	D031	5864	1995			Soil	yes	567120	134897	6.6	1	0.0043	1	0.1	1	1.4	1
Near facility	D031	S248151	1997			Soil	yes	567120	134897	1.2	1	0.00049	-1	0.026	1	0.28	1
Near facility	D031	S330245	1999			Soil	yes	567120	134897	2.7	1	0.0027	-1	0.15	1	1	1
Near facility	D031	S377336	2001			Soil	yes	567120	134897	3.7	1	0.019	-1	0.19	1	0.44	1
Near facility	D031	S566203	2003			Soil	yes	567120	134897	3.1	1	0.006	-1	0.12	1	0.42	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D032	6377	1996			Soil	yes	566571	135334	7.1	1	0.027	1	1.5	1	0.87	1
Near facility	D032	D032	1998			Soil	yes	566571	135334	2.7	1	0.02	1	1.2	1	0.33	1
Near facility	D032	S339305	2000			Soil	yes	566571	135334	5.2	1	0.0035	-1	1.8	1	3.3	1
Near facility	D032	S423817	2002			Soil	yes	566571	135334	5.3	1	0.014	-1	0.94	1	1.2	1
Near facility	D033	5865	1995			Soil	yes	566895	135049	8.8	1	0.0028	1	0.13	1	1.1	1
Near facility	D033	S248158	1997			Soil	yes	566895	135049	12	1	0.0022	1	0.13	1	0.91	1
Near facility	D033	S330073	1999			Soil	yes	566895	135049	5.4	1	0.0085	-1	0.091	1	0.93	1
Near facility	D033	S377337	2001			Soil	yes	566895	135049	1.1	1	0.029	-1	0.022	-1	0.64	1
Near facility	D033	S566204	2003			Soil	yes	566895	135049	7.6	1	0.0072	-1	0.048	1	0.95	1
Near facility	D034	5514	1994			Soil	yes	566902	135214	11	1	0.0052	1	0.31	1	2.2	1
Near facility	D034	6379	1996			Soil	yes	566902	135214	6.9	1	0.015	1	0.75	1	1.3	1
Near facility	D034	D034	1998			Soil	yes	566902	135214	10	1	0.0052	-1	0.074	1	1.3	1
Near facility	D034	S339308	2000			Soil	yes	566902	135214	5.2	1	0.038	-1	0.61	1	1.8	1
Near facility	D034	S423818	2002			Soil	yes	566902	135214	7.3	1	0.0097	-1	0.74	1	0.78	1
Near facility	D035	5866	1995			Soil	yes	566915	136551	6.5	1	0.00063	1	0.019	1	0.31	1
Near facility	D035	S248159	1997			Soil	yes	566915	136551	5.7	1	0.0013	-1	0.011	1	3.4	1
Near facility	D035	S330085	1999			Soil	yes	566915	136551	1.2	1	-0.017	-1	0.029	1	0.61	1
Near facility	D035	S377338	2001			Soil	yes	566915	136551	2.1	1	-0.021	-1	0.047	1	0.17	1
Near facility	D035	S566205	2003			Soil	yes	566915	136551	4	1	0.0083	-1	0.033	1	-0.068	-1
Near facility	D036	6381	1996			Soil	yes	566968	136412	1	1	0.00025	1	0.0044	1	0.13	1
Near facility	D036	D036	1998			Soil	yes	566968	136412	0.28	1	-0.0048	-1	0.0076	1	-0.056	-1
Near facility	D036	S339310	2000			Soil	yes	566968	136412	0.4	1	-0.0039	-1	0.0096	-1	1.2	1
Near facility	D036	S423819	2002			Soil	yes	566968	136412	0.22	1	-0.0044	-1	0.0022	-1	0.2	-1
Near facility	D037	5867	1995			Soil	yes	567021	134216	1.7	1	0.00059	1	0.0093	1	0.42	1
Near facility	D037	S248165	1997			Soil	yes	567021	134216	1.4	1	-0.00089	-1	0.0044	1	0.44	1
Near facility	D037	S330080	1999			Soil	yes	567021	134216	1.7	1	-0.0073	-1	0.024	1	2.5	1
Near facility	D037	S377339	2001			Soil	yes	567021	134216	2	1	-0.0037	-1	0.028	1	0.51	1
Near facility	D037	S566206	2003			Soil	yes	567021	134216	6.8	1	0.0017	-1	0.044	1	0.82	1
Near facility	D038	5516	1994			Soil	yes	567206	134011	1.1	1	0.005	1	0.034	1	0.24	1
Near facility	D038	6383	1996			Soil	yes	567206	134011	0.26	1	0.00068	1	0.012	1	0.18	1
Near facility	D038	D038	1998			Soil	yes	567206	134011	3.3	1	0.0057	-1	0.12	1	0.69	1
Near facility	D038	S339312	2000			Soil	yes	567206	134011	0.48	1	0.0059	-1	0.03	1	1.4	1
Near facility	D038	S423820	2002			Soil	yes	567206	134011	1.4	1	0.0051	1	0.027	1	0.49	1
Near facility	D038	S423920	2002			Soil	yes	567206	134011	2.5	1	-0.0034	-1	0.029	1	0.088	-1
Near facility	D039	5868	1995			Soil	yes	567530	133997	2.9	1	0.016	1	0.4	1	0.81	1
Near facility	D039	S248167	1997			Soil	yes	567530	133997	7	1	0.05	1	1.4	1	1.4	1
Near facility	D039	S330069	1999			Soil	yes	567530	133997	1	1	0.02	-1	0.5	1	0.74	1
Near facility	D039	S377340	2001			Soil	yes	567530	133997	0.88	1	0.029	-1	0.06	1	0.37	1
Near facility	D039	S566207	2003			Soil	yes	567530	133997	3.6	1	0.01	-1	0.67	1	0.53	1
Near facility	D040	5517	1994			Soil	yes	567398	134871	0.34	1	0.00082	1	0.023	1	0.062	1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D040	6385	1996			Soil	yes	567398	134871	0.3	1	0.001	1	0.027	1	0.056	1
Near facility	D040	D040	1998			Soil	yes	567398	134871	0.85	1	-0.0011	-1	0.062	1	-0.017	-1
Near facility	D040	S339314	2000			Soil	yes	567398	134871	0.89	1	-0.019	-1	0.049	1	0.93	1
Near facility	D040	S423821	2002			Soil	yes	567398	134871	0.44	1	-0.013	-1	0.046	1	0.057	-1
Near facility	D041	5869	1995			Soil	yes	567590	134427	1.2	1	0.0029	1	0.059	1	0.26	1
Near facility	D041	S248173	1997			Soil	yes	567590	134427	1.6	1	0.0043	1	0.095	1	0.081	1
Near facility	D041	S330229	1999			Soil	yes	567590	134427	0.88	1	-0.008	-1	0.05	1	0.29	1
Near facility	D041	S377341	2001			Soil	yes	567590	134427	0.76	1	0.024	-1	0.061	1	0.4	1
Near facility	D041	S566208	2003			Soil	yes	567590	134427	0.49	1	-0.014	-1	0.039	1	-0.32	-1
Near facility	D042	5518	1994			Soil	yes	567616	134626	7.5	1	0.00055	1	0.027	1	0.2	1
Near facility	D042	6387	1996			Soil	yes	567616	134626	0.22	1	0.00082	1	0.028	1	0.14	1
Near facility	D042	D042	1998			Soil	yes	567616	134626	0.091	1	0.00093	-1	0.016	1	0.00095	-1
Near facility	D042	S339316	2000			Soil	yes	567616	134626	0.46	1	0.012	-1	0.089	1	0.77	1
Near facility	D042	S423822	2002			Soil	yes	567616	134626	0.3	1	-0.02	-1	0.052	1	0.13	-1
Near facility	D043	5870	1995			Soil	yes	567689	134897	3.6	1	0.0069	1	0.3	1	0.22	1
Near facility	D043	S248175	1997			Soil	yes	567689	134897	2.9	1	-0.0015	-1	0.038	1	0.26	1
Near facility	D043	S330070	1999			Soil	yes	567689	134897	1.5	1	0.0041	-1	0.061	1	0.71	1
Near facility	D043	S377342	2001			Soil	yes	567689	134897	0.66	1	-0.017	-1	0.02	-1	0.38	1
Near facility	D043	S566209	2003			Soil	yes	567689	134897	1.2	1	0.0056	-1	0.1	1	-0.13	-1
Near facility	D044	5519	1994			Soil	yes	567265	134990	6.3	1	0.03	1	1	1	0.32	1
Near facility	D044	6389	1996			Soil	yes	567265	134990	6.5	1	0.014	1	0.74	1	0.22	1
Near facility	D044	D044	1998			Soil	yes	567265	134990	0.11	1	0.0047	-1	0.0075	1	0.047	-1
Near facility	D044	S339318	2000			Soil	yes	567265	134990	1	1	0.016	-1	0.17	1	1.6	1
Near facility	D044	S423823	2002			Soil	yes	567265	134990	5.1	1	0.0023	-1	0.63	1	0.54	1
Near facility	D045	5871	1995			Soil	yes	567411	135003	4.7	1	0.0043	1	0.18	1	0.38	1
Near facility	D045	S248181	1997			Soil	yes	567411	135003	6.9	1	0.0048	1	0.11	1	2.6	1
Near facility	D045	S330062	1999			Soil	yes	567411	135003	5.2	1	0.0061	-1	0.18	1	2.2	1
Near facility	D045	S377343	2001			Soil	yes	567411	135003	4.4	1	-0.0053	-1	0.11	1	3.8	1
Near facility	D045	S566210	2003			Soil	yes	567411	135003	6.2	1	0.0078	-1	0.12	1	1.5	1
Near facility	D046	5520	1994			Soil	yes	567775	134904	0.16	1	0.0015	1	0.055	1	0.047	1
Near facility	D046	6391	1996			Soil	yes	567775	134904	0.93	1	0.0019	1	0.043	1	0.13	1
Near facility	D046	D046	1998			Soil	yes	567775	134904	0.15	1	-0.0011	-1	0.013	1	-0.021	-1
Near facility	D046	S339320	2000			Soil	yes	567775	134904	0.04	1	0.014	-1	0.54	1	1	1
Near facility	D046	S423824	2002			Soil	yes	567775	134904	0.13	1	-0.025	-1	0.015	-1	0.2	1
Near facility	D047	5872	1995			Soil	yes	567834	135009	4.6	1	0.0048	1	0.2	1	0.84	1
Near facility	D047	S248185	1997			Soil	yes	567834	135009	3	1	0.004	1	0.2	1	-0.56	-1
Near facility	D047	S330064	1999			Soil	yes	567834	135009	2.5	1	0.089	1	0.46	1	0.32	1
Near facility	D047	S377344	2001			Soil	yes	567834	135009	2.2	1	0.029	-1	0.3	1	0.27	-1
Near facility	D047	S566211	2003			Soil	yes	567834	135009	1.6	1	0.0019	-1	0.019	-1	-0.012	-1
Near facility	D048	5521	1994			Soil	yes	567815	135261	0.48	1	0.0013	1	0.046	1	0.16	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D048	6393	1996			Soil	yes	567815	135261	6.9	1	0.0046	1	0.23	1	0.88	1
Near facility	D048	D048	1998			Soil	yes	567815	135261	0.7	1	-0.0021	-1	0.019	1	-0.08	-1
Near facility	D048	S339322	2000			Soil	yes	567815	135261	2.2	1	0.012	-1	0.13	1	1.1	1
Near facility	D048	S423825	2002			Soil	yes	567815	135261	1.3	1	-0.006	-1	0.057	1	-0.011	-1
Near facility	D049	5873	1995			Soil	yes	568271	135320	1.6	1	0.0021	1	0.085	1	0.16	1
Near facility	D049	S248187	1997			Soil	yes	568271	135320	0.57	1	0.0011	-1	0.026	1	-0.66	-1
Near facility	D049	S330227	1999			Soil	yes	568271	135320	0.45	1	0.0027	-1	0.04	1	0.067	1
Near facility	D049	S377345	2001			Soil	yes	568271	135320	0.27	1	-0.02	-1	0.024	1	0.31	1
Near facility	D049	S566212	2003			Soil	yes	568271	135320	0.49	1	-0.025	-1	0.04	1	-0.059	-1
Near facility	D050	5522	1994			Soil	yes	.	.	0.19	1	0.00034	1	0.013	1	0.039	1
Near facility	D050	6395	1996			Soil	yes	.	.	0.21	1	0.00065	1	0.027	1	0.024	1
Near facility	D050	D050	1998			Soil	yes	.	.	0.2	1	-0.0042	-1	0.053	1	0.004	-1
Near facility	D050	S339324	2000			Soil	yes	.	.	0.2	1	0.0072	-1	0.023	1	0.93	1
Near facility	D050	S423826	2002			Soil	yes	.	.	0.097	1	0.021	-1	0.011	-1	0.057	-1
Near facility	D051	5874	1995			Soil	yes	567517	133745	0.53	1	0.0047	1	0.023	1	0.091	1
Near facility	D051	S248194	1997			Soil	yes	567517	133745	0.48	1	0.0035	1	0.03	1	-0.37	-1
Near facility	D051	S330058	1999			Soil	yes	567517	133745	0.85	1	0.038	-1	0.098	1	0.31	1
Near facility	D051	S377346	2001			Soil	yes	567517	133745	0.78	1	0.01	-1	0.077	1	0.11	-1
Near facility	D051	S566213	2003			Soil	yes	567517	133745	0.28	1	-0.013	-1	0.028	1	-0.11	-1
Near facility	D052	5523	1994			Soil	yes	566465	134288	0.25	1	0.00099	1	0.027	1	0.049	1
Near facility	D052	6397	1996			Soil	yes	566465	134288	0.3	1	0.00091	1	0.027	1	0.056	1
Near facility	D052	D052	1998			Soil	yes	566465	134288	0.75	1	-0.015	-1	0.094	1	0.29	1
Near facility	D052	S339326	2000			Soil	yes	566465	134288	0.8	1	0.013	-1	0.02	1	2.5	1
Near facility	D052	S423827	2002			Soil	yes	566465	134288	0.25	1	-0.017	-1	0.019	1	0.14	-1
Near facility	D053	5875	1995			Soil	yes	573735	137801	6.6	1	0.00044	1	0.012	1	0.29	1
Near facility	D053	S248195	1997			Soil	yes	573735	137801	3.4	1	0.0013	-1	0.0038	-1	-0.46	-1
Near facility	D053	S330068	1999			Soil	yes	573735	137801	4.2	1	0.018	-1	0.0092	-1	0.21	-1
Near facility	D053	S377347	2001			Soil	yes	573735	137801	11	1	0.0079	-1	0.034	1	0.77	1
Near facility	D053	S566214	2003			Soil	yes	573735	137801	0.71	1	-0.012	-1	0.0019	-1	-0.11	-1
Near facility	D054	5524	1994			Soil	yes	573816	137762	0.25	1	0.00017	-1	0.00048	1	0.37	1
Near facility	D054	6348	1996			Soil	yes	573816	137762	3.2	1	0.00035	1	0.0032	1	0.6	1
Near facility	D054	D054	1998			Soil	yes	573816	137762	0.75	1	-0.0084	-1	0.0072	-1	-0.051	-1
Near facility	D054	S339330	2000			Soil	yes	573816	137762	6	1	0.018	-1	0.024	1	1.4	1
Near facility	D054	S423828	2002			Soil	yes	573816	137762	5.2	1	0.024	-1	-0.0022	-1	0.52	1
Near facility	D055	5876	1995			Soil	yes	573512	137501	8.8	1	0.00017	-1	0.014	1	0.22	1
Near facility	D055	S248201	1997			Soil	yes	573512	137501	0.81	1	0.0013	-1	0.0026	-1	-1.1	-1
Near facility	D055	S330086	1999			Soil	yes	573512	137501	5.5	1	-0.022	-1	0.012	-1	0.2	-1
Near facility	D055	S377348	2001			Soil	yes	573512	137501	2.5	1	-0.032	-1	0.027	1	-0.13	-1
Near facility	D055	S566215	2003			Soil	yes	573512	137501	2.2	1	0.021	-1	0.0075	-1	0.11	-1
Near facility	D056	5525	1994			Soil	yes	573692	137507	0.9	1	-0.000016	-1	0.0016	1	0.053	1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D056	6350	1996			Soil	yes	573692	137507	1.3	1	0.00056	1	0.0016	1	0.057	1
Near facility	D056	D056	1998			Soil	yes	573692	137507	1.9	1	0.022	-1	0.0044	-1	0.042	-1
Near facility	D056	S339332	2000			Soil	yes	573692	137507	3.1	1	-0.019	-1	-0.0075	-1	0.89	1
Near facility	D056	S423829	2002			Soil	yes	573692	137507	1.9	1	0.014	-1	-0.0045	-1	0.31	1
Near facility	D057	5877	1995			Soil	yes	573686	137181	8.1	1	0.00064	1	0.013	1	0.63	1
Near facility	D057	S248205	1997			Soil	yes	573686	137181	3.5	1	0.0013	-1	0.014	1	-0.58	-1
Near facility	D057	S330082	1999			Soil	yes	573686	137181	9.6	1	0.034	-1	0.032	1	5.9	1
Near facility	D057	S377349	2001			Soil	yes	573686	137181	9.6	1	0.0054	-1	0.021	1	0.49	1
Near facility	D057	S566216	2003			Soil	yes	573686	137181	14	1	0.027	-1	0.054	1	0.16	-1
Near facility	D058	5526	1994			Soil	yes	573878	137205	5.9	1	0.000017	-1	0.0032	1	3.4	1
Near facility	D058	6352	1996			Soil	yes	573878	137205	8.9	1	0.00072	1	0.029	1	2	1
Near facility	D058	D058	1998			Soil	yes	573878	137205	3.3	1	0.01	-1	0.046	1	0.76	1
Near facility	D058	S339334	2000			Soil	yes	573878	137205	6.2	1	-0.017	-1	0.021	1	1.7	1
Near facility	D058	S423830	2002			Soil	yes	573878	137205	12	1	0.015	-1	0.015	1	0.82	1
Near facility	D059	5878	1995			Soil	yes	573996	137305	3.1	1	0.00023	-1	0.0031	1	3.5	1
Near facility	D059	S248207	1997			Soil	yes	573996	137305	0.62	1	0.01	1	0.047	1	0.18	1
Near facility	D059	S330233	1999			Soil	yes	573996	137305	1.7	1	-0.0068	-1	0.023	1	0.37	1
Near facility	D059	S377350	2001			Soil	yes	573996	137305	2.4	1	-0.008	-1	0.0016	-1	0.32	1
Near facility	D059	S566217	2003			Soil	yes	573996	137305	4.2	1	0.0037	-1	0.011	1	-0.0035	-1
Near facility	D060	5527	1994			Soil	yes	574593	137093	1.6	1	0.000043	-1	0.0039	1	0.26	1
Near facility	D060	6354	1996			Soil	yes	574593	137093	1.8	1	0.00013	1	0.013	1	0.23	1
Near facility	D060	D060	1998			Soil	yes	574593	137093	1.3	1	0.021	-1	0.017	1	0.35	1
Near facility	D060	S339336	2000			Soil	yes	574593	137093	1.1	1	0.02	-1	0.0056	1	0.47	1
Near facility	D060	S423831	2002			Soil	yes	574593	137093	1.2	1	-0.0025	-1	0.0099	-1	0.25	1
Near facility	D061	5879	1995			Soil	yes	575272	137815	0.79	1	0.00014	-1	0.0041	1	0.29	1
Near facility	D061	S248214	1997			Soil	yes	575272	137815	0.22	1	0.0028	-1	0.0057	1	0.52	1
Near facility	D061	S329946	1999			Soil	yes	575272	137815	0.67	1	0.012	-1	0.015	1	0.46	1
Near facility	D061	S377351	2001			Soil	yes	575272	137815	0.34	1	0.015	-1	0.0077	1	0.53	1
Near facility	D061	S566218	2003			Soil	yes	575272	137815	1.4	1	0.002	-1	0.004	-1	-0.15	-1
Near facility	D062	5528	1994			Soil	yes	573238	136553	4.5	1	0.00014	-1	0.0064	1	0.24	1
Near facility	D062	6356	1996			Soil	yes	573238	136553	0.69	1	0.00017	1	0.0096	1	0.26	1
Near facility	D062	D062	1998			Soil	yes	573238	136553	0.97	1	0.002	-1	0.007	-1	0.13	-1
Near facility	D062	S339338	2000			Soil	yes	573238	136553	1.8	1	-0.011	-1	0.0054	-1	0.99	1
Near facility	D062	S423832	2002			Soil	yes	573238	136553	1.9	1	0.0019	-1	0.013	1	0.59	1
Near facility	D063	5880	1995			Soil	yes	574712	136466	0.6	1	0.00072	1	0.04	1	1.5	1
Near facility	D063	S248215	1997			Soil	yes	574712	136466	0.42	1	0.0024	-1	0.017	1	0.91	1
Near facility	D063	S330066	1999			Soil	yes	574712	136466	0.43	1	-0.0019	-1	0.019	1	1.3	1
Near facility	D063	S377352	2001			Soil	yes	574712	136466	0.5	1	0.0019	-1	0.019	1	0.85	1
Near facility	D063	S566219	2003			Soil	yes	574712	136466	0.52	1	0.0019	-1	0.035	1	0.3	1
Near facility	D064	5529	1994			Soil	yes	575029	136481	4	1	0.00085	1	0.058	1	5.8	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D064	6358	1996			Soil	yes	575029	136481	0.95	1	0.00043	1	0.0096	1	0.98	1
Near facility	D064	D064	1998			Soil	yes	575029	136481	2.2	1	0.0038	-1	0.016	1	1.5	1
Near facility	D064	S339340	2000			Soil	yes	575029	136481	1.4	1	0.0062	-1	0.041	1	2.8	1
Near facility	D064	S423833	2002			Soil	yes	575029	136481	1.6	1	0.002	-1	0.0079	1	1.9	1
Near facility	D065	5881	1995			Soil	yes	575228	136466	3.5	1	0.00032	1	0.0045	1	1.1	1
Near facility	D065	S248222	1997			Soil	yes	575228	136466	7.4	1	0.0015	-1	0.0061	1	0.66	1
Near facility	D065	S330084	1999			Soil	yes	575228	136466	0.47	1	-0.0021	-1	0.012	1	0.75	1
Near facility	D065	S377353	2001			Soil	yes	575228	136466	2.6	1	-0.0076	-1	0.0057	1	0.21	-1
Near facility	D065	S566220	2003			Soil	yes	575228	136466	1.7	1	-0.014	-1	0.002	-1	0.23	-1
Near facility	D066	5530	1994			Soil	yes	575234	136708	12	1	0.00065	1	0.021	1	1.9	1
Near facility	D066	6360	1996			Soil	yes	575234	136708	6.2	1	0.00014	1	0.01	1	0.71	1
Near facility	D066	D066	1998			Soil	yes	575234	136708	2.5	1	0.077	1	0.0059	-1	0.24	1
Near facility	D066	S339342	2000			Soil	yes	575234	136708	1.8	1	0.026	-1	0.0018	-1	1.6	1
Near facility	D066	S423834	2002			Soil	yes	575234	136708	5.2	1	0.012	-1	0.0077	1	0.54	1
Near facility	D067	5882	1995			Soil	yes	575103	136285	0.35	1	0.00013	-1	0.0055	1	0.98	1
Near facility	D067	S248223	1997			Soil	yes	575103	136285	0.16	1	0.00094	-1	0.00094	-1	0.61	1
Near facility	D067	S330078	1999			Soil	yes	575103	136285	0.077	1	0.015	-1	0.0066	1	0.66	1
Near facility	D067	S377354	2001			Soil	yes	575103	136285	0.051	1	-0.02	-1	0.0078	-1	0.061	-1
Near facility	D067	S566221	2003			Soil	yes	575103	136285	0.012	-1	0.014	-1	0.0064	-1	-0.2	-1
Near facility	D068	6362	1996			Soil	yes	575215	136211	0.19	1	0.000045	1	0.0036	1	0.16	1
Near facility	D068	D068	1998			Soil	yes	575215	136211	0.1	1	0.00091	-1	0.0036	1	0.018	-1
Near facility	D068	S339344	2000			Soil	yes	575215	136211	0.076	1	0.029	-1	0.012	-1	0.33	1
Near facility	D068	S423835	2002			Soil	yes	575215	136211	0.079	1	0.0082	-1	-0.002	-1	0.089	-1
Near facility	D069	5883	1995			Soil	yes	575284	136372	0.51	1	0.0000047	-1	0.0014	1	0.27	1
Near facility	D069	S248230	1997			Soil	yes	575284	136372	0.038	1	0.0011	-1	0.0011	-1	0.53	1
Near facility	D069	S330075	1999			Soil	yes	575284	136372	0.47	1	0.0091	-1	0.016	1	0.8	1
Near facility	D069	S566222	2003			Soil	yes	575284	136372	0.53	1	0.033	-1	0.0017	-1	-0.024	-1
Near facility	D070	5532	1994			Soil	yes	575246	136105	0.86	1	0.000068	-1	0.0014	1	0.3	1
Near facility	D070	D070	1998			Soil	yes	575246	136105	0.22	1	0.00099	-1	0.002	-1	0.26	1
Near facility	D070	S339346	2000			Soil	yes	575246	136105	0.18	1	-0.013	-1	-0.0018	-1	1.3	1
Near facility	D070	S423836	2002			Soil	yes	575246	136105	0.038	1	0.0061	-1	0.002	-1	0.15	-1
Near facility	D071	5884	1995			Soil	yes	575302	135999	26	1	0.00009	-1	0.002	1	0.42	1
Near facility	D071	S248231	1997			Soil	yes	575302	135999	0.21	1	0.001	-1	0.0031	1	0.45	1
Near facility	D071	S330244	1999			Soil	yes	575302	135999	0.21	1	-0.033	-1	0.0019	-1	0.38	1
Near facility	D071	S377356	2001			Soil	yes	575302	135999	0.091	1	-0.0023	-1	0.011	1	0.26	1
Near facility	D071	S566223	2003			Soil	yes	575302	135999	0.19	1	-0.029	-1	0.062	1	0.073	-1
Near facility	D072	5533	1994			Soil	yes	575402	135906	0.91	1	0.0002	-1	0.0092	1	0.25	1
Near facility	D072	6366	1996			Soil	yes	575402	135906	0.3	1	0.00022	1	0.0025	1	0.41	1
Near facility	D072	D072	1998			Soil	yes	575402	135906	0.32	1	0.11	1	0.013	1	0.073	-1
Near facility	D072	S339347	2000			Soil	yes	575402	135906	0.24	1	0.0016	-1	0.027	1	1	1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D072	S423837	2002			Soil	yes	575402	135906	0.091	1	-0.002	-1	0.004	-1	-0.098	-1
Near facility	D073	5885	1995			Soil	yes	575489	136267	0.59	1	0.00065	1	0.0099	1	3	1
Near facility	D073	S248238	1997			Soil	yes	575489	136267	1.1	1	0.00087	-1	0.0026	-1	0.54	1
Near facility	D073	S330251	1999			Soil	yes	575489	136267	0.025	1	0.016	-1	0.0041	-1	-0.062	-1
Near facility	D073	S377357	2001			Soil	yes	575489	136267	1.2	1	0.0077	-1	0.0019	-1	0.2	-1
Near facility	D073	S566224	2003			Soil	yes	575489	136267	1.9	1	-0.0043	-1	0.011	1	-0.085	-1
Near facility	D074	5534	1994			Soil	yes	575638	136068	0.81	1	0.00022	-1	0.0049	1	0.15	1
Near facility	D074	6368	1996			Soil	yes	575638	136068	0.56	1	0.00016	1	0.0089	1	0.091	1
Near facility	D074	D074	1998			Soil	yes	575638	136068	0.62	1	0.0063	-1	0.0031	1	0.0073	-1
Near facility	D074	S339349	2000			Soil	yes	575638	136068	0.96	1	0.02	-1	0.022	1	0.59	1
Near facility	D074	S423838	2002			Soil	yes	575638	136068	1.9	1	0.0044	-1	0.0044	-1	0.41	1
Near facility	D075	5886	1995			Soil	yes	575346	135421	0.31	1	0.00024	1	0.0067	1	0.15	1
Near facility	D075	S248239	1997			Soil	yes	575346	135421	0.19	1	0.0017	-1	0.024	1	0.84	1
Near facility	D075	S330231	1999			Soil	yes	575346	135421	1.1	1	-0.0017	-1	0.005	-1	0.25	-1
Near facility	D075	S377358	2001			Soil	yes	575346	135421	0.23	1	0.0065	-1	0.016	1	-0.036	-1
Near facility	D075	S566225	2003			Soil	yes	575346	135421	0.29	1	0.0035	-1	0.03	1	0.42	1
Near facility	D076	5535	1994			Soil	yes	575451	135390	0.19	1	0.00038	-1	0.0049	1	0.094	1
Near facility	D076	6370	1996			Soil	yes	575451	135390	0.42	1	0.001	1	0.028	1	0.26	1
Near facility	D076	D076	1998			Soil	yes	575451	135390	0.17	1	0.0051	-1	0.013	1	0.17	1
Near facility	D076	S339353	2000			Soil	yes	575451	135390	0.3	1	0.019	-1	0.03	1	0.89	1
Near facility	D076	S423839	2002			Soil	yes	575451	135390	0.18	1	0.019	-1	0.019	1	0.75	1
Near facility	D077	5887	1995			Soil	yes	575109	135427	0.42	1	0.00046	1	0.011	1	0.14	1
Near facility	D077	S248246	1997			Soil	yes	575109	135427	0.3	1	0.0036	-1	0.02	1	0.42	1
Near facility	D077	S330241	1999			Soil	yes	575109	135427	0.25	1	0.006	-1	0.026	1	0.075	-1
Near facility	D077	S377359	2001			Soil	yes	575109	135427	0.46	1	0.0024	-1	0.024	1	-0.11	-1
Near facility	D077	S566226	2003			Soil	yes	575109	135427	0.36	1	0.024	-1	0.029	1	-0.16	-1
Near facility	D078	5536	1994			Soil	yes	574979	135384	0.9	1	0.019	1	0.36	1	0.57	1
Near facility	D078	6372	1996			Soil	yes	574979	135384	0.22	1	0.00023	1	0.0061	1	.	.
Near facility	D078	D078	1998			Soil	yes	574979	135384	0.52	1	0.0039	-1	0.018	1	0.11	-1
Near facility	D078	S339355	2000			Soil	yes	574979	135384	0.76	1	0.0018	-1	0.024	1	0.41	1
Near facility	D078	S423840	2002			Soil	yes	574979	135384	0.28	1	0.02	-1	0.009	-1	-0.11	-1
Near facility	D079	5888	1995			Soil	yes	574823	135620	1.1	1	0.0011	1	0.042	1	0.16	1
Near facility	D079	S248247	1997			Soil	yes	574823	135620	0.095	1	0.0014	-1	0.0014	-1	-0.088	-1
Near facility	D079	S330074	1999			Soil	yes	574823	135620	0.51	1	-0.015	-1	0.025	1	0.095	-1
Near facility	D079	S377360	2001			Soil	yes	574823	135620	0.77	1	0.014	-1	0.064	1	0.027	-1
Near facility	D079	S566227	2003			Soil	yes	574823	135620	0.61	1	-0.006	-1	0.032	1	0.012	-1
Near facility	D080	5537	1994			Soil	yes	573089	136092	0.73	1	0.001	1	0.029	1	0.15	1
Near facility	D080	6374	1996			Soil	yes	573089	136092	0.99	1	0.00039	1	0.027	1	0.18	1
Near facility	D080	D080	1998			Soil	yes	573089	136092	0.024	1	-0.005	-1	0.007	-1	0.0059	-1
Near facility	D080	S339357	2000			Soil	yes	573089	136092	0.08	1	0.0052	-1	0.0017	-1	0.55	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D080	S423841	2002			Soil	yes	573089	136092	0.095	1	-0.014	-1	0.014	1	0.077	-1
Near facility	D081	5889	1995			Soil	yes	574539	139991	0.0071	-1	-0.00005	-1	0.00065	1	0.012	1
Near facility	D081	S248255	1997			Soil	yes	574539	139991	0.0027	-1	0.0012	-1	0.0012	-1	0.11	-1
Near facility	D081	S330247	1999			Soil	yes	574539	139991	0.0086	-1	0.01	-1	0.01	1	0.0098	-1
Near facility	D081	S377361	2001			Soil	yes	574539	139991	0.017	-1	0.03	-1	0.011	1	-0.066	-1
Near facility	D081	S566228	2003			Soil	yes	574539	139991	0.066	1	0.002	-1	0.004	-1	-0.021	-1
Near facility	D082	5538	1994			Soil	yes	575419	139221	0.031	1	0.000096	-1	0.00098	1	0.025	1
Near facility	D082	6376	1996			Soil	yes	575419	139221	0.077	1	-0.000032	-1	0.00059	1	0.023	1
Near facility	D082	D082	1998			Soil	yes	575419	139221	0.028	1	0.00092	-1	-0.0018	-1	0.022	-1
Near facility	D082	S339359	2000			Soil	yes	575419	139221	0.021	1	-0.013	-1	0.027	1	0.69	1
Near facility	D082	S423842	2002			Soil	yes	575419	139221	0.093	1	0.009	-1	0.013	-1	0.15	-1
Near facility	D083	5890	1995			Soil	yes	566639	139586	2.6	1	0.001	1	0.044	1	0.14	1
Near facility	D083	S248262	1997			Soil	yes	566639	139586	1.1	1	0.0038	1	0.027	1	0.42	1
Near facility	D083	S330063	1999			Soil	yes	566639	139586	0.41	1	0.021	-1	0.021	1	0.17	-1
Near facility	D083	S377362	2001			Soil	yes	566639	139586	0.82	1	-0.052	-1	0.069	1	-0.11	-1
Near facility	D083	S566229	2003			Soil	yes	566639	139586	1.4	1	0.019	-1	0.076	1	-0.14	-1
Near facility	D084	5539	1994			Soil	yes	571772	139643	0.17	1	0.0002	1	0.0036	1	0.092	1
Near facility	D084	6378	1996			Soil	yes	571772	139643	1.3	1	0.00059	1	0.031	1	0.17	1
Near facility	D084	D084	1998			Soil	yes	571772	139643	2.3	1	0.0011	-1	0.028	1	0.19	1
Near facility	D084	S339361	2000			Soil	yes	571772	139643	9	1	0.019	-1	0.15	1	0.98	1
Near facility	D084	S423843	2002			Soil	yes	571772	139643	0.36	1	-0.0062	-1	0.0041	-1	0.096	-1
Near facility	D085	5891	1995			Soil	yes	576435	138506	2.5	1	0.00097	1	0.03	1	0.38	1
Near facility	D085	S248263	1997			Soil	yes	576435	138506	1.1	1	0.001	-1	0.022	1	0.31	-1
Near facility	D085	S330076	1999			Soil	yes	576435	138506	0.23	1	0.011	-1	0.0018	-1	0.064	-1
Near facility	D085	S377363	2001			Soil	yes	576435	138506	0.38	1	0.0031	-1	0.0063	-1	-0.24	-1
Near facility	D085	S566230	2003			Soil	yes	576435	138506	0.45	1	0.0075	-1	0.028	1	-0.12	-1
Near facility	D086	5540	1994			Soil	yes	575641	137824	0.085	1	-0.000041	-1	0.00094	1	0.14	1
Near facility	D086	6380	1996			Soil	yes	575641	137824	1.1	1	0.00032	1	0.0076	1	0.26	1
Near facility	D086	D086	1998			Soil	yes	575641	137824	1.4	1	0.0017	-1	0.0061	-1	0.73	1
Near facility	D086	S339396	2000			Soil	yes	575641	137824	1.5	1	0.055	-1	0.022	-1	0.22	-1
Near facility	D086	S423844	2002			Soil	yes	575641	137824	0.85	1	-0.0019	-1	0.0097	-1	0.088	-1
Near facility	D087	5892	1995			Soil	yes	576911	136887	1	1	0.00069	1	0.023	1	0.34	1
Near facility	D087	S248269	1997			Soil	yes	576911	136887	0.12	1	0.0019	-1	0.0037	1	0.037	-1
Near facility	D087	S330057	1999			Soil	yes	576911	136887	0.038	1	0.0032	-1	0.0032	-1	0.15	-1
Near facility	D087	S377364	2001			Soil	yes	576911	136887	0.035	1	-0.027	-1	0.011	1	0.12	-1
Near facility	D087	S566231	2003			Soil	yes	576911	136887	0.021	1	0.0018	-1	0.0018	-1	-0.089	-1
Near facility	D088	5541	1994			Soil	yes	577260	136760	0.12	1	0.0000091	-1	0.0022	1	0.031	1
Near facility	D088	6382	1996			Soil	yes	577260	136760	0.51	1	0.00037	1	0.0079	1	0.11	1
Near facility	D088	D088	1998			Soil	yes	577260	136760	0.0052	-1	-0.005	-1	0.003	-1	-0.065	-1
Near facility	D088	S339698	2000			Soil	yes	577260	136760	0.99	1	1.2	1	0.99	1	0.76	1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D088	S423845	2002			Soil	yes	577260	136760	0.013	1	0.0065	-1	0.0043	-1	0.15	1
Near facility	D089	5893	1995			Soil	yes	577467	136204	0.38	1	0.0002	1	0.0058	1	0.068	1
Near facility	D089	S248271	1997			Soil	yes	577467	136204	0.056	1	-0.00095	-1	0.00095	-1	1	1
Near facility	D089	S329947	1999			Soil	yes	577467	136204	0.21	1	0.013	-1	0.0072	1	0.13	-1
Near facility	D089	S377365	2001			Soil	yes	577467	136204	0.23	1	0.0048	-1	0.0095	1	0.12	-1
Near facility	D089	S566232	2003			Soil	yes	577467	136204	0.4	1	-0.015	-1	0.0058	-1	-0.17	-1
Near facility	D090	5542	1994			Soil	yes	576133	136442	1.4	1	0.000064	-1	0.0048	1	0.22	1
Near facility	D090	6384	1996			Soil	yes	576133	136442	0.18	1	-0.000018	-1	0.0025	1	0.058	1
Near facility	D090	D090	1998			Soil	yes	576133	136442	0.12	1	-0.0024	-1	0.0012	-1	-0.11	-1
Near facility	D090	S339400	2000			Soil	yes	576133	136442	0.55	1	0.0063	-1	0.025	1	0.47	1
Near facility	D090	S423846	2002			Soil	yes	576133	136442	0.38	1	0.031	-1	0.0021	-1	-0.0035	-1
Near facility	D091	5894	1995			Soil	yes	575530	136347	3.3	1	0.0013	1	0.009	1	0.36	1
Near facility	D091	S248278	1997			Soil	yes	575530	136347	0.77	1	0.0019	-1	0.0019	-1	0.94	1
Near facility	D091	S330067	1999			Soil	yes	575530	136347	0.82	1	0.012	-1	0.0086	1	0.083	-1
Near facility	D091	S377366	2001			Soil	yes	575530	136347	2.1	1	-0.0057	-1	0.017	1	0.2	-1
Near facility	D091	S566233	2003			Soil	yes	575530	136347	2	1	0.014	-1	0.0032	-1	-0.0091	-1
Near facility	D092	5543	1994			Soil	yes	575975	135950	0.32	1	0.0014	1	0.082	1	0.12	1
Near facility	D092	6386	1996			Soil	yes	575975	135950	0.74	1	0.00032	1	0.01	1	0.11	1
Near facility	D092	D092	1998			Soil	yes	575975	135950	0.27	1	0.01	-1	0.082	1	-0.039	-1
Near facility	D092	S339402	2000			Soil	yes	575975	135950	0.4	1	-0.0082	-1	0.26	1	1.1	1
Near facility	D092	S423847	2002			Soil	yes	575975	135950	0.04	1	-0.004	-1	0.002	-1	0.049	-1
Near facility	D093	5895	1995			Soil	yes	575721	135744	0.34	1	0.0011	1	0.02	1	0.16	1
Near facility	D093	S248279	1997			Soil	yes	575721	135744	0.33	1	0.00093	-1	0.0093	1	0.4	1
Near facility	D093	S330071	1999			Soil	yes	575721	135744	0.27	1	0.0049	-1	0.0032	-1	0.15	-1
Near facility	D093	S377367	2001			Soil	yes	575721	135744	0.74	1	0.007	-1	0.014	1	0.42	1
Near facility	D093	S566234	2003			Soil	yes	575721	135744	1.1	1	-0.0053	-1	0.042	1	0.25	1
Near facility	D094	5544	1994			Soil	yes	576419	135395	0.22	1	0.00023	-1	0.0082	1	0.099	1
Near facility	D094	6388	1996			Soil	yes	576419	135395	0.12	1	0.0003	1	0.0032	1	0.041	1
Near facility	D094	D094	1998			Soil	yes	576419	135395	1	1	0.0057	-1	0.18	1	0.21	1
Near facility	D094	S339405	2000			Soil	yes	576419	135395	0.077	1	0.02	-1	0.012	-1	0.28	-1
Near facility	D094	S423848	2002			Soil	yes	576419	135395	0.27	1	0.013	-1	0.0021	-1	0.13	-1
Near facility	D095	5896	1995			Soil	yes	575816	135458	0.51	1	0.00058	1	0.014	1	0.13	1
Near facility	D095	S248286	1997			Soil	yes	575816	135458	0.51	1	0.0035	1	0.0083	-1	0.63	1
Near facility	D095	S330060	1999			Soil	yes	575816	135458	0.17	1	0.011	-1	0.015	1	0.17	-1
Near facility	D095	S377368	2001			Soil	yes	575816	135458	0.097	1	0.031	-1	0.034	1	-0.16	-1
Near facility	D095	S566235	2003			Soil	yes	575816	135458	0.57	1	-0.002	-1	0.012	-1	0.11	-1
Near facility	D096	5545	1994			Soil	yes	576578	134410	0.3	1	0.00012	-1	0.0073	1	1.1	1
Near facility	D096	6390	1996			Soil	yes	576578	134410	1	1	0.001	1	0.021	1	0.19	1
Near facility	D096	D096	1998			Soil	yes	576578	134410	0.47	1	-0.0051	-1	0.079	1	0.15	-1
Near facility	D096	S339407	2000			Soil	yes	576578	134410	0.31	1	0.0092	-1	0.015	-1	0.36	-1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D096	S423849	2002			Soil	yes	576578	134410	0.2	1	0.036	-1	0.0094	-1	0.43	1
Near facility	D097	5897	1995			Soil	yes	576435	130585	0.044	1	0.00013	1	0.0017	1	0.061	1
Near facility	D097	S248287	1997			Soil	yes	576435	130585	0.066	1	0.0011	-1	0.0033	1	0.44	1
Near facility	D097	S330059	1999			Soil	yes	576435	130585	0.029	1	-0.014	-1	0.0054	-1	0.075	1
Near facility	D097	S377369	2001			Soil	yes	576435	130585	0.84	1	-0.034	-1	0.071	1	0.22	-1
Near facility	D097	S566236	2003			Soil	yes	576435	130585	0.086	1	0.0017	-1	0.0085	1	-0.093	-1
Near facility	D098	5546	1994			Soil	yes	572387	130585	0.11	1	0.0002	-1	0.0013	1	0.24	1
Near facility	D098	6392	1996			Soil	yes	572387	130585	0.041	1	0.00002	1	0.0014	1	0.022	1
Near facility	D098	D098	1998			Soil	yes	572387	130585	0.035	1	-0.0032	-1	-0.0011	-1	-0.093	-1
Near facility	D098	S339410	2000			Soil	yes	572387	130585	0.052	1	0.014	-1	0.0098	-1	0.11	-1
Near facility	D098	S423850	2002			Soil	yes	572387	130585	0.11	1	0.024	-1	0.0059	1	0.12	-1
Near facility	D099	5898	1995			Soil	yes	572244	134204	0.12	1	0.00008	-1	0.0027	1	0.16	1
Near facility	D099	S248297	1997			Soil	yes	572244	134204	0.046	1	0.003	-1	0.0071	-1	0.91	1
Near facility	D099	S248298	1997			Soil	yes	572244	134204	0.24	1	0.0011	-1	0.0067	1	0.67	1
Near facility	D099	S330072	1999			Soil	yes	572244	134204	0.013	1	-0.084	-1	0.0016	-1	-0.061	-1
Near facility	D099	S377370	2001			Soil	yes	572244	134204	0.19	1	-0.0023	-1	0.021	-1	0.005	-1
Near facility	D099	S566237	2003			Soil	yes	572244	134204	0.34	1	0.0018	-1	0.011	-1	0.28	1
Near facility	D100	5547	1994			Soil	yes	572530	135934	0.27	1	0.0004	1	0.0088	1	0.061	1
Near facility	D100	6394	1996			Soil	yes	572530	135934	0.91	1	0.0012	1	0.023	1	0.11	1
Near facility	D100	D100	1998			Soil	yes	572530	135934	0.034	1	0.01	-1	0.0077	1	0.44	1
Near facility	D100	S339412	2000			Soil	yes	572530	135934	0.36	1	0.0061	-1	0.053	1	0.11	-1
Near facility	D100	S423851	2002			Soil	yes	572530	135934	0.14	1	-0.0083	-1	0.013	-1	0.086	-1
Near facility	D101	5899	1995			Soil	yes	570641	135569	2.4	1	0.00019	1	0.0086	1	1.5	1
Near facility	D101	S248302	1997			Soil	yes	570641	135569	1.6	1	-0.00047	-1	0.0062	1	0.48	1
Near facility	D101	S330056	1999			Soil	yes	570641	135569	0.0063	-1	0.0018	-1	0.0054	1	0.14	-1
Near facility	D101	S377371	2001			Soil	yes	570641	135569	0.11	1	-0.0024	-1	0.019	1	-0.25	-1
Near facility	D101	S566238	2003			Soil	yes	570641	135569	0.25	1	0.0078	-1	0.02	1	0.27	-1
Near facility	D102	5548	1994			Soil	yes	568656	135172	0.44	1	0.00077	1	0.025	1	0.17	1
Near facility	D102	6396	1996			Soil	yes	568656	135172	0.49	1	0.001	1	0.03	1	0.12	1
Near facility	D102	D102	1998			Soil	yes	568656	135172	1.5	1	0.015	-1	0.12	1	0.82	1
Near facility	D102	S339414	2000			Soil	yes	568656	135172	2.5	1	-0.0032	-1	0.17	1	0.78	1
Near facility	D102	S423852	2002			Soil	yes	568656	135172	1.1	1	0.035	-1	0.08	1	0.4	1
Near facility	D103	5900	1995			Soil	yes	566799	133696	1.1	1	0.0087	1	0.53	1	0.024	1
Near facility	D103	S248309	1997			Soil	yes	566799	133696	0.32	1	0.002	-1	0.15	1	0.29	1
Near facility	D103	S330081	1999			Soil	yes	566799	133696	0.19	1	0.011	-1	0.038	1	-0.072	-1
Near facility	D103	S377372	2001			Soil	yes	566799	133696	1.1	1	-0.012	-1	0.22	1	0.43	1
Near facility	D103	S566239	2003			Soil	yes	566799	133696	0.93	1	0.0031	-1	0.099	1	-0.02	-1
Near facility	D104	5549	1994			Soil	yes	565822	134950	0.061	1	0.00008	-1	0.0022	1	0.031	1
Near facility	D104	6398	1996			Soil	yes	565822	134950	0.068	1	0.00053	1	0.002	1	0.012	1
Near facility	D104	D104	1998			Soil	yes	565822	134950	0.012	-1	-0.0043	-1	0.0043	-1	0.6	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D104	S339416	2000			Soil	yes	565822	134950	0.012	1	0.019	-1	0.0084	-1	0.47	1
Near facility	D104	S423853	2002			Soil	yes	565822	134950	0.019	1	0.017	-1	-0.0019	-1	-0.026	-1
Near facility	D105	5901	1995			Soil	yes	564900	133100	0.25	1	0.0093	1	0.34	1	0.12	1
Near facility	D105	S248310	1997			Soil	yes	564900	133100	0.12	1	0.0068	1	0.24	1	0.15	-1
Near facility	D105	S330077	1999			Soil	yes	564900	133100	0.016	1	-0.0042	-1	0.046	1	-0.11	-1
Near facility	D105	S377373	2001			Soil	yes	564900	133100	0.28	1	0.046	-1	0.6	1	0.13	-1
Near facility	D105	S566240	2003			Soil	yes	564900	133100	0.2	1	0.014	-1	0.22	1	-0.26	-1
Near facility	D106	5550	1994			Soil	yes	565550	133045	2	1	0.0013	1	0.051	1	0.66	1
Near facility	D106	6400	1996			Soil	yes	565550	133045	0.13	1	0.00018	1	0.012	1	0.12	1
Near facility	D106	D106	1998			Soil	yes	565550	133045	0.051	1	0.0011	-1	0.0054	-1	0.45	1
Near facility	D106	S339418	2000			Soil	yes	565550	133045	0.66	1	0.0058	-1	0.25	1	0.85	1
Near facility	D106	S423854	2002			Soil	yes	565550	133045	0.23	1	0.0017	-1	0.077	1	0.12	-1
Near facility	D107	S248317	1997			Soil	yes	566180	132982	0.013	1	0.0063	-1	-0.001	-1	0.44	1
Near facility	D107	S330055	1999			Soil	yes	566180	132982	0.45	1	0.013	-1	0.55	1	0.035	1
Near facility	D107	S377374	2001			Soil	yes	566180	132982	0.88	1	0.0017	-1	0.98	1	0.43	1
Near facility	D107	S566241	2003			Soil	yes	566180	132982	0.086	1	0.0018	-1	0.12	1	0.0028	-1
Near facility	D108	5551	1994			Soil	yes	566354	133521	1.5	1	0.0018	1	0.085	1	0.24	1
Near facility	D108	6402	1996			Soil	yes	566354	133521	0.66	1	0.0022	1	0.072	1	0.22	1
Near facility	D108	D108	1998			Soil	yes	566354	133521	0.32	1	0.0065	-1	0.15	1	0.5	1
Near facility	D108	S339420	2000			Soil	yes	566354	133521	0.036	1	0.007	-1	0.023	1	0.44	1
Near facility	D108	S423855	2002			Soil	yes	566354	133521	1.1	1	0.0055	-1	0.15	1	0.34	1
Near facility	D109	5903	1995			Soil	yes	566624	133125	0.44	1	0.0026	1	0.14	1	0.13	1
Near facility	D109	S248318	1997			Soil	yes	566624	133125	0.038	1	0.0029	1	0.0029	1	0.29	1
Near facility	D109	S330054	1999			Soil	yes	566624	133125	0.4	1	0.0056	-1	0.36	1	-0.032	-1
Near facility	D109	S377375	2001			Soil	yes	566624	133125	0.48	1	0.025	-1	0.31	1	0.11	-1
Near facility	D109	S566242	2003			Soil	yes	566624	133125	0.67	1	0.033	-1	1.8	1	0.14	-1
Near facility	D110	5552	1994			Soil	yes	565672	134537	0.19	1	0.00062	1	0.016	1	0.1	1
Near facility	D110	6404	1996			Soil	yes	565672	134537	0.022	1	0.00036	1	0.0056	1	0.018	1
Near facility	D110	D110	1998			Soil	yes	565672	134537	0.006	-1	0.0023	-1	0.0023	-1	0.34	1
Near facility	D110	S339422	2000			Soil	yes	565672	134537	0.045	1	0.029	-1	0.016	1	0.57	1
Near facility	D110	S423856	2002			Soil	yes	565672	134537	0.048	1	-0.0017	-1	0.007	-1	0.11	-1
Near facility	D111	5553	1994			Soil	yes	.	.	0.29	1	0.0018	1	0.041	1	0.06	1
Near facility	D111	S330083	1999			Soil	yes	.	.	0.41	1	0.012	-1	0.058	1	-0.13	-1
Near facility	D111	S377376	2001			Soil	yes	.	.	0.46	1	0.017	-1	0.15	1	0.47	1
Near facility	D111	S566243	2003			Soil	yes	.	.	0.2	1	-0.0086	-1	0.019	1	0.052	-1
Near facility	D112	5554	1994			Soil	yes	.	.	0.6	1	0.000067	-1	0.002	1	0.13	1
Near facility	D112	S339348	2000			Soil	yes	.	.	0.14	1	-0.0062	-1	0.0021	-1	0.15	-1
Near facility	D112	S423857	2002			Soil	yes	.	.	0.17	1	0.0051	-1	0.0017	-1	0.23	1
Near facility	D113	5555	1994			Soil	yes	.	.	0.031	1	0.000035	-1	0.00037	1	0.021	1
Near facility	D113	S330228	1999			Soil	yes	.	.	0.025	1	-0.008	-1	0.0064	-1	-0.097	-1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	D113	S377377	2001			Soil	yes	.	.	0.055	1	-0.004	-1	0.004	-1	-0.28	-1
Near facility	D113	S566244	2003			Soil	yes	.	.	0.31	1	-0.0018	-1	0.023	1	-0.14	-1
Near facility	D114	5556	1994			Soil	yes	.	.	0.38	1	0.00026	1	0.057	1	0.17	1
Near facility	D114	S339404	2000			Soil	yes	.	.	0.12	1	0.045	-1	0.13	1	0.43	1
Near facility	D114	S423858	2002			Soil	yes	.	.	0.0099	-1	-0.0018	-1	0.0092	-1	-0.082	-1
Near facility	D115	5557	1994			Soil	yes	.	.	0.24	1	0.00013	-1	0.01	1	0.27	1
Near facility	D115	S329940	1999			Soil	yes	.	.	0.48	1	-0.0093	-1	0.021	1	-0.045	-1
Near facility	D115	S377378	2001			Soil	yes	.	.	0.77	1	0.016	-1	0.018	1	-0.0054	-1
Near facility	V001	5909	1995			Vegetation	yes	566439	134401	0.0069	-1	-0.00012	-1	0.00062	1	0.17	1
Near facility	V001	S248408	1997			Vegetation	yes	566439	134401	0.031	1	0.0085	-1	0.001	-1	-0.0034	-1
Near facility	V001	S330274	1999			Vegetation	yes	566439	134401	0.077	-1	0.01	-1	0.0056	-1	0.27	1
Near facility	V001	S377382	2001			Vegetation	yes	566439	134401	-0.00011	-1	0.0062	-1	0.02	1	0.15	1
Near facility	V001	S566246	2003			Vegetation	yes	566439	134401	0.13	1	0.0019	-1	-0.00094	-1	2.2	1
Near facility	V002	5558	1994			Vegetation	yes	566353	134758	0.18	1	0.00034	-1	0.023	1	3.3	1
Near facility	V002	6410	1996			Vegetation	yes	566353	134758	0.15	1	0.000053	1	0.0019	1	0.4	1
Near facility	V002	V002	1998			Vegetation	yes	566353	134758	0.25	1	-0.00057	-1	0.0011	-1	0.48	1
Near facility	V002	S336954	2000			Vegetation	yes	566353	134758	0.025	-1	-0.0072	-1	0.0041	-1	0.76	1
Near facility	V002	S423859	2002			Vegetation	yes	566353	134758	0.13	1	0.02	-1	0.0085	1	0.24	1
Near facility	V003	5910	1995			Vegetation	yes	566597	134427	0.025	-1	0.000089	-1	0.0039	1	0.096	1
Near facility	V003	S248409	1997			Vegetation	yes	566597	134427	0.021	-1	0.0025	1	0.0005	-1	0.26	1
Near facility	V003	S330254	1999			Vegetation	yes	566597	134427	0.094	1	-0.0051	-1	0.0051	1	0.16	1
Near facility	V003	S377383	2001			Vegetation	yes	566597	134427	0.12	1	-0.026	-1	0.028	1	0.028	-1
Near facility	V003	S566247	2003			Vegetation	yes	566597	134427	1.3	1	-0.0097	-1	0.0029	-1	25	1
Near facility	V004	6412	1996			Vegetation	yes	566604	134712	0.13	1	0.00018	1	0.0053	1	0.17	1
Near facility	V004	V004	1998			Vegetation	yes	566604	134712	0.058	-1	0.0062	-1	0.0034	-1	-0.035	-1
Near facility	V004	S336956	2000			Vegetation	yes	566604	134712	0.066	1	0.0056	-1	0.0056	-1	0.097	-1
Near facility	V004	S423860	2002			Vegetation	yes	566604	134712	0.078	1	-0.0086	-1	0.006	-1	3.2	1
Near facility	V006	6414	1996			Vegetation	yes	566366	135347	-0.0044	-1	0.00035	1	0.0028	1	0.078	1
Near facility	V006	V006	1998			Vegetation	yes	566366	135347	-0.025	-1	-0.0026	-1	0.0057	1	-0.019	-1
Near facility	V006	S336958	2000			Vegetation	yes	566366	135347	-0.034	-1	0.0054	-1	0.0009	-1	0.013	-1
Near facility	V006	S423861	2002			Vegetation	yes	566366	135347	0.044	-1	-0.0059	-1	0.004	1	0.4	1
Near facility	V007	5559	1994			Vegetation	yes	566379	135532	0.19	1	0.0016	1	0.019	1	.	.
Near facility	V007	5912	1995			Vegetation	yes	566379	135532	0.15	1	0.00088	1	0.022	1	0.28	1
Near facility	V007	S330267	1999			Vegetation	yes	566379	135532	0.014	-1	0.0076	-1	0.0076	-1	0.091	-1
Near facility	V007	S377384	2001			Vegetation	yes	566379	135532	0.14	1	-0.003	-1	0.012	1	-0.0082	-1
Near facility	V007	S566248	2003			Vegetation	yes	566379	135532	0.024	-1	0.013	-1	0.0035	-1	-0.086	-1
Near facility	V008	6466	1996			Vegetation	yes	566736	135195	-0.058	-1	0.00048	1	0.04	1	0.016	1
Near facility	V008	V008	1998			Vegetation	yes	566736	135195	-0.0014	-1	0.0055	-1	0.061	1	-0.033	-1
Near facility	V008	S336960	2000			Vegetation	yes	566736	135195	0.05	-1	-0.0051	-1	0.22	1	0.21	1
Near facility	V008	S423862	2002			Vegetation	yes	566736	135195	0.056	-1	-0.005	-1	0.013	1	0.041	-1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V009	5560	1994			Vegetation	yes	566386	135988	0.012	-1	0.0014	1	0.01	1	0.41	1
Near facility	V009	5913	1995			Vegetation	yes	566386	135988	-0.019	-1	0.000018	-1	0.0013	1	0.4	1
Near facility	V009	S248415	1997			Vegetation	yes	566386	135988	0.031	-1	0.00051	-1	0.003	1	0.067	-1
Near facility	V009	S330285	1999			Vegetation	yes	566386	135988	0.0071	-1	0.0027	-1	0.0055	1	0.17	-1
Near facility	V009	S377385	2001			Vegetation	yes	566386	135988	0.083	1	0.012	-1	0.035	1	0.2	1
Near facility	V009	S566249	2003			Vegetation	yes	566386	135988	0.0053	-1	0.0037	-1	0.0065	-1	-0.072	-1
Near facility	V010	6418	1996			Vegetation	yes	566650	135929	0.095	1	0.0003	1	0.013	1	0.081	1
Near facility	V010	V010	1998			Vegetation	yes	566650	135929	0.033	-1	0.005	-1	0.0029	1	0.031	-1
Near facility	V010	S336962	2000			Vegetation	yes	566650	135929	0.002	-1	-0.0084	-1	0.018	1	0.28	-1
Near facility	V010	S423863	2002			Vegetation	yes	566650	135929	0.011	-1	-0.0021	-1	0.0072	1	0.91	1
Near facility	V011	5914	1995			Vegetation	yes	566862	135803	0.068	-1	0.00062	1	0.011	1	0.13	1
Near facility	V011	S248417	1997			Vegetation	yes	566862	135803	0.15	1	0.0017	-1	0.0067	1	0.31	1
Near facility	V011	S330259	1999			Vegetation	yes	566862	135803	0.052	-1	-0.0063	-1	0.0089	1	0.28	1
Near facility	V011	S377386	2001			Vegetation	yes	566862	135803	0.096	1	-0.0073	-1	0.0082	-1	0.03	-1
Near facility	V011	S566250	2003			Vegetation	yes	566862	135803	0.021	-1	0.012	-1	0.0042	-1	-0.023	-1
Near facility	V012	6420	1996			Vegetation	yes	566591	136154	-0.0074	-1	-0.000053	-1	0.0016	1	0.037	1
Near facility	V012	V012	1998			Vegetation	yes	566591	136154	0.025	-1	0.0031	-1	0.00044	-1	0.039	-1
Near facility	V012	S336964	2000			Vegetation	yes	566591	136154	-0.023	-1	0.012	-1	0.0027	-1	0.17	-1
Near facility	V012	S423864	2002			Vegetation	yes	566591	136154	-0.018	-1	0.002	-1	0.0041	-1	0.029	-1
Near facility	V015	5916	1995			Vegetation	yes	566736	136597	0.2	1	0.00022	-1	0.0016	1	7.2	1
Near facility	V015	S248424	1997			Vegetation	yes	566736	136597	0.23	1	0.0029	1	0.002	1	27	1
Near facility	V015	S330276	1999			Vegetation	yes	566736	136597	0.098	1	0.016	-1	0.00089	-1	4.8	1
Near facility	V015	S377388	2001			Vegetation	yes	566736	136597	0.084	-1	-0.0076	-1	0.0076	-1	-0.024	-1
Near facility	V015	S566251	2003			Vegetation	yes	566736	136597	0.071	1	0.012	-1	0.0058	-1	0.49	1
Near facility	V016	6424	1996			Vegetation	yes	566664	136597	0.025	1	0.000072	1	0.00076	1	0.07	1
Near facility	V016	V016	1998			Vegetation	yes	566664	136597	0.011	-1	-0.0032	-1	0.032	1	0.004	1
Near facility	V016	S336967	2000			Vegetation	yes	566664	136597	-0.0074	-1	0.0065	-1	0.0083	1	-0.0038	-1
Near facility	V016	S423865	2002			Vegetation	yes	566664	136597	0.046	-1	-0.017	-1	0.0085	1	0.089	-1
Near facility	V017	5917	1995			Vegetation	yes	566743	136802	0.21	1	0.00034	1	0.013	1	0.86	1
Near facility	V017	S248425	1997			Vegetation	yes	566743	136802	0.13	1	0.0068	-1	0.0047	1	0.43	1
Near facility	V017	S330281	1999			Vegetation	yes	566743	136802	0.067	-1	0.031	1	0.0083	1	0.23	1
Near facility	V017	S377389	2001			Vegetation	yes	566743	136802	0.11	-1	0.0065	-1	0.019	1	0.057	-1
Near facility	V017	S566252	2003			Vegetation	yes	566743	136802	0.08	1	-0.0018	-1	0.0026	-1	-0.12	-1
Near facility	V018	6426	1996			Vegetation	yes	566928	136736	0.08	1	0.00014	1	0.0014	1	0.34	1
Near facility	V018	V018	1998			Vegetation	yes	566928	136736	-0.021	-1	-0.003	-1	0.0007	-1	0.068	-1
Near facility	V019	5918	1995			Vegetation	yes	567160	137027	0.07	-1	0.00025	-1	0.000062	-1	0.27	1
Near facility	V019	S248431	1997			Vegetation	yes	567160	137027	0.009	-1	0.0069	-1	0.0017	1	0.16	1
Near facility	V019	S329941	1999			Vegetation	yes	567160	137027	0.04	1	0.00094	-1	0.0038	-1	0.093	1
Near facility	V019	S377390	2001			Vegetation	yes	567160	137027	0.14	1	0.0089	-1	0.004	-1	-0.004	-1
Near facility	V019	S566253	2003			Vegetation	yes	567160	137027	0.035	-1	-0.0009	-1	0.0009	-1	-0.1	-1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V020	6428	1996			Vegetation	yes	567180	137179	-0.054	-1	0.00002	1	0.0031	1	0.38	1
Near facility	V020	S336970	2000			Vegetation	yes	567180	137179	0.0099	-1	-0.0047	-1	0.0019	-1	0.29	1
Near facility	V020	S424923	2002			Vegetation	yes	567180	137179	0.033	-1	0.0081	-1	0.009	1	0.1	-1
Near facility	V021	5919	1995			Vegetation	yes	567285	137139	0.1	1	-0.00017	-1	0.0018	1	0.33	1
Near facility	V021	S329945	1999			Vegetation	yes	567285	137139	0.0092	-1	0.0064	-1	0.0037	-1	0.47	1
Near facility	V021	S377391	2001			Vegetation	yes	567285	137139	0.0075	-1	0.00091	-1	0.1	1	0.64	1
Near facility	V021	S566254	2003			Vegetation	yes	567285	137139	0.012	-1	0.0019	-1	0.0028	1	0.83	1
Near facility	V022	6430	1996			Vegetation	yes	567338	137113	0.099	1	0.00019	1	0.0011	1	0.32	1
Near facility	V022	V022	1998			Vegetation	yes	567338	137113	0.047	1	0.0016	-1	0.007	1	0.056	-1
Near facility	V022	S336972	2000			Vegetation	yes	567338	137113	0.013	-1	0.011	-1	0.0052	-1	0.6	1
Near facility	V022	S423867	2002			Vegetation	yes	567338	137113	0.087	1	0.0091	-1	0.0081	1	0.15	1
Near facility	V023	5920	1995			Vegetation	yes	567193	136663	0.086	-1	-0.00015	-1	0.0017	1	0.88	1
Near facility	V023	S248435	1997			Vegetation	yes	567193	136663	0.16	1	0.0006	-1	0.0024	1	2	1
Near facility	V023	S330266	1999			Vegetation	yes	567193	136663	0.071	1	-0.0068	-1	0.0043	1	-0.083	-1
Near facility	V023	S377392	2001			Vegetation	yes	567193	136663	0.072	-1	0.0059	-1	0.0049	-1	0.081	-1
Near facility	V023	S566255	2003			Vegetation	yes	567193	136663	0.057	-1	-0.0027	-1	0.0009	-1	0.093	-1
Near facility	V024	6432	1996			Vegetation	yes	567523	136934	-0.11	-1	-0.000046	-1	0.0029	1	0.12	1
Near facility	V024	V024	1998			Vegetation	yes	567523	136934	0.0053	-1	-0.00048	-1	0.00096	-1	0.078	1
Near facility	V024	S339300	2000			Vegetation	yes	567523	136934	0.15	1	0.005	-1	0.017	1	0.13	1
Near facility	V024	S423868	2002			Vegetation	yes	567523	136934	0.063	-1	-0.012	-1	0.0076	1	0.2	1
Near facility	V025	5561	1994			Vegetation	yes	567650	136990	9.7	1	-0.000054	-1	0.0072	1	5	1
Near facility	V025	5921	1995			Vegetation	yes	567650	136990	3.3	1	0.00017	-1	0.0023	1	5.1	1
Near facility	V025	S248437	1997			Vegetation	yes	567650	136990	0.2	1	0.00061	-1	0.0097	1	0.99	1
Near facility	V025	S377393	2001			Vegetation	yes	567650	136990	0.17	1	-0.0012	-1	0.0048	-1	4.8	1
Near facility	V025	S566256	2003			Vegetation	yes	567650	136990	0.11	1	-0.00099	-1	0.00099	-1	-0.064	-1
Near facility	V026	6434	1996			Vegetation	yes	567702	136914	0.19	1	0.00022	1	0.012	1	0.32	1
Near facility	V026	V026	1998			Vegetation	yes	567702	136914	-0.0098	-1	-0.00052	-1	0.0042	1	0.058	-1
Near facility	V026	S339298	2000			Vegetation	yes	567702	136914	0.041	-1	0.00095	-1	0.0066	-1	0.15	1
Near facility	V026	S423869	2002			Vegetation	yes	567702	136914	0.087	1	-0.0071	-1	0.037	1	0.28	1
Near facility	V027	5922	1995			Vegetation	yes	566802	134136	0.24	1	-0.00024	-1	0.00053	-1	2.9	1
Near facility	V027	S248444	1997			Vegetation	yes	566802	134136	0.09	1	0.0005	-1	0.0015	-1	0.79	1
Near facility	V027	S330288	1999			Vegetation	yes	566802	134136	0.066	1	-0.0082	-1	0.001	-1	0.2	1
Near facility	V027	S377394	2001			Vegetation	yes	566802	134136	0.2	1	0.0032	-1	0.037	1	0.1	-1
Near facility	V027	S566257	2003			Vegetation	yes	566802	134136	0.023	-1	0.0077	-1	0.0017	-1	-0.014	-1
Near facility	V029	5923	1995			Vegetation	yes	566855	134606	0.0077	-1	0.00014	-1	0.0034	1	2.5	1
Near facility	V029	S330079	1999			Vegetation	yes	566855	134606	0.11	1	0.00087	-1	0.0035	1	0.51	1
Near facility	V029	S377395	2001			Vegetation	yes	566855	134606	0.22	1	-0.008	-1	0.014	1	0.071	-1
Near facility	V029	S566258	2003			Vegetation	yes	566855	134606	0.05	-1	-0.014	-1	0.006	-1	-0.18	-1
Near facility	V030	6438	1996			Vegetation	yes	566948	134930	0.2	1	-0.000043	-1	0.0028	1	0.18	1
Near facility	V030	V030	1998			Vegetation	yes	566948	134930	0.029	-1	0.0013	-1	0.0053	1	0.01	-1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V030	S339304	2000			Vegetation	yes	566948	134930	0.11	1	-0.0077	-1	0.013	1	0.12	-1
Near facility	V030	S423870	2002			Vegetation	yes	566948	134930	1.5	1	-0.00085	-1	0.0085	1	0.26	1
Near facility	V031	5924	1995			Vegetation	yes	567120	134897	-0.035	-1	0.0075	1	0.00081	-1	2.8	1
Near facility	V031	S248445	1997			Vegetation	yes	567120	134897	0.059	1	0.00065	-1	0.0026	1	0.085	1
Near facility	V031	S329942	1999			Vegetation	yes	567120	134897	0.096	1	0.012	-1	0.0052	1	0.2	1
Near facility	V031	S377396	2001			Vegetation	yes	567120	134897	0.082	-1	0.02	-1	0.015	1	0.18	1
Near facility	V031	S566259	2003			Vegetation	yes	567120	134897	0.088	1	-0.0011	-1	0.0011	-1	0.21	1
Near facility	V032	5562	1994			Vegetation	yes	566571	135334	-0.094	-1	0.00012	-1	0.028	1	0.022	1
Near facility	V032	6440	1996			Vegetation	yes	566571	135334	0.25	1	0.0016	1	0.062	1	3.7	1
Near facility	V032	V032	1998			Vegetation	yes	566571	135334	0.061	-1	0.0054	-1	0.018	1	-0.02	-1
Near facility	V032	S339306	2000			Vegetation	yes	566571	135334	0.34	1	0.0063	-1	0.036	1	0.1	-1
Near facility	V032	S423871	2002			Vegetation	yes	566571	135334	0.13	1	0.0016	-1	0.014	1	0.039	-1
Near facility	V033	5925	1995			Vegetation	yes	566895	135049	0.38	1	0.0058	1	0.059	1	9.8	1
Near facility	V033	S248451	1997			Vegetation	yes	566895	135049	0.59	1	0.00079	-1	0.0056	1	13	1
Near facility	V033	S566260	2003			Vegetation	yes	566895	135049	3.3	1	0.00094	-1	0.0038	-1	24	1
Near facility	V034	5563	1994			Vegetation	yes	566902	135214	0.0016	-1	0.00081	1	0.05	1	0.3	1
Near facility	V034	6442	1996			Vegetation	yes	566902	135214	0.49	1	0.0015	1	0.075	1	0.56	1
Near facility	V034	V034	1998			Vegetation	yes	566902	135214	0.49	1	0.00047	-1	0.024	1	0.75	1
Near facility	V034	S339309	2000			Vegetation	yes	566902	135214	0.52	1	0.0037	-1	0.029	1	11	1
Near facility	V034	S423872	2002			Vegetation	yes	566902	135214	0.17	1	-0.0053	-1	0.044	1	0.16	1
Near facility	V035	5926	1995			Vegetation	yes	566915	136551	0.34	1	-0.00027	-1	0.00014	-1	8.3	1
Near facility	V035	S248455	1997			Vegetation	yes	566915	136551	0.19	1	0.0082	-1	0.0087	1	0.11	1
Near facility	V035	S329948	1999			Vegetation	yes	566915	136551	0.077	1	0.012	-1	0.00086	-1	0.12	-1
Near facility	V035	S377397	2001			Vegetation	yes	566915	136551	0.086	1	0.0045	-1	0.0027	-1	0.25	1
Near facility	V035	S566261	2003			Vegetation	yes	566915	136551	0.1	1	0.001	-1	0.002	-1	0.055	-1
Near facility	V036	6444	1996			Vegetation	yes	566968	136412	0.26	1	-0.000066	-1	0.0013	1	0.14	1
Near facility	V036	V036	1998			Vegetation	yes	566968	136412	0.034	-1	0.0005	-1	0.00052	-1	0.025	-1
Near facility	V036	S339311	2000			Vegetation	yes	566968	136412	0.05	-1	0.0048	-1	0.0012	-1	0.22	1
Near facility	V038	V038	1998			Vegetation	yes	567206	134011	0.072	-1	0.002	-1	0.0015	-1	-0.0036	-1
Near facility	V038	S339313	2000			Vegetation	yes	567206	134011	0.1	1	0.00098	-1	0.011	1	0.27	1
Near facility	V038	S423874	2002			Vegetation	yes	567206	134011	0.093	1	-0.0032	-1	0.0064	1	0.059	-1
Near facility	V039	5928	1995			Vegetation	yes	567530	133997	0.11	-1	0.00088	1	0.026	1	0.71	1
Near facility	V039	S248457	1997			Vegetation	yes	567530	133997	0.039	1	0.00053	-1	0.0016	-1	0.021	-1
Near facility	V039	S330272	1999			Vegetation	yes	567530	133997	0.099	1	0.0026	-1	0.026	1	0.82	1
Near facility	V039	S377399	2001			Vegetation	yes	567530	133997	0.12	-1	-0.0019	-1	0.013	1	0.64	1
Near facility	V039	S566262	2003			Vegetation	yes	567530	133997	0.015	-1	0.001	-1	0.0062	1	0.093	-1
Near facility	V040	6448	1996			Vegetation	yes	567398	134871	-0.0034	-1	0.00015	1	0.0039	1	0.034	1
Near facility	V040	V040	1998			Vegetation	yes	567398	134871	-0.0017	-1	0.001	-1	0.036	1	0.01	-1
Near facility	V040	S339315	2000			Vegetation	yes	567398	134871	0.18	1	0.0033	-1	0.011	1	0.076	-1
Near facility	V040	S423875	2002			Vegetation	yes	567398	134871	0.091	1	0.00089	-1	0.0098	1	0.16	-1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V041	5929	1995			Vegetation	yes	567590	134427	0.078	-1	-0.00015	-1	0.0029	1	0.15	1
Near facility	V041	S248464	1997			Vegetation	yes	567590	134427	0.04	-1	0.0022	1	0.0072	1	0.16	1
Near facility	V041	S329949	1999			Vegetation	yes	567590	134427	0.071	1	0.0036	-1	0.012	1	0.18	1
Near facility	V041	S377400	2001			Vegetation	yes	567590	134427	0.1	1	0.0047	-1	0.026	1	-0.037	-1
Near facility	V041	S566263	2003			Vegetation	yes	567590	134427	0.065	1	0.0028	-1	-0.0036	-1	0.058	-1
Near facility	V042	6470	1996			Vegetation	yes	567616	134626	0.016	1	-0.00032	-1	0.0024	1	0.034	1
Near facility	V042	V042	1998			Vegetation	yes	567616	134626	0.062	-1	0.00056	-1	0.0006	-1	0.011	-1
Near facility	V042	S339317	2000			Vegetation	yes	567616	134626	0.041	-1	-0.0046	-1	0.0035	-1	0.42	1
Near facility	V042	S423876	2002			Vegetation	yes	567616	134626	0.036	-1	0.0046	-1	0.0054	-1	0.22	1
Near facility	V043	5566	1994			Vegetation	yes	567689	134897	0.064	1	-2.30E-07	-1	0.016	1	0.13	1
Near facility	V043	5930	1995			Vegetation	yes	567689	134897	0.00098	-1	0.014	1	0.0019	-1	0.22	1
Near facility	V043	S248465	1997			Vegetation	yes	567689	134897	0.041	1	0.00043	-1	0.00043	-1	0.8	1
Near facility	V043	S330061	1999			Vegetation	yes	567689	134897	0.23	1	-0.0051	-1	0.011	1	0.051	1
Near facility	V043	S377401	2001			Vegetation	yes	567689	134897	0.1	1	-0.0018	-1	0.019	1	-0.12	-1
Near facility	V043	S566264	2003			Vegetation	yes	567689	134897	0.042	-1	0.0035	-1	0.0018	-1	-0.21	-1
Near facility	V044	5566	1994			Vegetation	yes	567265	134990	0.21	1	0.00081	-1	0.024	1	2.7	1
Near facility	V044	6452	1996			Vegetation	yes	567265	134990	0.14	1	0.00054	1	0.013	1	0.16	1
Near facility	V044	V044	1998			Vegetation	yes	567265	134990	0.053	-1	0.0027	-1	0.0033	-1	-0.012	-1
Near facility	V044	S339319	2000			Vegetation	yes	567265	134990	0.1	1	0.0047	-1	0.011	-1	0.15	1
Near facility	V044	S423877	2002			Vegetation	yes	567265	134990	0.17	1	0.0024	-1	0.031	1	0.017	-1
Near facility	V045	5931	1995			Vegetation	yes	567411	135003	1.1	1	0.00085	-1	0.037	1	0.46	1
Near facility	V045	S248472	1997			Vegetation	yes	567411	135003	0.029	-1	0.0021	1	0.0075	1	-0.025	-1
Near facility	V045	S329944	1999			Vegetation	yes	567411	135003	0.096	1	0.00081	-1	0.0081	-1	0.15	1
Near facility	V045	S377402	2001			Vegetation	yes	567411	135003	0.12	1	-0.0041	-1	0.019	1	0.13	-1
Near facility	V045	S566265	2003			Vegetation	yes	567411	135003	6	1	-0.0069	-1	0.006	-1	-0.045	-1
Near facility	V046	6454	1996			Vegetation	yes	567775	134904	0.071	1	-0.000093	-1	0.0011	1	0.083	1
Near facility	V046	V046	1998			Vegetation	yes	567775	134904	0.04	-1	-0.0015	-1	0.0015	-1	0.14	1
Near facility	V046	S339321	2000			Vegetation	yes	567775	134904	0.018	-1	0.028	-1	-0.0015	-1	2	1
Near facility	V046	S423878	2002			Vegetation	yes	567775	134904	0.088	1	-0.00082	-1	0.0049	-1	0.21	1
Near facility	V047	5932	1995			Vegetation	yes	567834	135009	0.22	1	0.00011	-1	0.0052	1	0.13	1
Near facility	V047	S248473	1997			Vegetation	yes	567834	135009	0.051	1	0.0011	-1	0.0038	-1	-0.012	-1
Near facility	V047	S330265	1999			Vegetation	yes	567834	135009	0.084	1	-0.0038	-1	0.0067	1	0.17	1
Near facility	V047	S377403	2001			Vegetation	yes	567834	135009	0.046	-1	0.0047	-1	0.013	1	-0.085	-1
Near facility	V047	S566266	2003			Vegetation	yes	567834	135009	0.13	1	-0.00086	-1	0.00086	-1	0.24	1
Near facility	V048	5567	1994			Vegetation	yes	567815	135261	0.21	1	0.00081	1	0.024	1	2.7	1
Near facility	V048	5568	1994			Vegetation	yes	567815	135261	0.08	1	-0.0001	-1	0.0022	1	0.058	1
Near facility	V048	6456	1996			Vegetation	yes	567815	135261	0.071	1	-0.00019	-1	0.0015	1	2.1	1
Near facility	V048	V048	1998			Vegetation	yes	567815	135261	0.065	-1	-0.0023	-1	0.0023	-1	0.072	1
Near facility	V048	S339323	2000			Vegetation	yes	567815	135261	0.03	-1	0.096	1	0.0077	-1	2	1
Near facility	V048	S423879	2002			Vegetation	yes	567815	135261	0.13	1	0.011	-1	0.038	1	0.13	-1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V049	5933	1995			Vegetation	yes	568271	135320	0.085	-1	-0.000024	-1	0.0016	1	0.13	1
Near facility	V049	S248480	1997			Vegetation	yes	568271	135320	0.051	-1	0.0013	-1	0.0052	-1	0.3	1
Near facility	V049	S329943	1999			Vegetation	yes	568271	135320	0.062	1	0.0098	-1	0.0053	1	0.38	1
Near facility	V049	S377404	2001			Vegetation	yes	568271	135320	0.086	1	-0.016	-1	0.019	1	-0.044	-1
Near facility	V049	S566267	2003			Vegetation	yes	568271	135320	-0.03	-1	-0.002	-1	0.005	-1	-0.13	-1
Near facility	V050	5568	1994			Vegetation	yes	.	.	0.049	-1	0.00025	-1	0.0022	1	0.1	1
Near facility	V050	6469	1996			Vegetation	yes	.	.	0.19	1	0.00025	1	0.0038	1	0.056	1
Near facility	V050	V050	1998			Vegetation	yes	.	.	-0.0014	-1	0.0011	-1	0.0016	1	0.051	-1
Near facility	V050	S339325	2000			Vegetation	yes	.	.	0.0094	-1	0.01	-1	0.0073	-1	0.034	-1
Near facility	V050	S423880	2002			Vegetation	yes	.	.	0.023	-1	0.0048	-1	0.0072	-1	0.28	1
Near facility	V051	5934	1995			Vegetation	yes	567517	133745	0.02	-1	-0.000015	-1	0.00056	1	0.1	1
Near facility	V051	S248481	1997			Vegetation	yes	567517	133745	0.078	1	-0.0039	-1	0.012	1	0.47	1
Near facility	V051	S330268	1999			Vegetation	yes	567517	133745	0.21	1	0.0018	-1	0.0019	-1	1.3	1
Near facility	V051	S377405	2001			Vegetation	yes	567517	133745	0.095	1	-0.005	-1	0.017	1	-0.18	-1
Near facility	V051	S566268	2003			Vegetation	yes	567517	133745	0.032	-1	-0.0035	-1	0.00088	-1	0.0099	-1
Near facility	V052	6460	1996			Vegetation	yes	566465	134288	-0.073	-1	0.000093	1	0.00048	1	0.061	1
Near facility	V052	V052	1998			Vegetation	yes	566465	134288	0.098	-1	0.001	-1	0.0015	-1	0.022	-1
Near facility	V052	S339327	2000			Vegetation	yes	566465	134288	0.092	1	0.0061	-1	0.014	1	0.41	1
Near facility	V052	S423881	2002			Vegetation	yes	566465	134288	0.063	-1	-0.0066	-1	0.011	1	0.23	1
Near facility	V053	5935	1995			Vegetation	yes	573735	137801	0.092	1	-0.00031	-1	0.00037	-1	0.66	1
Near facility	V053	S248487	1997			Vegetation	yes	573735	137801	0.18	1	0.00057	-1	0.00057	-1	1.5	1
Near facility	V053	S330253	1999			Vegetation	yes	573735	137801	0.22	1	-0.009	-1	0.009	1	1.6	1
Near facility	V053	S377406	2001			Vegetation	yes	573735	137801	0.094	1	-0.0049	-1	0.002	-1	0.13	1
Near facility	V053	S566269	2003			Vegetation	yes	573735	137801	-0.011	-1	-0.00094	-1	0.00094	-1	-0.076	-1
Near facility	V054	6411	1996			Vegetation	yes	573816	137762	0.041	1	0.0004	1	0.00076	1	0.22	1
Near facility	V054	V054	1998			Vegetation	yes	573816	137762	0.11	1	0.0048	-1	0.028	1	-0.05	-1
Near facility	V054	S339331	2000			Vegetation	yes	573816	137762	0.032	-1	0.0019	-1	0.04	1	0.21	1
Near facility	V055	5569	1994			Vegetation	yes	573512	137501	0.049	-1	0.00025	-1	0.0022	1	0.1	1
Near facility	V055	5570	1994			Vegetation	yes	573512	137501	1.4	1	0.00027	-1	0.0034	1	1.6	1
Near facility	V055	5936	1995			Vegetation	yes	573512	137501	0.044	-1	-0.000034	-1	0.0004	-1	5.3	1
Near facility	V055	S330270	1999			Vegetation	yes	573512	137501	0.21	1	0.0054	-1	0.0072	-1	0.3	1
Near facility	V055	S377407	2001			Vegetation	yes	573512	137501	0.12	1	-0.0028	-1	-0.00094	-1	0.011	-1
Near facility	V055	S566270	2003			Vegetation	yes	573512	137501	0.085	1	0.0048	-1	0.00096	-1	0.18	1
Near facility	V056	6413	1996			Vegetation	yes	573692	137507	0.13	1	0.00038	1	0.00088	1	0.079	1
Near facility	V056	V056	1998			Vegetation	yes	573692	137507	0.3	1	0.0007	-1	0.0033	1	0.09	1
Near facility	V056	S339333	2000			Vegetation	yes	573692	137507	0.41	1	-0.017	-1	0.0067	-1	2.5	1
Near facility	V057	5937	1995			Vegetation	yes	573686	137181	0.036	-1	-0.00017	-1	0.00052	-1	0.83	1
Near facility	V057	S248489	1997			Vegetation	yes	573686	137181	0.062	1	0.00052	-1	0.001	-1	0.29	1
Near facility	V057	S330277	1999			Vegetation	yes	573686	137181	0.16	1	-0.0034	-1	0.0084	1	0.6	1
Near facility	V057	S377408	2001			Vegetation	yes	573686	137181	0.21	1	0.014	-1	0.0039	-1	0.19	1

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Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V057	S566271	2003			Vegetation	yes	573686	137181	0.034	-1	0.014	-1	0.00092	-1	0.17	1
Near facility	V058	6415	1996			Vegetation	yes	573878	137205	0.0013	1	-0.00011	-1	0.0007	1	1.1	1
Near facility	V058	V058	1998			Vegetation	yes	573878	137205	0.21	1	0.009	-1	0.002	1	1.2	1
Near facility	V058	S339335	2000			Vegetation	yes	573878	137205	0.051	1	0.021	-1	0.0044	-1	-0.092	-1
Near facility	V058	S423884	2002			Vegetation	yes	573878	137205	0.11	1	0.0045	-1	0.0009	-1	0.29	1
Near facility	V059	5571	1994			Vegetation	yes	573996	137305	0.95	1	-0.000026	-1	0.0022	1	1.3	1
Near facility	V059	5938	1995			Vegetation	yes	573996	137305	0.071	-1	0.00014	-1	0.000058	-1	7.4	1
Near facility	V059	S248495	1997			Vegetation	yes	573996	137305	0.061	1	0.00051	-1	-0.00051	-1	0.7	1
Near facility	V059	S330264	1999			Vegetation	yes	573996	137305	0.49	1	0.0083	-1	0.0066	1	0.9	1
Near facility	V059	S377409	2001			Vegetation	yes	573996	137305	0.077	-1	0.0084	-1	0.00084	-1	0.26	1
Near facility	V059	S566272	2003			Vegetation	yes	573996	137305	0.12	1	-0.0086	-1	0.0022	-1	0.071	-1
Near facility	V060	6468	1996			Vegetation	yes	574519	137047	0.013	1	-0.000057	-1	-0.00026	-1	0.31	1
Near facility	V060	V060	1998			Vegetation	yes	574519	137047	0.048	-1	-0.0022	-1	0.00056	-1	0.13	1
Near facility	V060	S339337	2000			Vegetation	yes	574519	137047	0.082	1	0.0092	-1	0.0046	-1	2.3	1
Near facility	V060	S423885	2002			Vegetation	yes	574519	137047	0.011	-1	0.0051	-1	-0.0031	-1	0.6	1
Near facility	V061	5939	1995			Vegetation	yes	575272	137815	0.036	-1	-0.000029	-1	0.000095	-1	1.3	1
Near facility	V061	S248497	1997			Vegetation	yes	575272	137815	0.019	-1	-0.00051	-1	0.0056	1	1.5	1
Near facility	V061	S330263	1999			Vegetation	yes	575272	137815	0.2	1	0.0069	-1	0.0017	-1	0.48	1
Near facility	V061	S377410	2001			Vegetation	yes	575272	137815	0.034	-1	0.0036	-1	0.0063	-1	0.32	1
Near facility	V061	S566273	2003			Vegetation	yes	575272	137815	0.024	-1	-0.027	-1	0.0047	-1	-0.12	-1
Near facility	V062	6419	1996			Vegetation	yes	573238	136553	0.19	1	-0.000075	-1	0.00035	1	0.2	1
Near facility	V062	V062	1998			Vegetation	yes	573238	136553	0.066	-1	-0.0018	-1	-0.00046	-1	-0.072	-1
Near facility	V062	S339339	2000			Vegetation	yes	573238	136553	0.11	1	0.033	1	0.009	1	1.6	1
Near facility	V062	S423886	2002			Vegetation	yes	573238	136553	0.089	1	-0.0054	-1	-0.0009	-1	2.2	1
Near facility	V063	5940	1995			Vegetation	yes	574712	136466	0.067	1	0.0005	-1	0.00096	-1	14	1
Near facility	V063	S248503	1997			Vegetation	yes	574712	136466	0.011	-1	0.00042	-1	0.0013	-1	18	1
Near facility	V063	S377411	2001			Vegetation	yes	574712	136466	0.08	-1	-0.0072	-1	0.0072	1	4.6	1
Near facility	V063	S566274	2003			Vegetation	yes	574712	136466	-0.024	-1	-0.0064	-1	0.0042	-1	12	1
Near facility	V064	6421	1996			Vegetation	yes	575029	136481	0.06	1	0.0000096	1	0.0001	1	0.22	1
Near facility	V064	V064	1998			Vegetation	yes	575029	136481	0.0083	-1	0.0011	-1	0.0011	-1	0.27	1
Near facility	V064	S339341	2000			Vegetation	yes	575029	136481	0.0026	-1	0.012	-1	0.0041	-1	0.93	1
Near facility	V064	S423887	2002			Vegetation	yes	575029	136481	0.034	-1	0.005	-1	0.00082	-1	0.92	1
Near facility	V065	5941	1995			Vegetation	yes	575228	136466	-0.067	-1	-0.000015	-1	0.000092	-1	0.11	1
Near facility	V065	S377412	2001			Vegetation	yes	575228	136466	0.8	1	0.0032	-1	0.0053	-1	4.1	1
Near facility	V066	6423	1996			Vegetation	yes	575234	136708	0.25	1	0.00009	1	0.00062	1	1.1	1
Near facility	V066	V066	1998			Vegetation	yes	575234	136708	0.012	-1	0.0063	-1	0.033	1	0.038	-1
Near facility	V066	S339343	2000			Vegetation	yes	575234	136708	0.12	1	0.012	-1	0.0018	-1	3.3	1
Near facility	V066	S423888	2002			Vegetation	yes	575234	136708	0.079	1	-0.0018	-1	0.00087	-1	0.016	-1
Near facility	V067	5572	1994			Vegetation	yes	575103	136285	0.049	-1	-0.00014	-1	0.00051	1	0.28	1
Near facility	V067	S330286	1999			Vegetation	yes	575103	136285	0.085	-1	0.0056	-1	0.0019	-1	6.5	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V067	S377413	2001			Vegetation	yes	575103	136285	-0.008	-1	0.001	-1	0.0091	1	2.6	1
Near facility	V068	6425	1996			Vegetation	yes	575215	136211	0.097	1	0.000099	1	0.00017	1	0.16	1
Near facility	V068	V068	1998			Vegetation	yes	575215	136211	0.027	-1	-0.0044	-1	0.0019	-1	0.048	-1
Near facility	V068	S339345	2000			Vegetation	yes	575215	136211	0.011	-1	0.0029	-1	0.00098	-1	0.25	1
Near facility	V068	S423889	2002			Vegetation	yes	575215	136211	0.0023	-1	0.016	1	0.0058	-1	0.48	1
Near facility	V074	V074	1998			Vegetation	yes	575638	136068	0.15	1	0.0039	-1	0.002	-1	0.45	1
Near facility	V074	S339351	2000			Vegetation	yes	575638	136068	0.045	-1	-0.013	-1	0.001	-1	2.3	1
Near facility	V075	5946	1995			Vegetation	yes	575346	135421	-0.17	-1	0.00018	-1	0.00083	1	0.17	1
Near facility	V075	S377417	2001			Vegetation	yes	575346	135421	0.015	-1	0.011	-1	0.0039	1	0.067	-1
Near facility	V076	6433	1996			Vegetation	yes	575451	135390	0.016	1	0.000048	1	0.00045	1	0.19	1
Near facility	V076	V076	1998			Vegetation	yes	575451	135390	0.00048	-1	0.00059	-1	0.00059	-1	0.34	1
Near facility	V076	S339354	2000			Vegetation	yes	575451	135390	0.0079	-1	0.0058	-1	0.00097	-1	0.13	-1
Near facility	V076	S423891	2002			Vegetation	yes	575451	135390	0.032	-1	-0.00086	-1	0.0017	-1	0.17	1
Near facility	V077	5947	1995			Vegetation	yes	575109	135427	0.015	-1	0.00029	-1	0.001	1	0.14	1
Near facility	V077	S248507	1997			Vegetation	yes	575109	135427	0.024	-1	0.00053	-1	0.00053	-1	0.39	1
Near facility	V077	S330273	1999			Vegetation	yes	575109	135427	0.035	1	-0.0091	-1	-0.0046	-1	1.4	1
Near facility	V077	S377418	2001			Vegetation	yes	575109	135427	0.022	-1	0.01	-1	0.0038	-1	0.71	1
Near facility	V078	5573	1994			Vegetation	yes	574979	135384	0.78	1	0.015	1	0.29	1	0.19	1
Near facility	V078	6435	1996			Vegetation	yes	574979	135384	0.031	1	0.00021	1	0.0004	1	0.11	1
Near facility	V078	V078	1998			Vegetation	yes	574979	135384	0.018	-1	0.0026	-1	0.0011	-1	0.082	1
Near facility	V078	S339356	2000			Vegetation	yes	574979	135384	0.031	-1	0.0086	-1	0.0043	1	0.054	-1
Near facility	V078	S423892	2002			Vegetation	yes	574979	135384	0.034	-1	0.0067	-1	0.0019	-1	0.42	1
Near facility	V079	5574	1994			Vegetation	yes	574823	135620	0.041	-1	-0.000077	-1	0.0012	1	0.038	1
Near facility	V079	5948	1995			Vegetation	yes	574823	135620	0.19	1	-0.000059	-1	0.00011	-1	0.17	1
Near facility	V079	S248509	1997			Vegetation	yes	574823	135620	-0.02	-1	-0.001	-1	0.001	-1	0.17	1
Near facility	V079	S330279	1999			Vegetation	yes	574823	135620	0.0077	-1	0.0021	-1	0.017	1	1.1	1
Near facility	V079	S377419	2001			Vegetation	yes	574823	135620	0.086	-1	0.002	-1	0.002	-1	0.08	-1
Near facility	V079	S566277	2003			Vegetation	yes	574823	135620	0.011	-1	0.0023	-1	0.0023	-1	-0.059	-1
Near facility	V080	5575	1994			Vegetation	yes	573089	136092	0.07	-1	0.000054	-1	0.0022	1	0.29	1
Near facility	V080	6437	1996			Vegetation	yes	573089	136092	-0.012	-1	0.00021	1	0.00091	1	1.3	1
Near facility	V080	S339358	2000			Vegetation	yes	573089	136092	0.045	-1	0.013	-1	0.0041	1	0.99	1
Near facility	V080	S424924	2002			Vegetation	yes	573089	136092	0.0036	-1	-0.0042	-1	0.00085	-1	0.093	-1
Near facility	V081	5576	1994			Vegetation	yes	574539	139991	-0.0037	-1	-0.000017	-1	0.00042	1	0.035	1
Near facility	V081	5949	1995			Vegetation	yes	574539	139991	0.03	-1	0.000092	-1	0.000089	-1	0.15	1
Near facility	V081	S248518	1997			Vegetation	yes	574539	139991	-0.000047	-1	-0.00054	-1	0.0011	-1	-0.078	-1
Near facility	V081	S330255	1999			Vegetation	yes	574539	139991	-0.00023	-1	0.0078	-1	0.01	-1	0.37	1
Near facility	V081	S377420	2001			Vegetation	yes	574539	139991	-0.0016	-1	0.017	-1	0.0045	-1	0.088	-1
Near facility	V081	S566278	2003			Vegetation	yes	574539	139991	0.0095	-1	-0.001	-1	0.0011	-1	-0.089	-1
Near facility	V082	5577	1994			Vegetation	yes	575419	139221	0.0081	-1	-0.000035	-1	0.00031	-1	0.11	1
Near facility	V082	6439	1996			Vegetation	yes	575419	139221	0.0074	1	0.00017	1	-0.000044	-1	0.061	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V082	V082	1998			Vegetation	yes	575419	139221	0.051	-1	-0.0017	-1	-0.0011	-1	0.034	-1
Near facility	V082	S339360	2000			Vegetation	yes	575419	139221	0.0023	-1	0.0051	-1	0.0021	-1	0.22	1
Near facility	V082	S423893	2002			Vegetation	yes	575419	139221	0.0086	-1	0.0024	-1	0.0039	-1	0.13	-1
Near facility	V083	5578	1994			Vegetation	yes	566639	139586	0.55	1	0.00059	-1	0.011	1	.	.
Near facility	V083	5950	1995			Vegetation	yes	566639	139586	0.029	-1	0.000067	-1	0.00084	-1	0.14	1
Near facility	V083	S248521	1997			Vegetation	yes	566639	139586	0.0073	-1	0.00057	-1	0.00057	-1	-0.032	-1
Near facility	V083	S330289	1999			Vegetation	yes	566639	139586	0.0024	-1	0.017	-1	0.0019	-1	0.033	-1
Near facility	V083	S377421	2001			Vegetation	yes	566639	139586	0.066	-1	-0.0029	-1	0.0058	1	-0.0069	-1
Near facility	V083	S566279	2003			Vegetation	yes	566639	139586	-0.0041	-1	0.013	-1	0.0011	-1	-0.059	-1
Near facility	V084	5579	1994			Vegetation	yes	571772	139643	0.13	-1	-0.00037	-1	0.00068	-1	2.9	1
Near facility	V084	6441	1996			Vegetation	yes	571772	139643	0.025	1	-0.00013	-1	0.00051	1	0.1	1
Near facility	V084	V084	1998			Vegetation	yes	571772	139643	0.099	1	0.002	-1	0.00097	-1	0.43	1
Near facility	V084	S339362	2000			Vegetation	yes	571772	139643	0.0071	-1	0.018	-1	0.001	-1	0.057	-1
Near facility	V084	S423894	2002			Vegetation	yes	571772	139643	0.031	-1	0.0026	-1	0.0017	-1	0.28	1
Near facility	V085	5580	1994			Vegetation	yes	576435	138506	0.0042	-1	0.00024	-1	0.00067	1	0.028	1
Near facility	V085	5951	1995			Vegetation	yes	576435	138506	0.15	1	0.0001	-1	0.0024	1	1.8	1
Near facility	V085	S248527	1997			Vegetation	yes	576435	138506	0.013	-1	0.001	-1	0.001	-1	0.042	-1
Near facility	V085	S330262	1999			Vegetation	yes	576435	138506	-0.007	-1	0.027	-1	0.03	1	0.41	1
Near facility	V085	S377422	2001			Vegetation	yes	576435	138506	0.058	-1	0.0031	-1	0.0031	-1	0.16	1
Near facility	V085	S566280	2003			Vegetation	yes	576435	138506	0.0094	-1	0.018	-1	0.00095	-1	-0.092	-1
Near facility	V086	6443	1996			Vegetation	yes	575641	137824	0.12	1	0.00011	1	0.0042	1	1	1
Near facility	V086	V086	1998			Vegetation	yes	575641	137824	0.0098	-1	0.00096	-1	-0.00048	-1	0.17	1
Near facility	V086	S339397	2000			Vegetation	yes	575641	137824	0.0048	-1	0.0087	-1	0.0065	-1	2.1	1
Near facility	V086	S423895	2002			Vegetation	yes	575641	137824	0.09	1	0.014	-1	0.00085	-1	0.058	-1
Near facility	V087	5952	1995			Vegetation	yes	576911	136887	0.04	-1	0.00041	-1	0.00006	-1	0.2	1
Near facility	V087	S248529	1997			Vegetation	yes	576911	136887	0.016	-1	0.001	-1	0.00052	-1	0.42	1
Near facility	V087	S330256	1999			Vegetation	yes	576911	136887	0.0067	-1	-0.0028	-1	0.0057	-1	0.24	-1
Near facility	V087	S377423	2001			Vegetation	yes	576911	136887	-0.029	-1	-0.0037	-1	0.00092	-1	0.18	1
Near facility	V087	S566281	2003			Vegetation	yes	576911	136887	0.18	1	-0.0091	-1	0.001	-1	0.11	-1
Near facility	V088	5581	1994			Vegetation	yes	577260	136760	-0.043	-1	-0.000013	-1	0.00021	-1	0.022	1
Near facility	V088	6445	1996			Vegetation	yes	577260	136760	0.044	1	-0.000056	-1	0.00044	1	0.053	1
Near facility	V088	V088	1998			Vegetation	yes	577260	136760	0.051	-1	-0.0015	-1	0.016	1	0.13	1
Near facility	V088	S339399	2000			Vegetation	yes	577260	136760	0.064	1	0.011	-1	0.0065	-1	0.22	1
Near facility	V088	S423896	2002			Vegetation	yes	577260	136760	0.024	-1	-0.0065	-1	0.00092	-1	0.22	1
Near facility	V089	5953	1995			Vegetation	yes	577467	136204	0.0039	-1	-0.000021	-1	-0.00014	-1	0.16	1
Near facility	V089	S248536	1997			Vegetation	yes	577467	136204	0.013	-1	0.00062	-1	0.0087	1	0.19	1
Near facility	V089	S330261	1999			Vegetation	yes	577467	136204	-0.004	-1	0.02	-1	0.014	-1	0.55	1
Near facility	V089	S377424	2001			Vegetation	yes	577467	136204	0.073	-1	0.00097	-1	0.0029	1	0.095	-1
Near facility	V089	S566282	2003			Vegetation	yes	577467	136204	-0.0082	-1	-0.021	-1	0.0039	-1	-0.092	-1
Near facility	V090	5582	1994			Vegetation	yes	576133	136442	1.4	1	0.000066	-1	0.0019	1	0.22	1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V090	6447	1996			Vegetation	yes	576133	136442	0.016	1	-0.0001	-1	0.00028	1	0.11	1
Near facility	V090	V090	1998			Vegetation	yes	576133	136442	0.015	-1	0.0005	-1	0.016	1	0.12	1
Near facility	V090	S339401	2000			Vegetation	yes	576133	136442	0.25	1	0.0031	-1	0.0031	-1	2	1
Near facility	V090	S423897	2002			Vegetation	yes	576133	136442	0.079	1	0.0028	-1	0.02	1	0.36	1
Near facility	V091	5954	1995			Vegetation	yes	575530	136347	0.04	-1	0.00028	-1	-0.0001	-1	4.2	1
Near facility	V091	S248537	1997			Vegetation	yes	575530	136347	0.11	1	-0.00049	-1	0.00049	-1	3.2	1
Near facility	V091	S330252	1999			Vegetation	yes	575530	136347	0.02	-1	0.0079	-1	0.006	1	0.73	1
Near facility	V091	S377425	2001			Vegetation	yes	575530	136347	0.25	1	0.0019	-1	0.0019	-1	0.22	1
Near facility	V091	S566283	2003			Vegetation	yes	575530	136347	0.44	1	0.00083	-1	-0.0017	-1	0.93	1
Near facility	V092	5583	1994			Vegetation	yes	575975	135950	0.097	-1	-0.00009	-1	0.012	1	0.43	1
Near facility	V092	6449	1996			Vegetation	yes	575975	135950	0.064	1	-0.00026	-1	0.00022	1	0.023	1
Near facility	V092	V092	1998			Vegetation	yes	575975	135950	0.031	-1	0.0029	-1	0.0054	1	0.82	1
Near facility	V092	S339403	2000			Vegetation	yes	575975	135950	0.06	1	0.0041	-1	-0.0014	-1	0.12	-1
Near facility	V092	S423898	2002			Vegetation	yes	575975	135950	0.12	1	-0.0032	-1	0.0048	-1	0.19	1
Near facility	V093	5955	1995			Vegetation	yes	575721	135744	0.076	-1	-0.00026	-1	0.000087	-1	0.4	1
Near facility	V093	S330275	1999			Vegetation	yes	575721	135744	0.0025	-1	-0.013	-1	0.011	1	1.2	1
Near facility	V093	S377426	2001			Vegetation	yes	575721	135744	-0.015	-1	-0.022	-1	0.0019	-1	0.17	1
Near facility	V093	S566284	2003			Vegetation	yes	575721	135744	0.022	-1	-0.0018	-1	-0.0018	-1	-0.12	-1
Near facility	V094	5584	1994			Vegetation	yes	576419	135395	0.16	1	0.00026	-1	0.0058	1	0.086	1
Near facility	V094	6471	1996			Vegetation	yes	576419	135395	-0.049	-1	0.000036	1	0.00032	1	0.079	1
Near facility	V094	V094	1998			Vegetation	yes	576419	135395	-0.015	-1	-0.0014	-1	0.0021	-1	0.026	-1
Near facility	V094	S339406	2000			Vegetation	yes	576419	135395	0.011	-1	0.0071	-1	0.0035	1	-0.038	-1
Near facility	V094	S423899	2002			Vegetation	yes	576419	135395	0.012	-1	0.008	-1	0.0032	-1	0.13	-1
Near facility	V095	5585	1994			Vegetation	yes	575816	135458	0.16	1	-0.00052	-1	0.0013	-1	0.33	1
Near facility	V095	5956	1995			Vegetation	yes	575816	135458	-0.0025	-1	0.000092	-1	-0.00015	-1	0.27	1
Near facility	V095	S248544	1997			Vegetation	yes	575816	135458	0.018	1	0.00061	-1	0.0037	-1	0.061	-1
Near facility	V095	S330271	1999			Vegetation	yes	575816	135458	0.022	-1	0.0094	-1	0.0023	-1	0.4	1
Near facility	V095	S377427	2001			Vegetation	yes	575816	135458	0.037	-1	0.0037	-1	0.01	1	0.2	1
Near facility	V095	S566285	2003			Vegetation	yes	575816	135458	0.06	1	-0.006	-1	0.0024	-1	0.71	1
Near facility	V096	5586	1994			Vegetation	yes	576578	134410	0.036	-1	0.00014	-1	0.00054	1	0.13	1
Near facility	V096	6453	1996			Vegetation	yes	576578	134410	0.0034	1	-0.00014	-1	0.000028	1	0.082	1
Near facility	V096	V096	1998			Vegetation	yes	576578	134410	-0.011	-1	-0.009	-1	0.00069	-1	0.033	-1
Near facility	V096	S339408	2000			Vegetation	yes	576578	134410	-0.0011	-1	0.0026	-1	0.0017	-1	-0.017	-1
Near facility	V096	S423900	2002			Vegetation	yes	576578	134410	0.0037	-1	-0.002	-1	0.0058	1	0.25	1
Near facility	V097	5587	1994			Vegetation	yes	576435	130585	-0.0041	-1	0.000091	-1	0.0034	1	0.28	1
Near facility	V097	5957	1995			Vegetation	yes	576435	130585	0.024	-1	0.00044	-1	0.00043	-1	1	1
Near facility	V097	S248545	1997			Vegetation	yes	576435	130585	0.0034	-1	-0.00056	-1	0.0011	-1	-0.11	-1
Near facility	V097	S330282	1999			Vegetation	yes	576435	130585	-0.0036	-1	-0.0019	-1	0.0019	-1	0.37	1
Near facility	V097	S377428	2001			Vegetation	yes	576435	130585	0.013	-1	-0.0011	-1	0.0074	1	0.019	-1
Near facility	V097	S566286	2003			Vegetation	yes	576435	130585	-0.0051	-1	0.016	-1	-0.00088	-1	0.065	-1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V098	5588	1994			Vegetation	yes	572387	130585	-0.0045	-1	0.000086	-1	0.00061	1	0.67	1
Near facility	V098	6455	1996			Vegetation	yes	572387	130585	0.088	1	-0.00015	-1	0.0004	1	0.033	1
Near facility	V098	V098	1998			Vegetation	yes	572387	130585	-0.013	-1	0.0059	-1	0.0024	-1	0.052	-1
Near facility	V098	S339411	2000			Vegetation	yes	572387	130585	-0.0027	-1	0.002	-1	0.001	-1	0.017	-1
Near facility	V098	S423901	2002			Vegetation	yes	572387	130585	0.018	-1	0.00088	-1	-0.0018	-1	0.18	-1
Near facility	V099	5589	1994			Vegetation	yes	572244	134204	-0.031	-1	0.00008	-1	0.0006	1	0.73	1
Near facility	V099	5958	1995			Vegetation	yes	572244	134204	0.06	-1	-0.00022	-1	0.00046	-1	0.18	1
Near facility	V099	S248555	1997			Vegetation	yes	572244	134204	-0.04	-1	0.0051	-1	0.0046	1	0.11	1
Near facility	V099	S330284	1999			Vegetation	yes	572244	134204	-0.0051	-1	0.021	-1	0.0056	1	0.28	1
Near facility	V099	S377429	2001			Vegetation	yes	572244	134204	0.12	1	-0.0027	-1	0.0036	1	2	1
Near facility	V099	S566287	2003			Vegetation	yes	572244	134204	-0.008	-1	0.016	-1	0.001	-1	4.8	1
Near facility	V100	5590	1994			Vegetation	yes	572530	135934	0.075	1	0.000042	-1	0.00033	-1	0.056	1
Near facility	V100	6457	1996			Vegetation	yes	572530	135934	0.013	1	0.000013	1	-0.000088	-1	0.098	1
Near facility	V100	V100	1998			Vegetation	yes	572530	135934	-0.0022	-1	-0.0063	-1	0.00097	-1	0.011	1
Near facility	V100	S339413	2000			Vegetation	yes	572530	135934	0.007	-1	-0.002	-1	0.004	-1	0.21	-1
Near facility	V100	S423902	2002			Vegetation	yes	572530	135934	0.0053	-1	0.011	-1	-0.00077	-1	0.081	-1
Near facility	V101	5591	1994			Vegetation	yes	570641	135569	0.062	-1	0.00007	-1	0.00045	1	0.015	-1
Near facility	V101	5959	1995			Vegetation	yes	570641	135569	-0.025	-1	0.00014	-1	0.0017	1	2.7	1
Near facility	V101	S248556	1997			Vegetation	yes	570641	135569	-0.012	-1	0.00063	-1	0.00063	-1	0.99	1
Near facility	V101	S330260	1999			Vegetation	yes	570641	135569	0.012	-1	-0.0075	-1	0.0037	-1	0.45	1
Near facility	V101	S377430	2001			Vegetation	yes	570641	135569	0.009	-1	0.0048	-1	0.0087	1	0.11	-1
Near facility	V101	S566288	2003			Vegetation	yes	570641	135569	0.014	-1	0.00093	-1	-0.0019	-1	-0.018	-1
Near facility	V102	5592	1994			Vegetation	yes	568656	135172	0.029	-1	0.001	-1	0.0017	-1	0.0072	-1
Near facility	V102	6459	1996			Vegetation	yes	568656	135172	-0.068	-1	-0.000096	-1	0.0011	1	0.21	1
Near facility	V102	V102	1998			Vegetation	yes	568656	135172	-0.00047	-1	0.0005	-1	0.00049	-1	0.14	1
Near facility	V102	S339415	2000			Vegetation	yes	568656	135172	0.037	1	0.0019	-1	0.0039	1	0.066	-1
Near facility	V102	S423903	2002			Vegetation	yes	568656	135172	0.09	1	0.0025	-1	0.005	-1	0.085	-1
Near facility	V103	5960	1995			Vegetation	yes	566799	133696	0.0019	-1	-0.00015	-1	0.0046	1	0.17	1
Near facility	V103	S248562	1997			Vegetation	yes	566799	133696	0.029	-1	0.00064	-1	0.0089	1	0.089	-1
Near facility	V103	S330278	1999			Vegetation	yes	566799	133696	-0.0013	-1	-0.015	-1	0.028	1	0.26	1
Near facility	V103	S377431	2001			Vegetation	yes	566799	133696	0.1	-1	-0.0048	-1	0.031	1	-0.14	-1
Near facility	V103	S566289	2003			Vegetation	yes	566799	133696	0.012	-1	0.0045	-1	0.0068	1	0.013	-1
Near facility	V104	5593	1994			Vegetation	yes	565822	134950	-0.00046	-1	0.000092	-1	0.00076	1	0.069	1
Near facility	V104	6461	1996			Vegetation	yes	565822	134950	0.11	1	-0.000019	-1	0.00027	1	1.3	1
Near facility	V104	V104	1998			Vegetation	yes	565822	134950	-0.0077	-1	0.0037	-1	-0.0025	-1	0.00044	-1
Near facility	V104	S339417	2000			Vegetation	yes	565822	134950	-0.0031	-1	0.012	-1	-0.00098	-1	0.062	-1
Near facility	V104	S423904	2002			Vegetation	yes	565822	134950	0.0025	-1	-0.0023	-1	0.00085	-1	0.037	-1
Near facility	V105	5594	1994			Vegetation	yes	564900	133100	-0.019	-1	0.00031	1	0.011	1	0.52	1
Near facility	V105	5961	1995			Vegetation	yes	564900	133100	0.084	1	0.0004	1	0.012	1	0.52	1
Near facility	V105	S248564	1997			Vegetation	yes	564900	133100	-0.0072	-1	0.0012	-1	0.0055	1	-0.0008	-1

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
Near facility	V105	S330257	1999			Vegetation	yes	564900	133100	-0.00026	-1	0.0032	-1	0.0032	-1	0.81	1
Near facility	V105	S377432	2001			Vegetation	yes	564900	133100	0.019	-1	0.0069	-1	0.044	1	0.5	1
Near facility	V105	S566290	2003			Vegetation	yes	564900	133100	0.011	-1	-0.0062	-1	0.01	1	0.06	-1
Near facility	V106	5595	1994			Vegetation	yes	565550	133045	0.0075	-1	-0.0000022	-1	0.0023	1	0.065	1
Near facility	V106	6463	1996			Vegetation	yes	565550	133045	0.027	1	0.0000098	1	-0.00018	-1	0.41	1
Near facility	V106	V106	1998			Vegetation	yes	565550	133045	0.00033	-1	-0.0011	-1	0.0011	-1	0.15	1
Near facility	V106	S339419	2000			Vegetation	yes	565550	133045	0.015	-1	0.0063	-1	0.0042	-1	0.11	-1
Near facility	V106	S423905	2002			Vegetation	yes	565550	133045	0.13	1	-0.00085	-1	0.016	1	0.051	-1
Near facility	V107	5962	1995			Vegetation	yes	566180	132982	0.13	1	-0.000011	-1	0.0014	1	6.7	1
Near facility	V107	S248571	1997			Vegetation	yes	566180	132982	-0.0048	-1	-0.0011	-1	0.0017	1	0.18	1
Near facility	V107	S330287	1999			Vegetation	yes	566180	132982	-0.0005	-1	-0.032	-1	0.024	1	0.44	1
Near facility	V107	S566291	2003			Vegetation	yes	566180	132982	0.0046	-1	-0.0025	-1	0.0012	-1	-0.16	-1
Near facility	V108	6465	1996			Vegetation	yes	566354	133521	-0.031	-1	0.000059	1	0.0015	1	0.086	1
Near facility	V108	V108	1998			Vegetation	yes	566354	133521	-0.0042	-1	-0.0014	-1	0.0019	1	0.6	1
Near facility	V108	S339421	2000			Vegetation	yes	566354	133521	0.0098	-1	-0.01	-1	0.0061	1	0.18	-1
Near facility	V108	S423906	2002			Vegetation	yes	566354	133521	0.12	1	0.026	1	0.052	1	0.29	1
Near facility	V109	5963	1995			Vegetation	yes	566624	133125	0.06	-1	0.00023	-1	0.003	1	0.44	1
Near facility	V109	S248572	1997			Vegetation	yes	566624	133125	0.004	-1	0.00057	-1	0.0011	-1	-0.033	-1
Near facility	V109	S330280	1999			Vegetation	yes	566624	133125	-0.0028	-1	0.013	-1	0.013	1	0.42	1
Near facility	V109	S377434	2001			Vegetation	yes	566624	133125	0.1	-1	0.0037	-1	0.014	1	-0.049	-1
Near facility	V109	S566292	2003			Vegetation	yes	566624	133125	0.032	-1	0.00092	-1	0.023	1	-0.01	-1
Near facility	V110	5596	1994			Vegetation	yes	565672	134537	0.036	-1	0.000017	-1	0.0012	1	0.065	1
Near facility	V110	6467	1996			Vegetation	yes	565672	134537	0.036	1	-0.00015	-1	0.00056	1	0.083	1
Near facility	V110	V110	1998			Vegetation	yes	565672	134537	-0.02	-1	0.003	-1	0.01	1	0.013	-1
Near facility	V110	S339423	2000			Vegetation	yes	565672	134537	0.02	-1	0.0041	-1	0.001	-1	0.18	1
Near facility	V110	S423907	2002			Vegetation	yes	565672	134537	-0.028	-1	0.00084	-1	0.00084	-1	0.13	-1
Near facility	V111	5597	1994			Vegetation	yes	.	.	0.077	-1	0.0033	1	0.016	1	1.1	1
Near facility	V111	S330258	1999			Vegetation	yes	.	.	0.036	1	-0.004	-1	0.032	-1	0.42	1
Near facility	V111	S377435	2001			Vegetation	yes	.	.	0.14	1	0.015	-1	0.012	1	0.034	-1
Near facility	V111	S566293	2003			Vegetation	yes	.	.	0.0063	-1	-0.0021	-1	0.001	-1	-0.1	-1
Near facility	V112	S339307	2000			Vegetation	yes	.	.	0.25	1	0.0095	-1	0.029	1	0.015	-1
Near facility	V112	S423908	2002			Vegetation	yes	.	.	0.039	-1	0.0064	-1	0.0055	-1	0.2	-1
Near facility	V113	5599	1994			Vegetation	yes	.	.	-0.096	-1	-0.00056	-1	0.0039	1	0.061	1
Near facility	V113	S330269	1999			Vegetation	yes	.	.	0.0012	-1	0.0033	-1	0.026	1	0.25	1
Near facility	V113	S377436	2001			Vegetation	yes	.	.	0.013	-1	0.0027	-1	0.0036	-1	0.12	1
Near facility	V113	S566294	2003			Vegetation	yes	.	.	-0.00041	-1	-0.001	-1	0.001	-1	2	1
Near facility	V114	5600	1994			Vegetation	yes	.	.	0.011	-1	0.000031	-1	0.0013	1	0.23	1
Near facility	V114	S339409	2000			Vegetation	yes	.	.	0.0033	-1	0.015	-1	-0.0019	-1	0.27	1
Near facility	V114	S423909	2002			Vegetation	yes	.	.	0.021	-1	-0.00081	-1	-0.00081	-1	0.12	-1
WHC-EP-0150	E of 216-A-30 Crib		1985		Cryptogam	Cryptogam	no	576550	135400	1.23	.	.	.	.	.	0.9	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0150	E of 216-A-30 Crib		1985		Litter	Litter	no	576550	135400	8.14	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-30 Crib		1985		Soil	Soil	no	576550	135400	0.76	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-30 Crib		1985		Vegetation	Vegetation	no	576550	135400	0.34	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-30 Crib		1986		Cryptogam	Cryptogam	no	576550	135400	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-30 Crib		1986		Litter	Litter	no	576550	135400	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-30 Crib		1986		Soil	Soil	no	576550	135400	0.34	.	0.0002	.	.	0.01	.	.
WHC-EP-0150	E of 216-A-8		1985		Cryptogam	Cryptogam	no	576150	136250	5.4	.	.	.	.	.	2.01	.
WHC-EP-0150	E of 216-A-8		1985		Soil	Soil	no	576150	136250	4.18	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1985		Vegetation	Vegetation	no	576150	136250	0.46	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Litter	Litter	no	576150	136250	18.4	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Soil	Soil	no	576150	136250	2.53	.	.	.	.	.	1.87	.
WHC-EP-0150	E of 216-A-8		1986		Vegetation	Vegetation	no	576150	136250	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1985		Litter	Litter	no	576100	136150	6.38	.	.	.	.	.	0.34	.
WHC-EP-0150	E of 216-A-8		1985		Soil	Soil	no	576100	136150	4.69	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Cryptogam	Cryptogam	no	576100	136150	3.44	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Litter	Litter	no	576100	136150	8.32	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Soil	Soil	no	576100	136150	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Vegetation	Vegetation	no	576100	136150	0.31	.	.	.	.	.	0.23	.
WHC-EP-0150	E of 216-A-8		1985		Cryptogam	Cryptogam	no	576100	136090	3.1	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1985		Soil	Soil	no	576100	136090	2.38	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1985		Vegetation	Vegetation	no	576100	136090	0.28	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Litter	Litter	no	576100	136090	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Soil	Soil	no	576100	136090	1.93	.	0.0005	.	.	.	1.81	.
WHC-EP-0150	E of 216-A-8		1985		Litter	Litter	no	576200	136200	2.71	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1985		Soil	Soil	no	576200	136200	1.79	.	.	.	.	.	1.28	.
WHC-EP-0150	E of 216-A-8		1985		Vegetation	Vegetation	no	576200	136200	0.34	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Cryptogam	Cryptogam	no	576200	136200	2.78	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Litter	Litter	no	576200	136200	2.3	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Soil	Soil	no	576200	136200	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1985		Cryptogam	Cryptogam	no	576350	136325	4.4	.	.	.	.	0.02	0.49	.
WHC-EP-0150	E of 216-A-8		1985		Litter	Litter	no	576350	136325	17.4	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1985		Soil	Soil	no	576350	136325	2.17	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1985		Vegetation	Vegetation	no	576350	136325	0.66	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Cryptogam	Cryptogam	no	576350	136325	.	.	.	.	.	.	0.69	.
WHC-EP-0150	E of 216-A-8		1986		Litter	Litter	no	576350	136325	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-A-8		1986		Vegetation	Vegetation	no	576350	136325	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-AS-8 Crib		1985		Cryptogam	Cryptogam	no	576350	136200	8.58	.	.	.	.	.	0.56	.
WHC-EP-0150	E of 216-AS-8 Crib		1985		Soil	Soil	no	576350	136200	1.71	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-AS-8 Crib		1985		Vegetation	Vegetation	no	576350	136200	2.1	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0150	E of 216-AS-8 Crib		1986		Litter	Litter	no	576350	136200	12.2	.	.	.	.	.	1.18	.
WHC-EP-0150	E of 216-AS-8 Crib		1985		Litter	Litter	no	576400	136300	28.1	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-AS-8 Crib		1985		Soil	Soil	no	576400	136300	1.85	.	0.0003	.	.	0.01	.	.
WHC-EP-0150	E of 216-AS-8 Crib		1986		Cryptogam	Cryptogam	no	576400	136300	8.48	.	.	.	.	.	1.1	.
WHC-EP-0150	E of 216-AS-8 Crib		1985		Soil	Soil	no	576400	136300	1.66	.	0.0001	.	.	0.01	.	.
WHC-EP-0150	E of 216-AS-8 Crib		1985		Soil	Soil	no	576500	136350	3.1	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-AS-8 Crib		1986		Vegetation	Vegetation	no	576500	136350	1.4	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-AS-8 Crib		1986		Litter	Litter	no	576500	136350	15.1	.	.	.	.	.	.	.
WHC-EP-0150	E of 216-AS-8 Crib		1986		Soil	Soil	no	576500	136350	.	.	.	.	.	.	1.49	.
WHC-EP-0150	E of 216-AS-8 Crib		1986		Vegetation	Vegetation	no	576500	136350	.	.	.	.	.	.	0.43	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	575750	135850	7.7	.	.	.	.	.	7.22	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Litter	Litter	no	575750	135850	4.83	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Mammals	Small mammals	no	575750	135850	0.18	.	.	.	.	.	2.37	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	575750	135850	0.5	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Vegetation	Vegetation	no	575750	135850	1	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	575750	135850	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	575750	135850	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	575750	135850	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Litter	Litter	no	575725	135850	0.97	.	.	.	.	.	1.08	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	575725	135850	10.4	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	575725	135850	2.01	.	0.0002	.	.	0.3	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	575725	135850	1.17	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	575600	135775	0.45	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	575600	135775	0.88	.	.	.	.	.	0.41	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	575600	135775	1.02	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	575600	135775	0.37	.	0.0004	.	.	0.07	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	575600	135775	0.29	.	.	.	.	.	4.1	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	575600	135850	9.77	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0150	E of 241-AP Tank Farm		1985		Litter	Litter	no	575600	135850	22.7	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	575600	135850	13.4	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Vegetation	Vegetation	no	575600	135850	0.28	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	575750	135850	2.79	.	0.0008	.	.	0.12	1.1	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Vegetation	Vegetation	no	575750	135850	0.47	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	575725	135850	1.63	.	0.001	.	.	0.07	0.73	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	575725	135850	4.68	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	575725	135850	.	.	.	.	.	.	1.71	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	575725	135850	2.45	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	575725	135850	0.94	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	575750	135775	4.89	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Litter	Litter	no	575750	135775	28.1	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	575750	135775	3.44	.	0.0009	.	.	0.06	0.83	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Vegetation	Vegetation	no	575750	135775	0.83	.	.	.	.	.	0.99	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Litter	Litter	no	576100	135775	24.2	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	576100	135775	1.21	.	.	.	.	0.02	0.83	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	576100	135775	13.8	.	.	.	.	.	3.02	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	576100	135775	4.07	.	0.002	.	.	0.11	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	576100	135775	0.85	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	576150	135775	8.63	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	576150	135775	2.1	.	0.0004	.	.	.	0.88	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Vegetation	Vegetation	no	576150	135775	0.69	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	576150	135775	20.1	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	576250	135770	.	.	.	.	.	.	1.4	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0150	E of 241-AP Tank Farm		1985		Litter	Litter	no	576250	135770	34.8	.	.	.	.	.	6.1	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	576250	135770	3.15	.	0.0001	.	.	0.04	0.98	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	576250	135770	7.43	.	.	.	.	.	1.41	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	576250	135770	22.2	.	.	.	.	.	3.28	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	576250	135770	2.88	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	576250	135770	0.42	.	.	.	.	.	0.72	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	576450	135770	10.8	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Litter	Litter	no	576450	135770	11.3	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	576450	135770	2.44	.	0.0003	.	.	0.02	0.88	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	576450	135770	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	576450	135770	0.41	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	576500	135770	3.36	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Vegetation	Vegetation	no	576500	135770	0.89	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	576500	135770	5.61	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	576500	135770	6.41	.	.	.	.	.	1.88	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	576500	135770	2.6	.	0.0008	.	.	0.04	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	576600	135770	11.4	.	.	.	.	.	2.26	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Litter	Litter	no	576600	135770	15.2	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	576600	135770	2.26	.	0.0004	.	.	0.02	0.66	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	576600	135770	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	576700	135770	1.58	.	0.0003	.	.	0.01	0.66	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Vegetation	Vegetation	no	576700	135770	0.58	.	.	.	.	.	1.52	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	576700	135770	8.18	.	.	.	.	.	1.58	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	576700	135770	7.58	.	.	.	.	.	1.48	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	576700	135770	1.13	.	0.0001	.	.	0.02	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	576700	135770	0.66	.	.	.	.	.	1.81	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	575850	135775	2.16	.	.	.	.	0.02	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	575850	135775	3.18	.	.	.	.	.	0.82	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	575850	135775	8.87	.	.	.	.	.	3.38	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	575850	135775	0.94	.	0.0007	.	.	0.1	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	575850	135775	.	.	.	.	.	.	0.81	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	575900	135850	15.9	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Litter	Litter	no	575900	135850	28.2	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Mammals	Small mammals	no	575900	135850	-0.15	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	575900	135850	1.29	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Vegetation	Vegetation	no	575900	135850	1.08	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Litter	Litter	no	575750	135875	23.4	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Mammals	Small mammals	no	575750	135875	-0.03	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	575750	135875	1.52	.	0.0005	.	.	0.02	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	575750	135875	6.98	.	.	.	.	.	1.54	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	575750	135875	1.11	.	0.001	.	.	0.08	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	575750	135875	0.64	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	576050	135900	5.5	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	576050	135900	1.47	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Vegetation	Vegetation	no	576050	135900	1.4	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	576050	135900	14.6	.	.	.	.	.	2.66	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	576850	135600	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	576850	135600	.	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	576850	135600	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	576850	135600	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1985		Soil	Soil	no	576900	135500	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	576900	135500	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Litter	Litter	no	576900	135500	.	.	.	.	.	.	.	.
WHC-EP-0150	E of 241-AP Tank Farm		1986		Soil	Soil	no	576900	135500	-0.34	.	.	.	.	.	.	.
WHC-EP-0150	N of 207-A-62		1985		Cryptogam	Cryptogam	no	575750	135750	0.08	.	.	.	.	.	.	.
WHC-EP-0150	N of 207-A-62		1985		Litter	Litter	no	575750	135750	6.32	.	.	.	.	.	.	.
WHC-EP-0150	N of 207-A-62		1985		Soil	Soil	no	575750	135750	0.42	.	.	.	.	.	.	.
WHC-EP-0150	N of 207-A-62		1985		Vegetation	Vegetation	no	575750	135750	0.43	.	.	.	.	.	.	.
WHC-EP-0150	N of 207-A-62		1986		Cryptogam	Cryptogam	no	575750	135750	.	.	.	.	.	.	.	.
WHC-EP-0150	N of 207-A-62		1986		Litter	Litter	no	575750	135750	1.19	.	.	.	.	.	0.65	.
WHC-EP-0150	N of 207-A-62		1986		Soil	Soil	no	575750	135750	.	.	.	.	.	.	.	.
WHC-EP-0150	N of 207-A-62		1986		Vegetation	Vegetation	no	575750	135750	0.12	.	.	.	.	.	0.24	.
WHC-EP-0150	N of 216-A-37-1 Crib		1985		Cryptogam	Cryptogam	no	575725	135700	5.33	.	.	.	.	.	1.15	.
WHC-EP-0150	N of 216-A-37-1 Crib		1985		Litter	Litter	no	575725	135700	8.78	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-1 Crib		1985		Soil	Soil	no	575725	135700	4.59	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-1 Crib		1986		Soil	Soil	no	575725	135700	.	.	.	.	.	.	0.8	.
WHC-EP-0150	N of 216-A-37-2 Crib		1985		Cryptogam	Cryptogam	no	575750	135700	17.7	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-2 Crib		1985		Soil	Soil	no	575750	135700	1.68	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-2 Crib		1985		Vegetation	Vegetation	no	575750	135700	0.51	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-2 Crib		1986		Litter	Litter	no	575750	135700	22.2	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-2 Crib		1986		Soil	Soil	no	575750	135700	2.1	.	0.0006	.	.	0.06	.	.
WHC-EP-0150	N of 216-A-37-2 Crib		1986		Vegetation	Vegetation	no	575750	135700	.	.	.	.	.	.	-0.34	.
WHC-EP-0150	N of 216-A-37-2 Crib		1985		Cryptogam	Cryptogam	no	576150	135600	5.4	.	.	.	.	.	1.6	.
WHC-EP-0150	N of 216-A-37-2 Crib		1985		Litter	Litter	no	576150	135600	10.1	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-2 Crib		1985		Soil	Soil	no	576150	135600	1.25	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0150	N of 216-A-37-2 Crib		1986		Vegetation	Vegetation	no	576150	135600	0.43	.	.	.	.	.	1.14	.
WHC-EP-0150	N of 216-A-37-2 Crib		1985		Litter	Litter	no	576500	135550	1.96	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-2 Crib		1985		Soil	Soil	no	576500	135550	0.73	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-2 Crib		1985		Vegetation	Vegetation	no	576500	135550	0.45	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-2 Crib		1986		Cryptogam	Cryptogam	no	576500	135550	4.2	.	.	.	.	.	0.98	.
WHC-EP-0150	N of 216-A-37-2 Crib		1986		Litter	Litter	no	576500	135550	.	.	.	.	.	.	.	.
WHC-EP-0150	N of 216-A-37-2 Crib		1986		Soil	Soil	no	576500	135550	0.55	.	0.0003	.	.	0.01	0.65	.
WHC-EP-0150	NE of 241-AP Tank Farm		1985		Litter	Litter	no	576100	136600	9.61	.	.	.	.	.	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1985		Soil	Soil	no	576100	136600	1.31	.	0.0001	.	.	0.01	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	576100	136600	12.4	.	.	.	.	.	1.87	.
WHC-EP-0150	NE of 241-AP Tank Farm		1986		Litter	Litter	no	576100	136600	.	.	.	.	.	.	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1986		Soil	Soil	no	576100	136600	2.92	.	0.0006	.	.	0.04	0.53	.
WHC-EP-0150	NE of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	576100	136600	1.13	.	.	.	.	.	1	.
WHC-EP-0150	NE of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	576150	136050	13.9	.	.	.	.	.	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1985		Soil	Soil	no	576150	136050	1.48	.	.	.	.	.	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1985		Vegetation	Vegetation	no	576150	136050	1.39	.	.	.	.	.	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1986		Litter	Litter	no	576150	136050	4.74	.	.	.	.	.	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1985		Cryptogam	Cryptogam	no	576250	136090	6.69	.	.	.	.	.	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1985		Litter	Litter	no	576250	136090	25.4	.	.	.	.	.	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1985		Soil	Soil	no	576250	136090	0.9	.	0.0003	.	.	0.01	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1986		Cryptogam	Cryptogam	no	576250	136090	4.78	.	.	.	.	.	0.84	.
WHC-EP-0150	NE of 241-AP Tank Farm		1986		Litter	Litter	no	576250	136090	.	.	.	.	.	.	.	.
WHC-EP-0150	NE of 241-AP Tank Farm		1986		Soil	Soil	no	576250	136090	0.95	.	0.0001	.	.	0.02	0.54	.
WHC-EP-0150	NE of 241-AP Tank Farm		1986		Vegetation	Vegetation	no	576250	136090	2.61	.	.	.	.	.	0.12	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0150	S of 216-A-24		1985		Cryptogam	Cryptogam	no	575600	136250	68.2	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1985		Mammals		no	575600	136250	0	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1985		Soil	Soil	no	575600	136250	50.8	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1986		Cryptogam	Cryptogam	no	575600	136250	.	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1986		Litter	Litter	no	575600	136250	36.4	.	.	.	.	.	5.72	.
WHC-EP-0150	S of 216-A-24		1986		Soil	Soil	no	575600	136250	55	.	0.0009	.	.	0.02	2.21	.
WHC-EP-0150	S of 216-A-24		1986		Vegetation	Vegetation	no	575600	136250	33.1	.	.	.	.	.	24.8	.
WHC-EP-0150	S of 216-A-24		1985		Litter	Litter	no	575750	136090	62.9	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1985		Mammals	Small mammals	no	575750	136090	0.11	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1985		Soil	Soil	no	575750	136090	1.94	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1985		Vegetation	Vegetation	no	575750	136090	0.97	.	.	.	.	.	2.48	.
WHC-EP-0150	S of 216-A-24		1986		Cryptogam	Cryptogam	no	575750	136090	49.4	.	.	.	.	.	4.78	.
WHC-EP-0150	S of 216-A-24		1986		Vegetation	Vegetation	no	575750	136090	.	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1985		Cryptogam	Cryptogam	no	575850	136250	18.6	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1985		Litter	Litter	no	575850	136250	70.8	.	.	.	.	.	2.78	.
WHC-EP-0150	S of 216-A-24		1985		Mammals	Small mammals	no	575850	136250	0.14	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1985		Soil	Soil	no	575850	136250	4.17	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1985		Vegetation	Vegetation	no	575850	136250	0.8	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1986		Soil	Soil	no	575850	136250	1.99	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-24		1986		Vegetation	Vegetation	no	575850	136250	.	.	.	.	.	.	1.56	.
WHC-EP-0150	S of 216-A-30 Crib		1985		Cryptogam	Cryptogam	no	576150	135375	1.73	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-30 Crib		1985		Soil	Soil	no	576150	135375	1.91	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-30 Crib		1986		Litter	Litter	no	576150	135375	1.45	.	.	.	.	.	0.58	.
WHC-EP-0150	S of 216-A-30 Crib		1986		Soil	Soil	no	576150	135375	1.72	.	0.0004	.	.	0.01	.	.
WHC-EP-0150	S of 216-A-30 Crib		1986		Vegetation	Vegetation	no	576150	135375	0.39	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-30 Crib		1985		Cryptogam	Cryptogam	no	575750	135450	3.76	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-30 Crib		1985		Litter	Litter	no	575750	135450	.	.	.	.	.	.	1.38	.
WHC-EP-0150	S of 216-A-30 Crib		1985		Soil	Soil	no	575750	135450	0.57	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-30 Crib		1985		Vegetation	Vegetation	no	575750	135450	0.59	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-30 Crib		1986		Cryptogam	Cryptogam	no	575750	135450	.	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-30 Crib		1986		Litter	Litter	no	575750	135450	14.8	.	.	.	.	.	5.25	.
WHC-EP-0150	S of 216-A-30 Crib		1986		Soil	Soil	no	575750	135450	0.78	.	.	.	.	.	0.42	.
WHC-EP-0150	S of 216-A-30 Crib		1985		Litter	Litter	no	575800	135530	2.18	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-30 Crib		1985		Soil	Soil	no	575800	135530	1.18	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-30 Crib		1985		Vegetation	Vegetation	no	575800	135530	0.32	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-30 Crib		1986		Cryptogam	Cryptogam	no	575800	135530	1.68	.	.	.	.	.	0.87	.
WHC-EP-0150	S of 216-A-30 Crib		1986		Soil	Soil	no	575800	135530	0.78	.	0.0006	.	.	0.01	.	.
WHC-EP-0150	S of 216-A-8		1985		Cryptogam	Cryptogam	no	575900	136100	900	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Soil	Soil	no	575900	136100	7.26	.	.	.	.	.	.	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0150	S of 216-A-8		1986		Cryptogam	Cryptogam	no	575900	136100	36.6	.	.	.	.	.	2.44	.
WHC-EP-0150	S of 216-A-8		1986		Litter	Litter	no	575900	136100	20.9	.	.	.	.	.	1.98	.
WHC-EP-0150	S of 216-A-8		1986		Soil	Soil	no	575900	136100	10.7	.	0.0007	.	.	0.04	0.46	.
WHC-EP-0150	S of 216-A-8		1986		Vegetation	Vegetation	no	575900	136100	1.62	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Litter	Litter	no	575750	136090	96.3	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Soil	Soil	no	575750	136090	8.21	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Vegetation	Vegetation	no	575750	136090	1.51	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1986		Cryptogam	Cryptogam	no	575750	136090	12.1	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Cryptogam	Cryptogam	no	575600	136090	27.7	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Soil	Soil	no	575600	136090	40	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1986		Litter	Litter	no	575600	136090	23.9	.	.	.	.	.	4.35	.
WHC-EP-0150	S of 216-A-8		1986		Soil	Soil	no	575600	136090	5.15	.	0.0002	.	.	0.02	.	.
WHC-EP-0150	S of 216-A-8		1986		Vegetation	Vegetation	no	575600	136090	1.24	.	.	.	.	.	2.49	.
WHC-EP-0150	S of 216-A-8		1985		Cryptogam	Cryptogam	no	575750	136050	7.7	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Litter	Litter	no	575750	136050	15.4	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Soil	Soil	no	575750	136050	1.12	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Vegetation	Vegetation	no	575750	136050	0.63	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1986		Soil	Soil	no	575750	136050	4.02	.	0.0005	.	.	0.03	.	.
WHC-EP-0150	S of 216-A-8		1985		Cryptogam	Cryptogam	no	575750	136090	9.9	.	.	.	.	.	1.69	.
WHC-EP-0150	S of 216-A-8		1985		Litter	Litter	no	575750	136090	27	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Soil	Soil	no	575750	136090	3.05	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Vegetation	Vegetation	no	575750	136090	0.43	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Cryptogam	Cryptogam	no	575750	136050	3.1	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Mammals	Small mammals	no	575750	136050	0.05	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Soil	Soil	no	575750	136050	1.83	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Vegetation	Vegetation	no	575750	136050	1.1	.	.	.	.	.	1.99	.
WHC-EP-0150	S of 216-A-8		1986		Litter	Litter	no	575750	136050	.	.	.	.	.	.	1.31	.
WHC-EP-0150	S of 216-A-8		1986		Soil	Soil	no	575750	136050	2.12	.	0.0002	.	.	0.02	.	.
WHC-EP-0150	S of 216-A-8		1985		Cryptogam	Cryptogam	no	575725	136050	8.84	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Litter	Litter	no	575725	136050	28.2	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Mammals	Small mammals	no	575725	136050	0.11	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Soil	Soil	no	575725	136050	0.54	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1986		Cryptogam	Cryptogam	no	575725	136050	.	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1986		Litter	Litter	no	575725	136050	.	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1986		Soil	Soil	no	575725	136050	1.8	.	0.0003	.	.	0.02	.	.
WHC-EP-0150	S of 216-A-8		1986		Vegetation	Vegetation	no	575725	136050	0.73	.	.	.	.	.	1.27	.
WHC-EP-0150	S of 216-A-8		1985		Litter	Litter	no	575900	135950	10.1	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Soil	Soil	no	575900	135950	4.37	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1986		Cryptogam	Cryptogam	no	575900	135950	7.45	.	.	.	.	.	1.65	.

Table C-1. Data Table. (98 Pages)

Source	samp_site_name	samp_num	Year	samp_item	samp_from	Medium	Qualifiers	Easting	Northing	Cesium-137	Cesium-137_code	Plutonium-238	Plutonium-238_code	Plutonium-239_240	Plutonium-239_240_code	Strontium-90	Strontium-90_code
WHC-EP-0150	S of 216-A-8		1986		Soil	Soil	no	575900	135950	1.95	.	0.0009	.	.	0.13	.	.
WHC-EP-0150	S of 216-A-8		1986		Vegetation	Vegetation	no	575900	135950	0.48	.	.	.	.	.	1.26	.
WHC-EP-0150	S of 216-A-8		1985		Cryptogam	Cryptogam	no	576050	136050	2.7	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Litter	Litter	no	576050	136050	4	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Soil	Soil	no	576050	136050	2.28	.	.	.	.	.	.	.
WHC-EP-0150	S of 216-A-8		1985		Vegetation	Vegetation	no	576050	136050	0.56	.	.	.	.	.	.	.

BHI-00032, *Ecological Sampling at Four Waste Sites in the 200 Areas.*
BHI-00172, *Preoperational Environmental Baseline Survey Conducted at the Environmental Restoration Disposal Facility (ERDF).*
DOE/RL-92-24, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes.*
DOE/RL-95-55, *Hanford Site Background: Evaluation of Existing Soil Radionuclide Data.*
DOE/RL-96-12, *Hanford Site Background: Part 2, Soil Background for Radionuclides.*
Duratek, *Soil and Biota Collections at Gable Mountain Pond, B-Pond and Control Site.*
HNF-6150, *Preoperational Environmental Survey for the Spent Nuclear Fuel Project Facilities.*
RHO-RE-ST-45P, *PUREX Preoperational Environmental Survey Report.*
WHC-EP-0150, *Grout Treatment Facility Environmental Baseline and Site Characterization Report.*
WHC-EP-0771, *Comparison of Radionuclide Levels in Soil, Sagebrush, Plant Litter, Cryptogams, and Small Mammals.*
WHC-SD-C018H-RPT-004, *Preoperational Environmental Survey Report: 200 Areas Effluent Treatment Facility (ETF), State Approved Land Disposal Structure (SALDS), and Liquid Effluent Retention Facility (LERF) (C018H).*

DOH = U.S. Department of Health.
EMA = elevated-metals area.
FFTF = Fast Flux Test Facility.
HGP = Hanford Generating Project.
HRNM = Hanford Reach National Monument.
SDA = suspected diesel-contaminated area.
TWRS = Tank Waste Remediation System.
WSU = Washington State University.

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APPENDIX D

SUMMARY OF 200 WEST AREA CARBON TETRACHLORIDE SOIL-GAS DATA ASSESSMENT

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APPENDIX D

SUMMARY OF 200 WEST AREA CARBON TETRACHLORIDE SOIL-GAS DATA ASSESSMENT

D1.0 INTRODUCTION

Carbon tetrachloride was used extensively at the Hanford Site, mainly in the plutonium recovery process. Discharges of process wastes to the soil column have resulted in a dispersed carbon tetrachloride plume in the 200 West Area vadose zone and underlying groundwater. Since 1994, the Hanford Site has been pursuing carbon tetrachloride remediation activities using soil-vapor extraction and groundwater pump-and-treat operations. Because carbon tetrachloride can partition into a gas phase, the focus of the carbon tetrachloride Phase III investigation is on the soil-gas exposure pathway to burrowing small mammals.

As part of the data assessment for the Phase III ecological data quality objective, two types of data from the Hanford Site soil-gas monitoring program were evaluated based on subsurface air as an exposure medium for the Central Plateau. Subsurface air samples that were actively withdrawn from the subsurface into Tedlar[1] bags for subsequent analysis were compiled and compared to an inhalation-based ecological screening level (ESL) developed for carbon tetrachloride (Chapter 4.0 of the main text). Carbon tetrachloride samples measured in this manner are considered "active-gas" data. In addition, EMFLUX[2] tubes, which consist of a glass beaker housing a proprietary resin to sorb carbon tetrachloride, also were placed in top soil, collected after 72 hours, and analyzed; these results are referred to as "passive-gas" data. Passive soil-gas data are not directly comparable to the ESL; however, these results were evaluated and mapped to determine the relative magnitude of carbon tetrachloride vapors in near-surface soils of the 200 West Area.

This appendix summarizes the sources of available data, describes the data assessment methodology, and reports results of the data assessment for carbon tetrachloride soil-gas samples in the Hanford Site 200 West Area.

D2.0 SUMMARY OF DATA USED

Both active and passive soil-gas data were evaluated in the data assessment. The following subsections describe the sources and extent of available data.

D2.1 ACTIVE SOIL-GAS DATA

Carbon tetrachloride data were compiled from numerous sources representing active soil-gas conditions in the 200 West Area between 1992 and 2003. Active-gas data represent 16 general

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[1] Tedlar is a registered trademark of E. I. du Pont de Nemours and Company, Wilmington, Delaware.

[2] EMFLUX is a trademark of BEACON Environmental Services, Inc., Bel Air, Maryland.

investigation areas (Table D-1). Passive soil-gas sampling locations included the Plutonium Finishing Plant (PFP) Area, Z-1A Crib area, Site Z-9, and Site TX-TY. Northing and easting global positioning system coordinates were available for many sample results. Where coordinates were not available, locations were extrapolated based on the sample location description or from hard-copy maps in the accompanying monitoring reports in which the data were published.

Analyses of soil-gas data were limited to depths between 0 and 4.6 m (0 and 15 ft) below ground surface (bgs). Depths beyond 4.6 m (15 ft) are not representative of likely exposures to burrowing mammals, because the biologically active zone typically is shallower than 4.6 m (WMP-20570, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase I*, Section 2.1).

Sites where active soil-gas data were collected are listed in WHC-SD-EN-TI-063, *FY1992 Site Characterization Status Report and Data Package for Carbon Tetrachloride*, and CP-13514, *200-PW-1 Operable Unit Report on Step I Sampling and Analysis of the Dispersed Carbon Tetrachloride Vadose Zone Plume*. Between 1992 and 2003, 721 active shallow (0 to 4.6 m [0 to 15 ft] bgs) soil-gas samples were collected and analyzed for carbon tetrachloride. All active-gas data were reported in parts per million per unit volume (ppmv). Because both active-gas data and the inhalation ESL are reported in mass per unit volume, no unit conversions were required for comparing these data.

D2.2 PASSIVE SOIL-GAS DATA

Carbon tetrachloride passive soil-gas data were compiled from electronic reports and represent near-surface soil-gas conditions in the 200 West Area. Four hundred and twenty-one passive soil-gas sample results were available to characterize the magnitude of carbon tetrachloride present in near-surface soils (0 to 1.5 m bgs). Data were collected in 72-hour sampling events in the 200 West Area during 2003 and 2004. Passive soil-gas data were reported in nanograms based on the cumulative amount sorbed to the resin over the 72-hour period. Passive soil-gas sampling locations included the PFP Area, Z-1A Crib area, Site Z-9, and Site TX-TY. Northing and easting global positioning system coordinates were available for the majority of sample results. Locations for some samples were extrapolated based on the sample location description or from accompanying maps. However, for some data, no locational information was available.

D3.0 DATA ANALYSIS

Active and passive soil-gas data were compiled electronically into separate worksheets for analysis (see Tables D-2 and D-3). The analysis and assessment methods are reported in the following sections for active and passive soil gas, respectively.

For Table D-2, active soil-gas results, the following data field descriptions are provided.

WMP-29253 REV 0

Active Soil-Gas Data Field Descriptions.

Column Header	Definition
Site	Site identification
Sample Location	General sample location
Depth (m)	Sample collection depth
Zone	Depth zone
Sample Year	Year sample was collected
Sample Date	Date sample was collected
EPA Method	U.S. Environmental Protection Agency method
Analyte	Carbon tetrachloride
Result (ppmv)	Results in parts per million volume
ESL (ppmv)	Ecological screening level in parts per million volume
HQ	Hazard quotient (unitless)
HQ Category	Hazard quotient ranking
Easting (m)	Easting coordinates
Northing (m)	Northing coordinates
Data Source	Source of the data
Comments	General observations

For Table D-3, passive soil-gas results, the following data field descriptions are provided.

Passive Soil-Gas Data Field Descriptions.

Column Header	Definition
Reference	Source of passive gas data
Sample Loc	General sample location
Sample Date	Date sample was collected
Sample No.	Unique identification code
EPA Method	U.S. Environmental Protection Agency method
Analyte	Carbon tetrachloride
Result	Nanograms carbon tetrachloride
Qualifier	Detection status
Easting (m)	Easting coordinates
Northing (m)	Northing coordinates
Grouping	Relative magnitude of CCl_4 mass

D3.1 ACTIVE SOIL-GAS ANALYSIS AND ASSESSMENT METHODS

Data analysis consisted of calculating hazard quotients (HQ) for each active-gas sample. Between 1992 and 2003, 721 active shallow (0 to 4.6 m bgs) soil-gas samples were collected and analyzed for carbon tetrachloride. Reported active soil-gas concentrations of carbon tetrachloride (in ppmv) were compared to the carbon tetrachloride inhalation ESL developed for the protection of fossorial mammals (ESL = 0.91 ppmv).[3] Results of the comparison were reported in terms of an HQ by dividing the analytical result by the ESL.

Where analytical results were reported as nondetect values and the detection limit was adequate for comparison to the ESL, results are plotted with an "X" (Figures D-1 through D-24). Values that were reported as less than detection but in excess of the ESL were inadequate for ESL comparison; therefore, HQs were not calculated. These data are identified as uncertainties, and plotted with an open circle in Figures D-1 through D-24. Because the emphasis of this assessment was to locate areas of elevated carbon tetrachloride, sampling locations with an HQ less than 1 were not plotted.

The data were summarized by location and year in terms of the number of samples collected, the range of sample collection depth, HQ range (including values less than 1), total frequency of exceedance of the ESL (i.e., total frequency of samples with HQ greater than 1), the frequency of ESL exceedance in the 0 to 1.5 m depth interval, the frequency of ESL exceedance in the 1.5 to 4.6 m depth interval, the maximum HQ, and the median and mean HQs (of HQs greater than 1). The location of the maximum HQ was identified for each site and year. Depth data were not available for any samples collected in 1992, 1994, or 1995. Depth data also were unavailable for several individual locations. These data are summarized in Tables D-4, D-5a, and D-5b.

Data were plotted by location and by year, with their relative magnitude of exceedance indicated by color. Figures D-1 through D-24 depict the locations and relative magnitude of exceedances of the ESL.

D3.2 PASSIVE SOIL-GAS ANALYSIS AND ASSESSMENT METHODS

Passive soil-gas data were compiled electronically from EMFLUX[4] and BEACON Environmental Services, Inc., data reports. Analytical results were obtained using EPA Methods 8021 and 8260B (from SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update III-A*) for EMFLUX and BEACON Environmental Services, Inc., results, respectively. Because passive soil-gas data were reported in terms of mass only, these data could not be compared to the available ESL and, consequently, HQs were not calculated.

To assess the relative concentrations and distribution of passive soil-gas data, results were plotted with concentration ranges (in nanograms) indicated by color. Figure D-25 depicts

[3] Derivation of the inhalation ESL is described in Chapter 4.0 of the main text.

[4] EMFLUX is a registered trademark of BEACON Environmental Services, Inc., Bel Air, Maryland.

passive soil-gas concentrations in the 200 West Area, with concentrations ranging from nondetect (indicated by an "X") to greater than 5000 ng.

D4.0 DATA ASSESSMENT RESULTS

D4.1 ACTIVE SOIL-GAS RESULTS

Of the 721 active soil-gas samples evaluated, 196 samples exceeded the small-mammal ESL of 0.91 ppmv for carbon tetrachloride (frequency of exceedance equals 27 percent). Reported HQs ranged from less than 1.0 to 79.9.

One hundred and three of the 721 samples were reported as nondetects (i.e., less than 1 ppmv), but these results were insufficient for HQ interpretation because the detection limit (1 ppmv) was greater than the ESL (0.91 ppmv). These 103 samples were retained as uncertainties, with a maximum magnitude of exceedance (HQ) of 1.1.

Active soil-gas sample data were grouped by investigation unit as reported in the data source documents (see Tables D-1 and D-4). Data also were grouped by year to qualitatively evaluate trends in concentrations over consecutive years (Tables D-5a and D-5b).

Maximum, median, and average HQs were calculated for each investigation unit. The greatest maximum, median, and average HQs were observed at the 200-ZP-2, pipeline to the 216-Z-12 Crib, 218-W-4C Burial Ground, and 216-Z-9 investigation units (Table D-2). Maximum HQs were 79.9, 68.2, 52.3, and 7.2 for each of these locations, respectively; however, only a single sample was collected at the pipeline to the 216-Z-12 Crib. The greatest median HQ was observed at the 200-ZP-2 investigation unit, with a value of 5.8. The highest average HQ exceedance (13.0) was observed at the 218-W-4C Burial Ground.

The greatest frequency of ESL exceedances (percentage of samples with HQ greater than 1) were observed in the following investigation units:

- 218-W-4C Burial Ground (100 percent)
- Pipeline to 216-Z-12 Crib (100 percent)
- 216-Z-9 (40 percent)
- 200-ZP-2 (38.1 percent).

Frequency of ESL exceedance is a function of sample size, and while all samples exceeded the carbon tetrachloride ESL for the 218-W-4C Burial Ground and the pipeline to the 216-Z-12 Crib, the sample sizes were 14 and 1, respectively. A greater number of samples were collected at the 216-Z-9 and 200-ZP-2 investigation units (248 and 176 samples, respectively), which may indicate a more prevalent contamination issue within these investigation units.

D4.2 PASSIVE SOIL-GAS RESULTS

Four hundred and twenty-one passive soil-gas sample results were evaluated to determine the magnitude of carbon tetrachloride present in near-surface soils (0 to 1.5 m bgs). Data were collected in 72-hour sampling events in the 200 West Area during 2003 and 2004. Carbon tetrachloride soil-gas concentrations ranged from 1 ng/sample to greater than 5000 ng/sample. Seventy-seven samples were reported as less than 25, indicating that detection limits were

variable between sampling events. The greatest number of samples (n=244) reported between 1 and 50 ng/sample carbon tetrachloride. Fifty-three samples contained between 50 and 100 ng carbon tetrachloride per sample. Twenty-seven samples contained between 100 and 200 ng/sample carbon tetrachloride. Two samples contained between 400 and 1000 ng/sample, and three samples contained between 1000 and 5000 ng/sample. One sample contained greater than 5000 ng carbon tetrachloride. These data are reported in Table D-3.

The highest measured passive soil-gas concentrations of carbon tetrachloride (1000 to 5100 ng) were localized to the vicinity of the 216-Z-1A site (Figure D-25). A secondary cluster of concentrations ranging from 100 to 400 ng was located in vicinity of the 216-Z-9 site, which is consistent with reports of elevated active soil-gas concentrations.

D5.0 REFERENCES

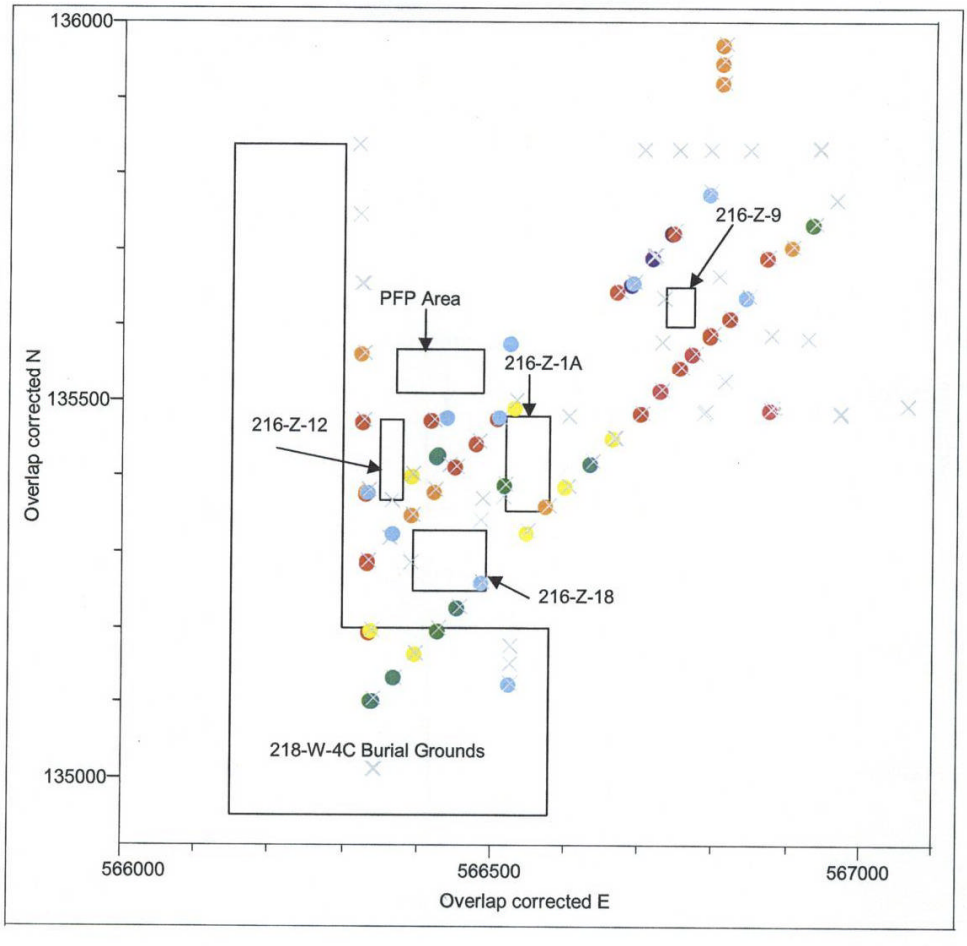
CP-13514, 2003, *200-PW-1 Operable Unit Report on Step I Sampling and Analysis of the Dispersed Carbon Tetrachloride Vadose Zone Plume*, Fluor Hanford, Inc., Richland, Washington.

SW-846, 1999, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update III-A*, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. The latest updated methods are online at www.epa.gov/SW-846/main.htm .

WHC-SD-EN-TI-063, 1993, *FY1992 Site Characterization Status Report and Data Package for Carbon Tetrachloride*, Westinghouse Hanford, Inc., Richland, Washington.

WMP-20570, 2005, *Central Plateau Terrestrial Ecological Risk Assessment Data Quality Objectives Summary Report – Phase I*, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

Figure D-1. Carbon Tetrachloride Active Soil-Gas Results for 200-ZP-2 Sites.



X = Value Reported as Nondetect
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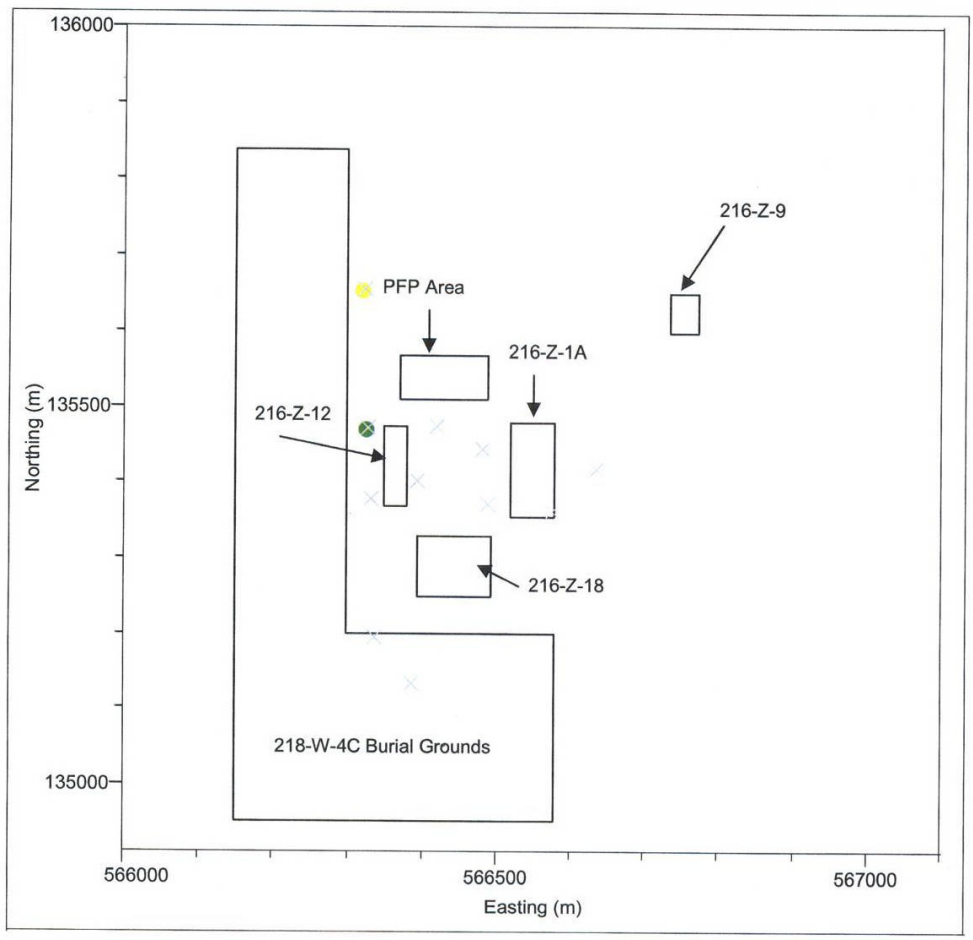
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-2. Carbon Tetrachloride Active Soil-Gas Results for 216-Z-1A Site.



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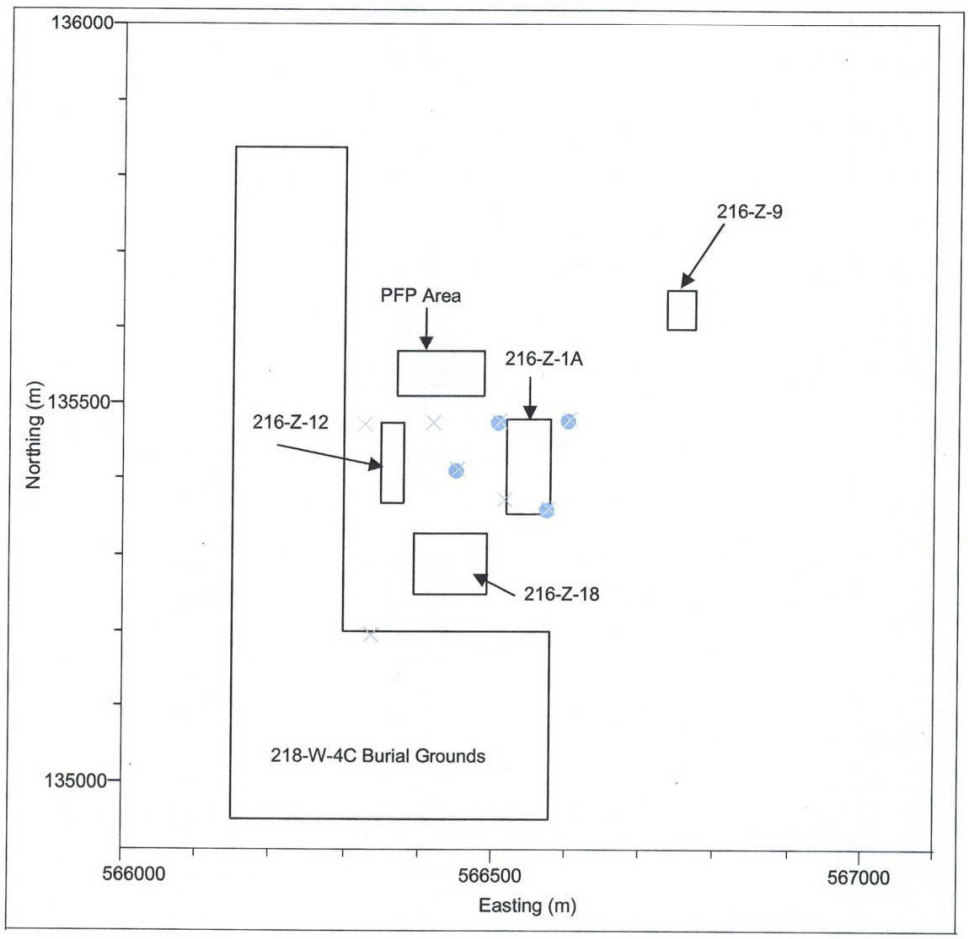
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-3. Carbon Tetrachloride Active Soil-Gas Results for 216-Z-1A/Z-18/Z-12 Site.



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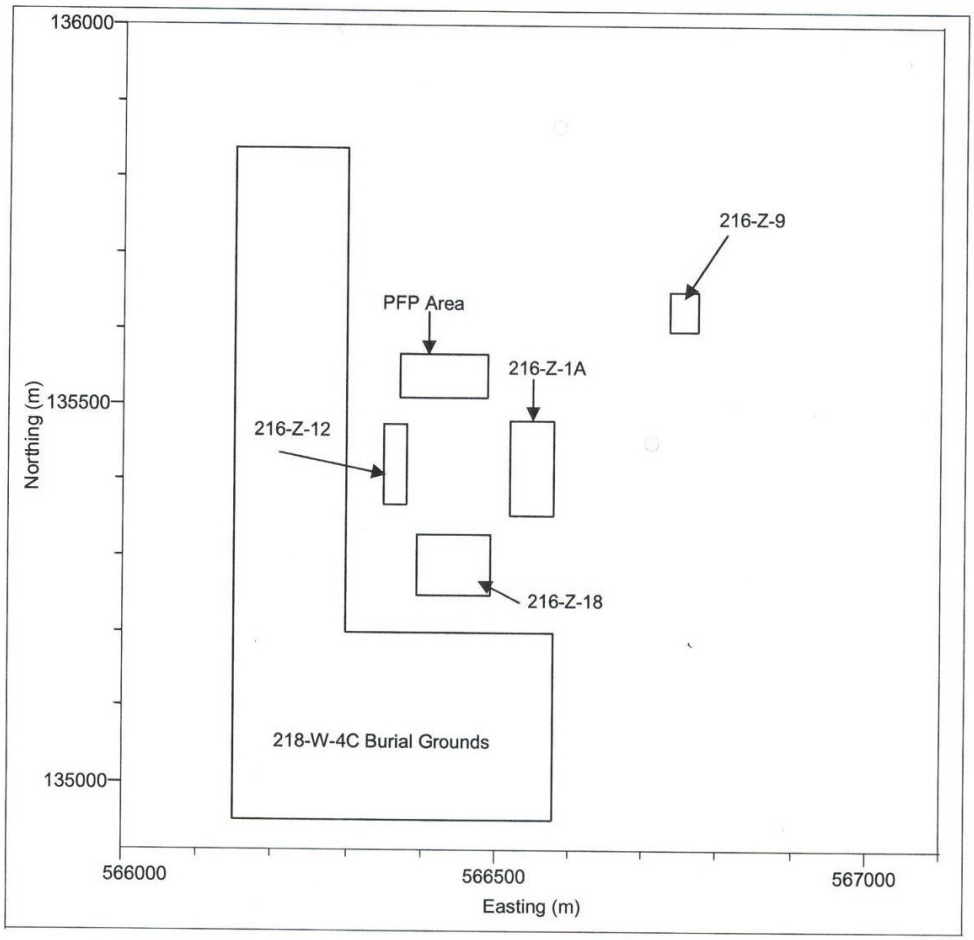
Aqua = 2 < HQ < 3
Green = 3 < HQ < 4
Yellow = 4 < HQ < 5
Orange = 5 < HQ < 10
Red = 10 < HQ < 25
Pink = 25 < HQ < 50
Purple = HQ > 50

Figure D-4. Carbon Tetrachloride Active Soil-Gas Results for 216-Z-1D/11/19/20 Ditches.



X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
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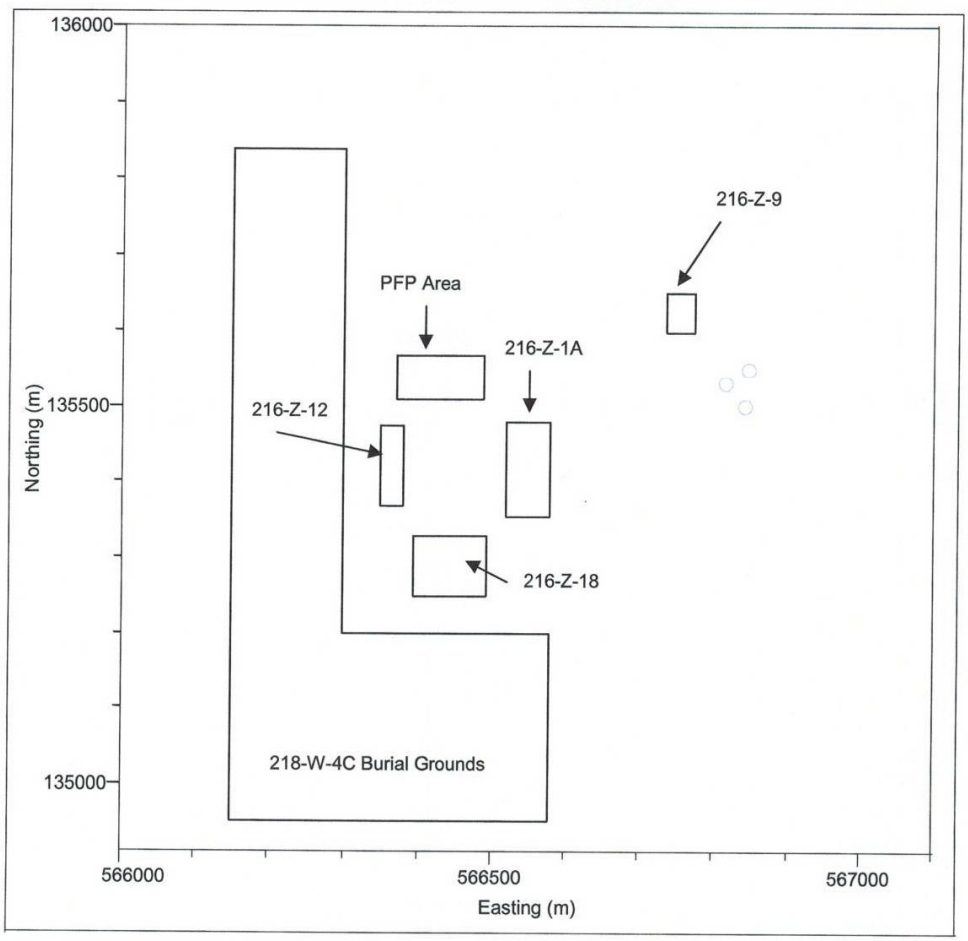
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-5. Carbon Tetrachloride Active Soil-Gas Results for 216-Z-21 Pond.



X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
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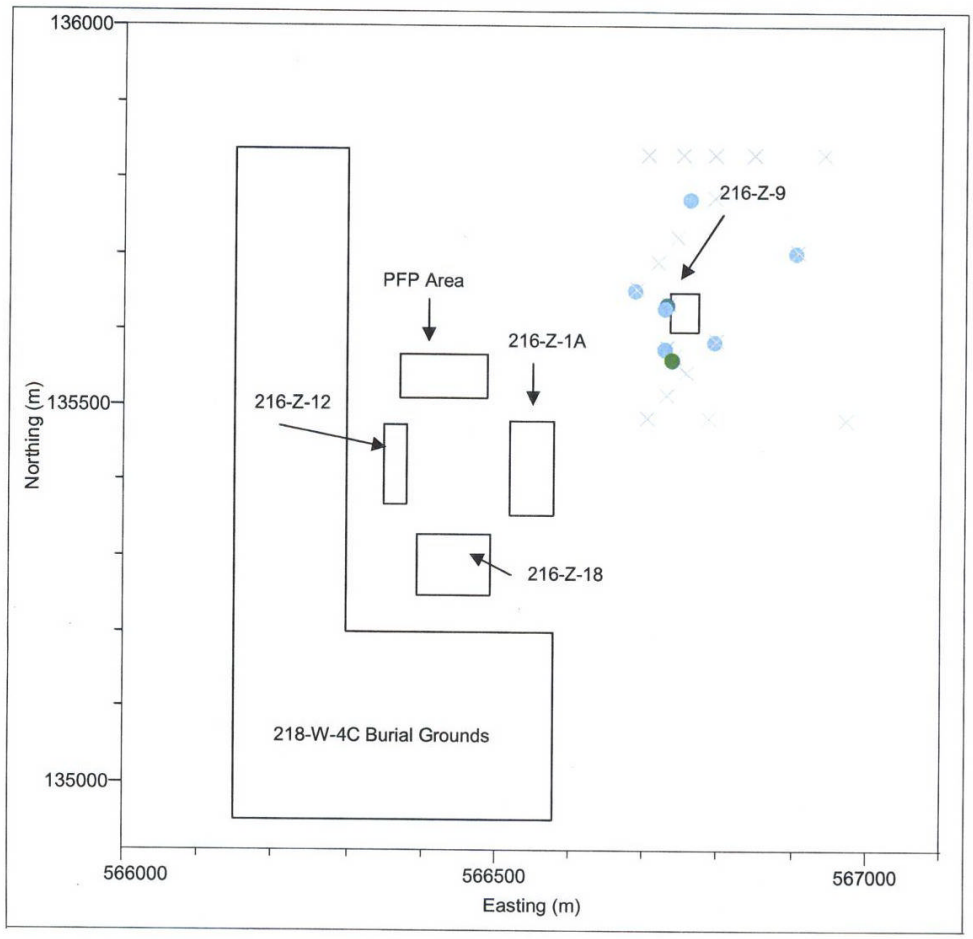
Aqua = 2 < HQ < 3
Green = 3 < HQ < 4
Yellow = 4 < HQ < 5
Orange = 5 < HQ < 10
Red = 10 < HQ < 25
Pink = 25 < HQ < 50
Purple = HQ > 50

Figure D-6. Carbon Tetrachloride Active Soil-Gas Results for 216-Z-9.



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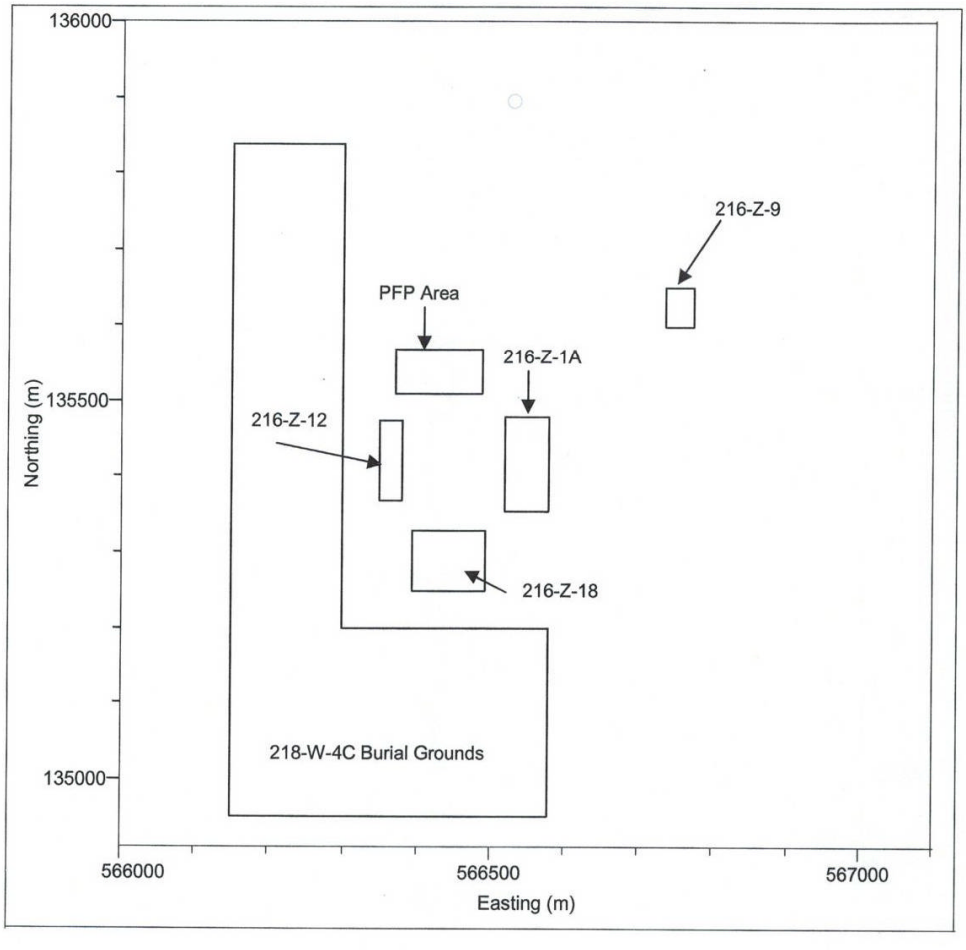
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-7. Carbon Tetrachloride Active Soil-Gas Results for 216-Z-D1/11/19/20 Ditches from 231-Z Building.



X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
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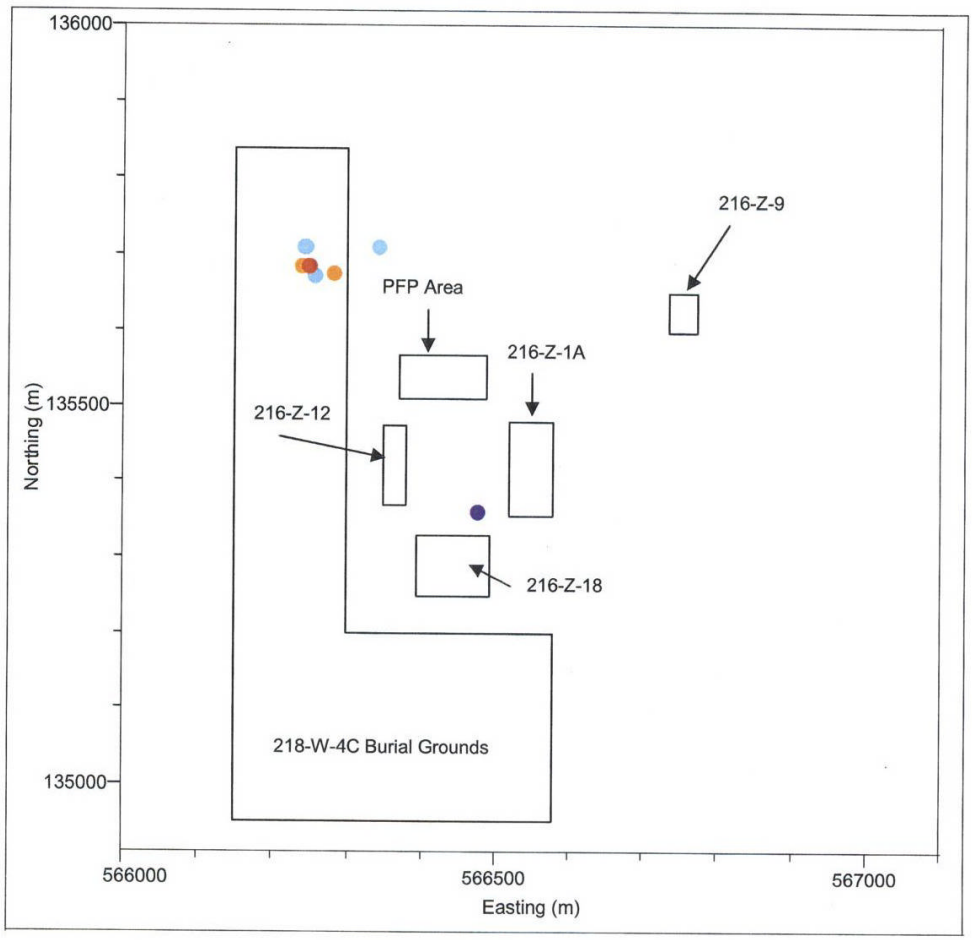
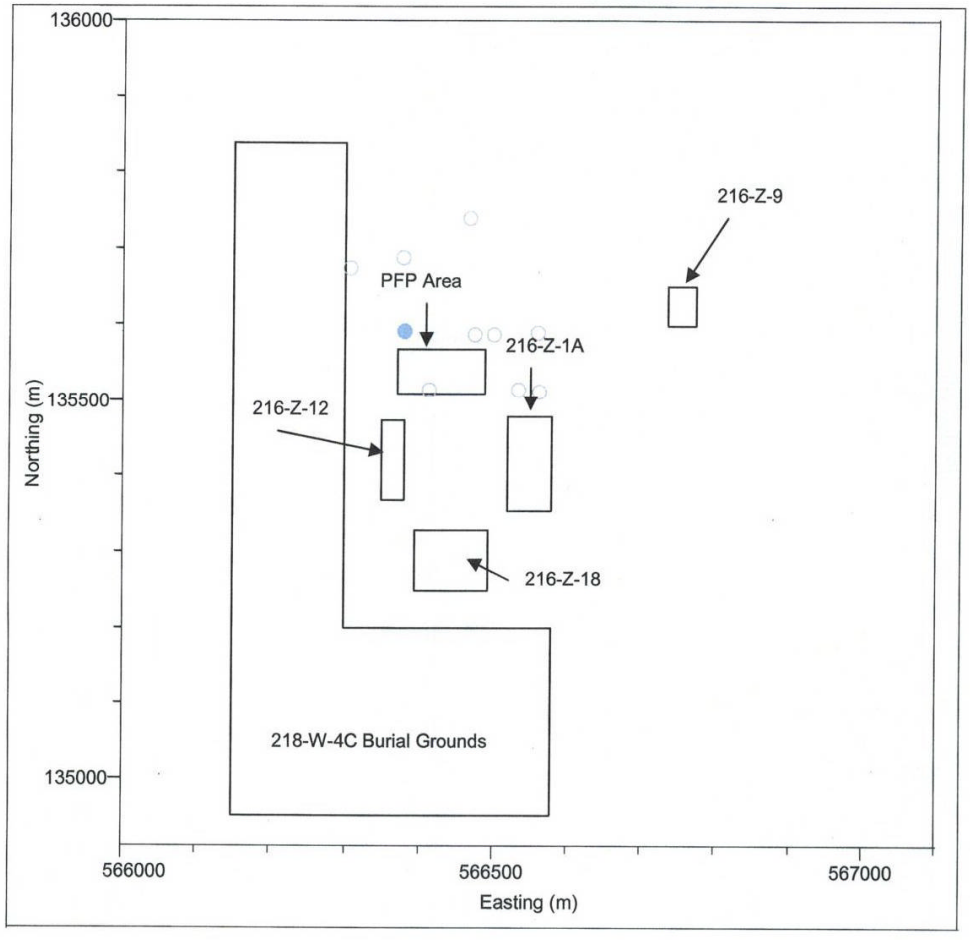
Aqua = 2 < HQ < 3
Green = 3 < HQ < 4
Yellow = 4 < HQ < 5
Orange = 5 < HQ < 10
Red = 10 < HQ < 25
Pink = 25 < HQ < 50
Purple = HQ > 50

Figure D-8. Carbon Tetrachloride Active Soil-Gas Results for 218-W-4C Burial Ground Trenches.



X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-9. Carbon Tetrachloride Active Soil-Gas Results for Boreholes.



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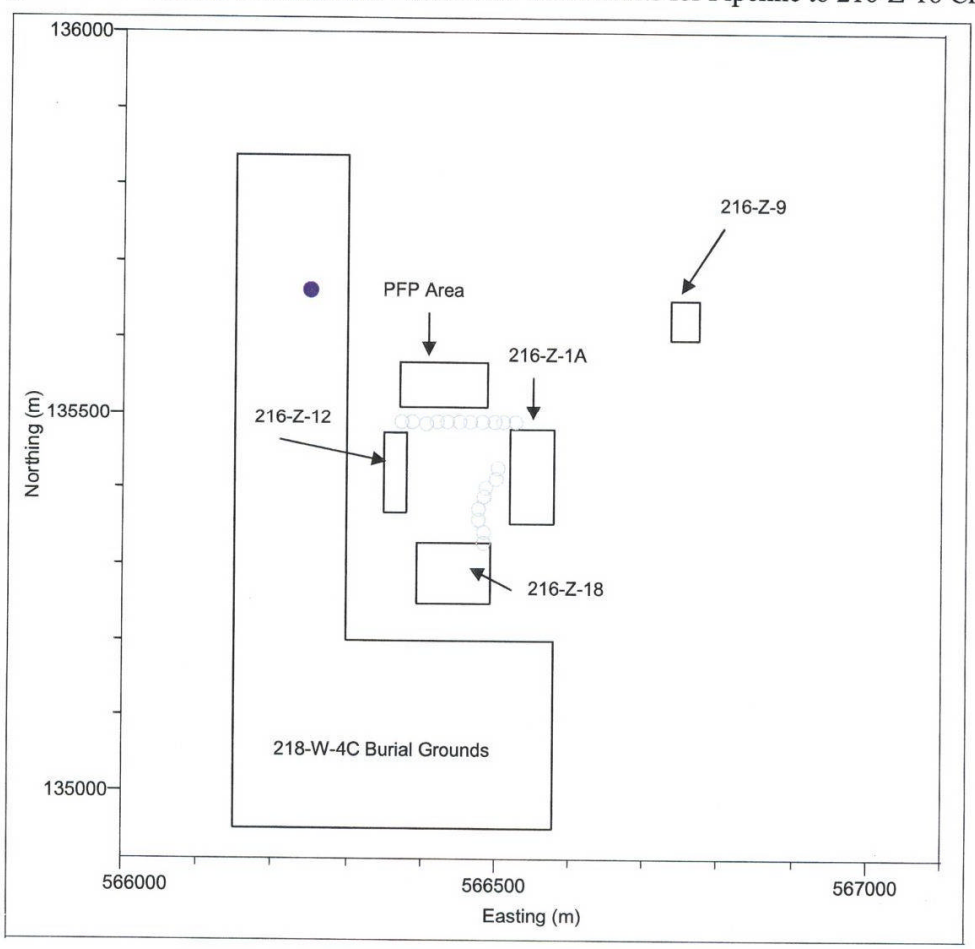
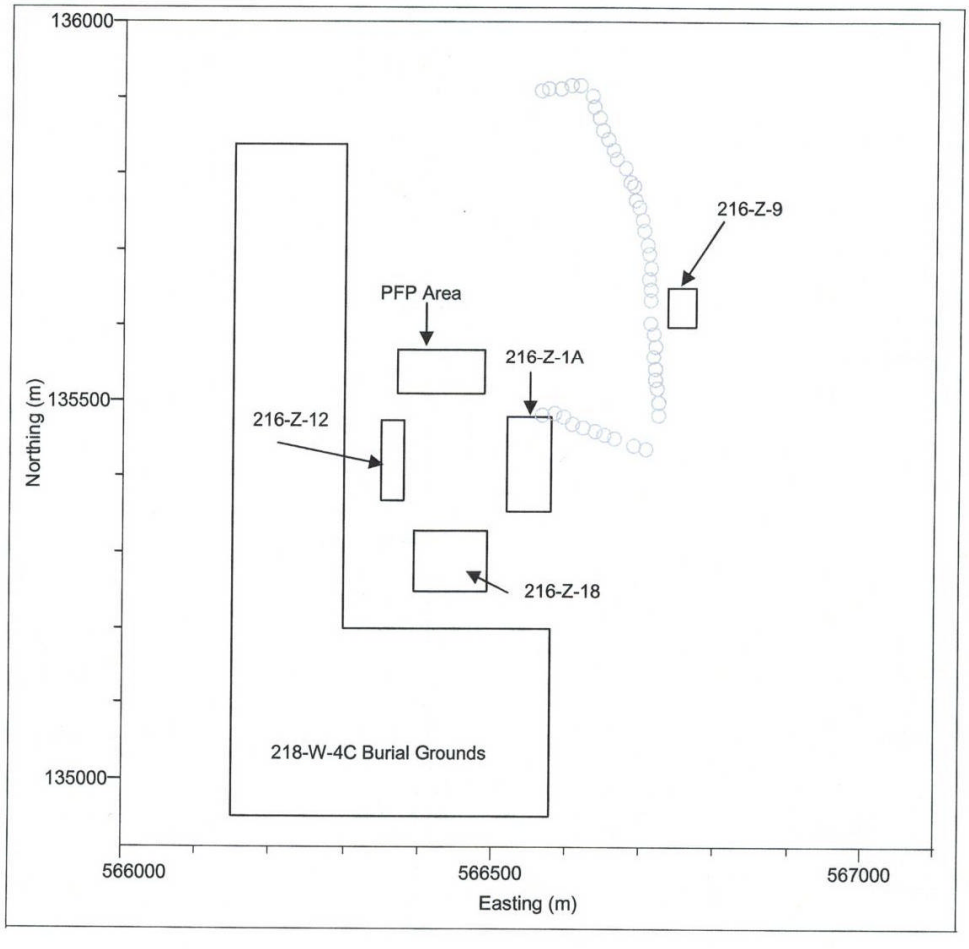
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-10. Carbon Tetrachloride Active Soil-Gas Results for Pipeline to 216-Z-18 Crib.



= Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-11. Carbon Tetrachloride Active Soil-Gas Results for Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building.



X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
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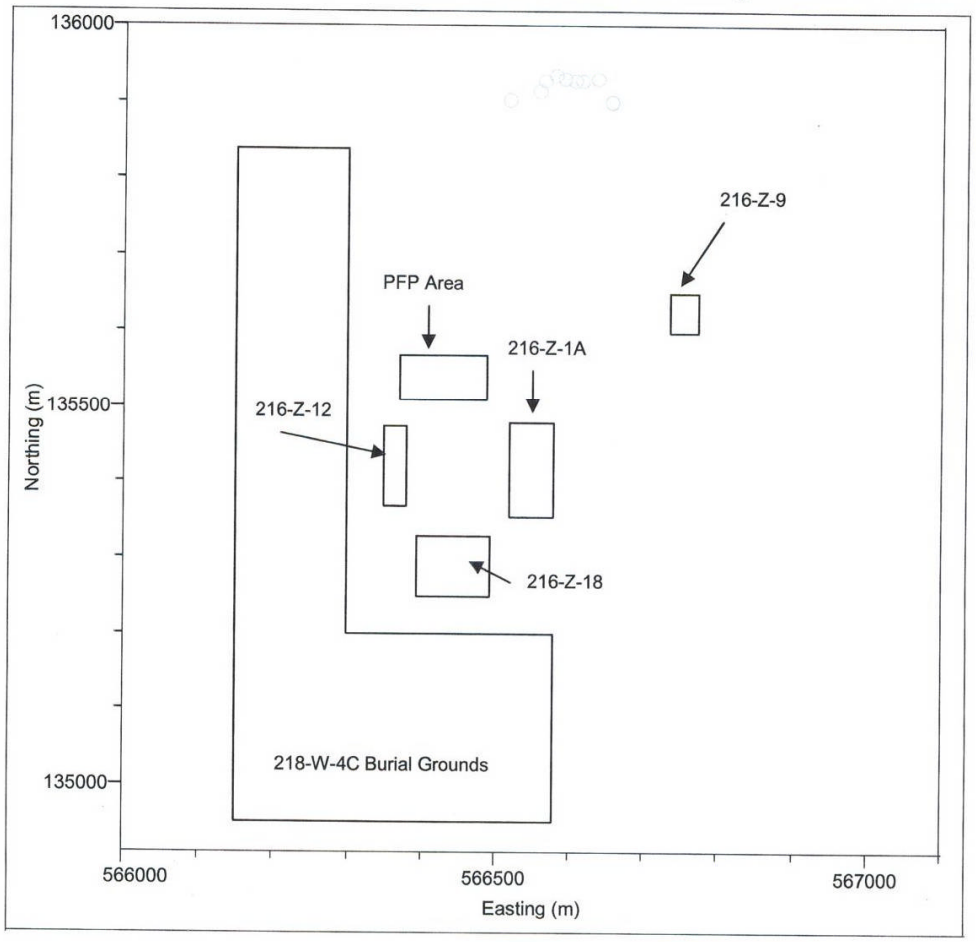
Aqua = 2 < HQ < 3
Green = 3 < HQ < 4
Yellow = 4 < HQ < 5
Orange = 5 < HQ < 10
Red = 10 < HQ < 25
Pink = 25 < HQ < 50
Purple = HQ > 50

Figure D-12. Carbon Tetrachloride Active Soil-Gas Results for Pipeline to 216-Z-7 Crib.



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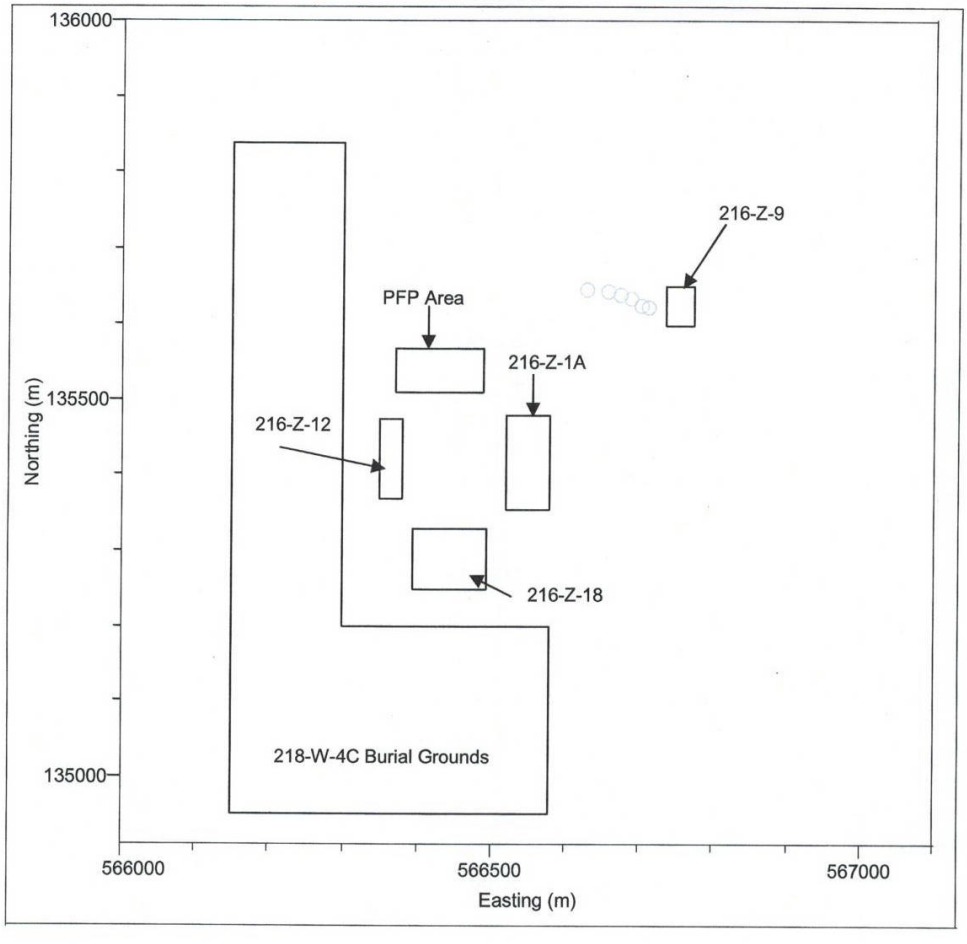
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-13. Carbon Tetrachloride Active Soil-Gas Results for Pipeline to 216-Z-9 Trench.



X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
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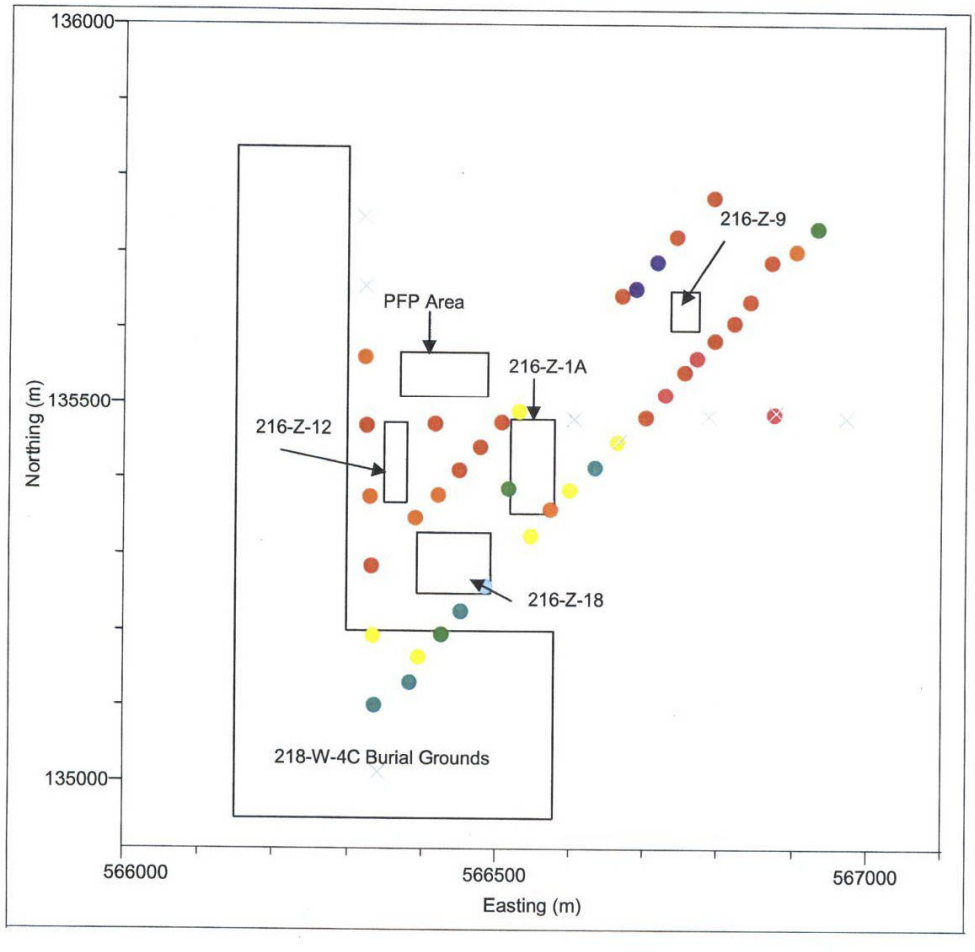
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-14. Carbon Tetrachloride Active Soil-Gas Concentrations – 1992.



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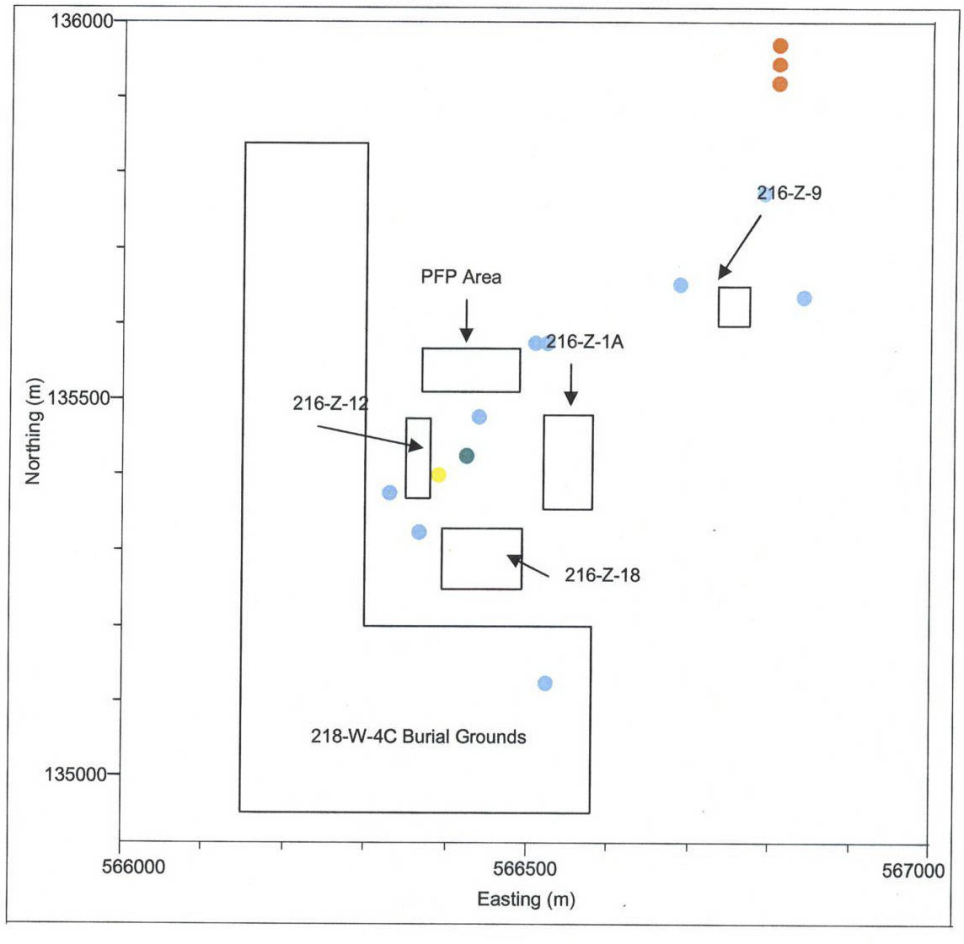
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-15. Carbon Tetrachloride Active Soil-Gas Concentrations – 1994.



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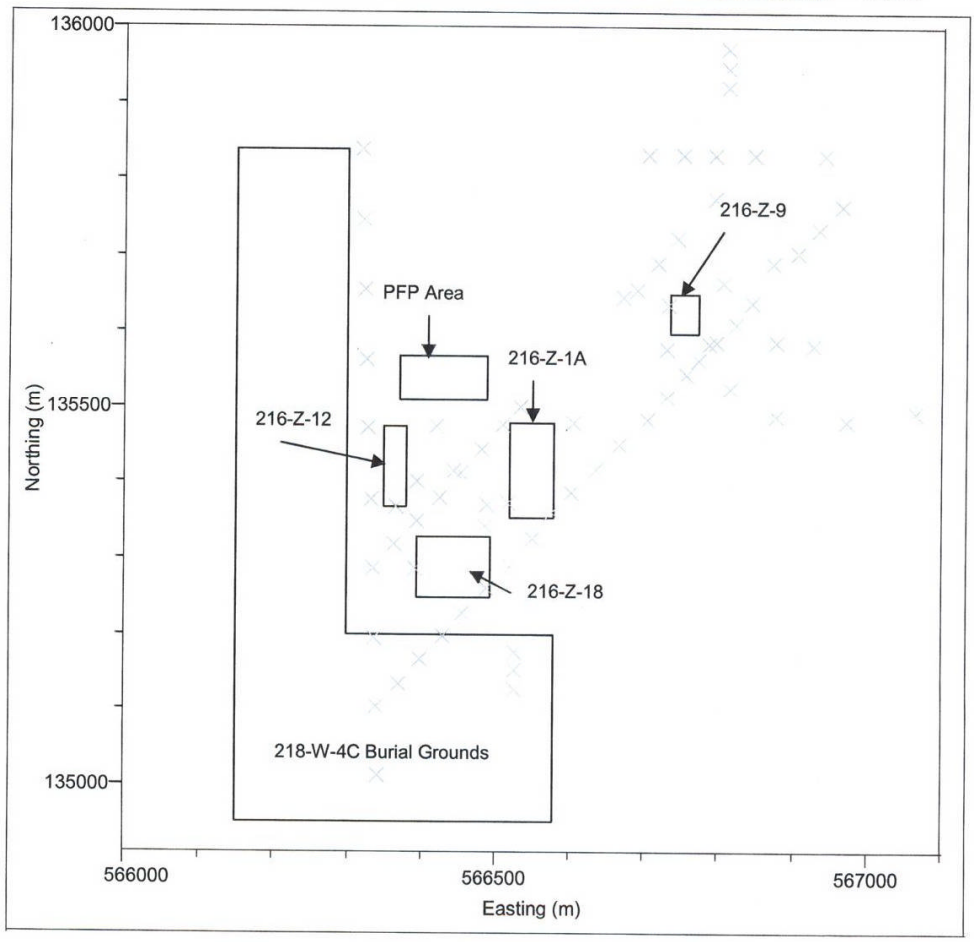
Green = 3 < HQ < 4
Yellow = 4 < HQ < 5
Orange = 5 < HQ < 10
Red = 10 < HQ < 25
Pink = 25 < HQ < 50
Purple = HQ > 50

Figure D-16. Carbon Tetrachloride Active Soil-Gas Concentrations – 1995.



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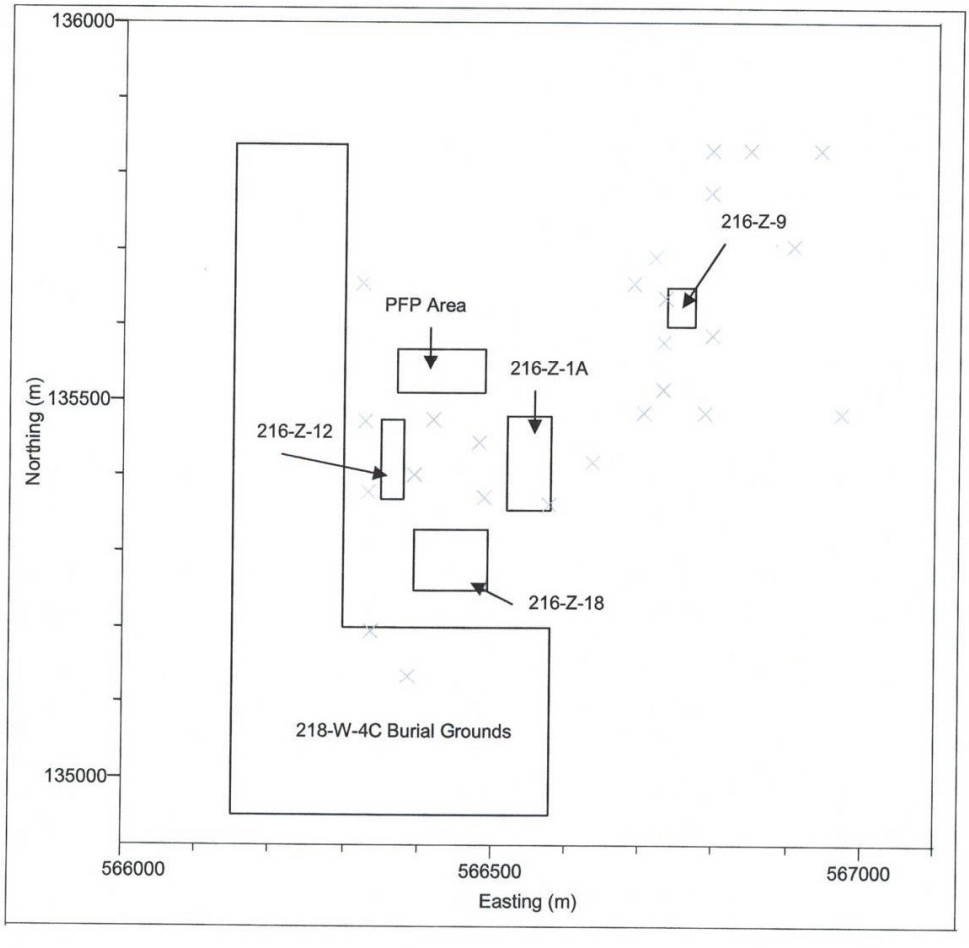
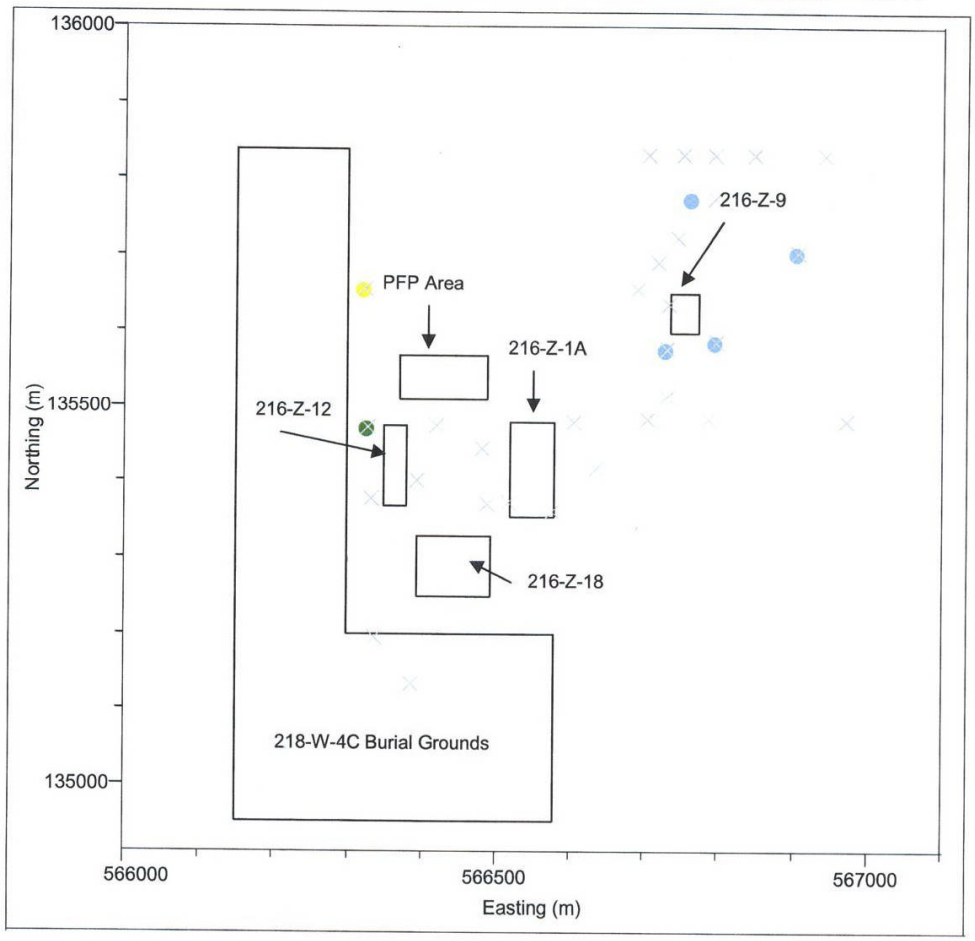
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-17. Carbon Tetrachloride Active Soil-Gas Concentrations – 1996.



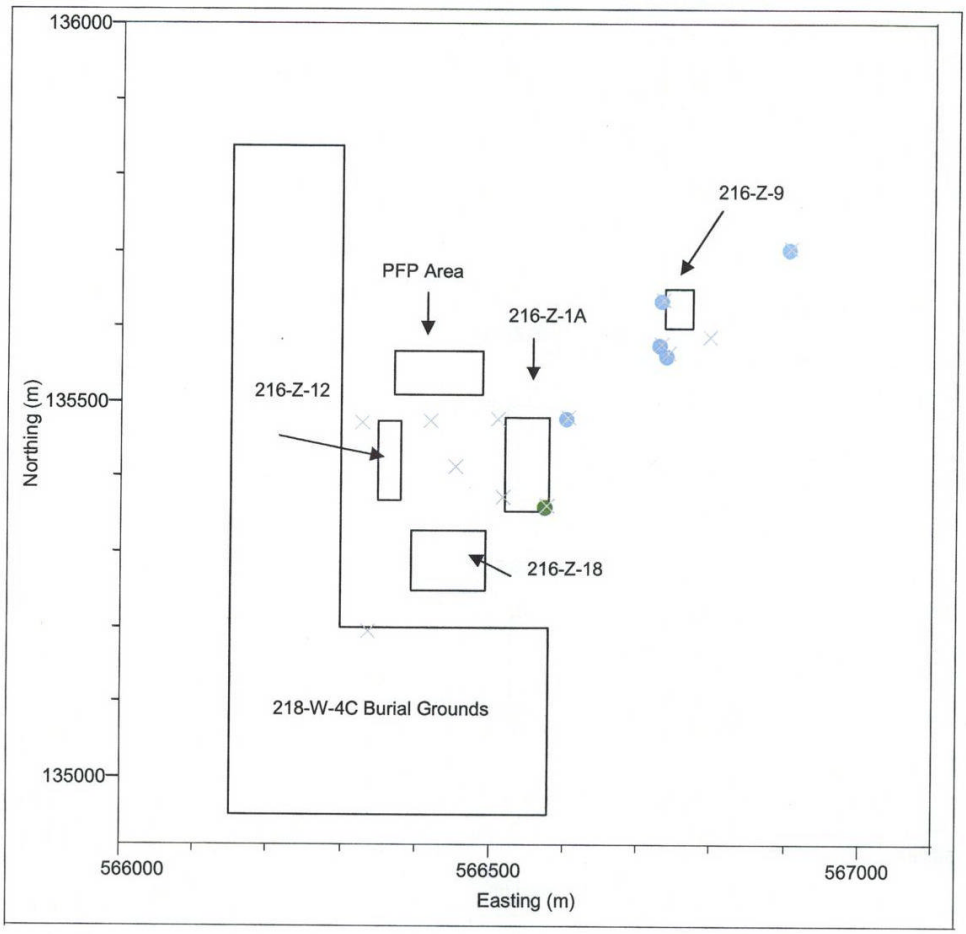
× = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-18. Carbon Tetrachloride Active Soil-Gas Concentrations – 1997.



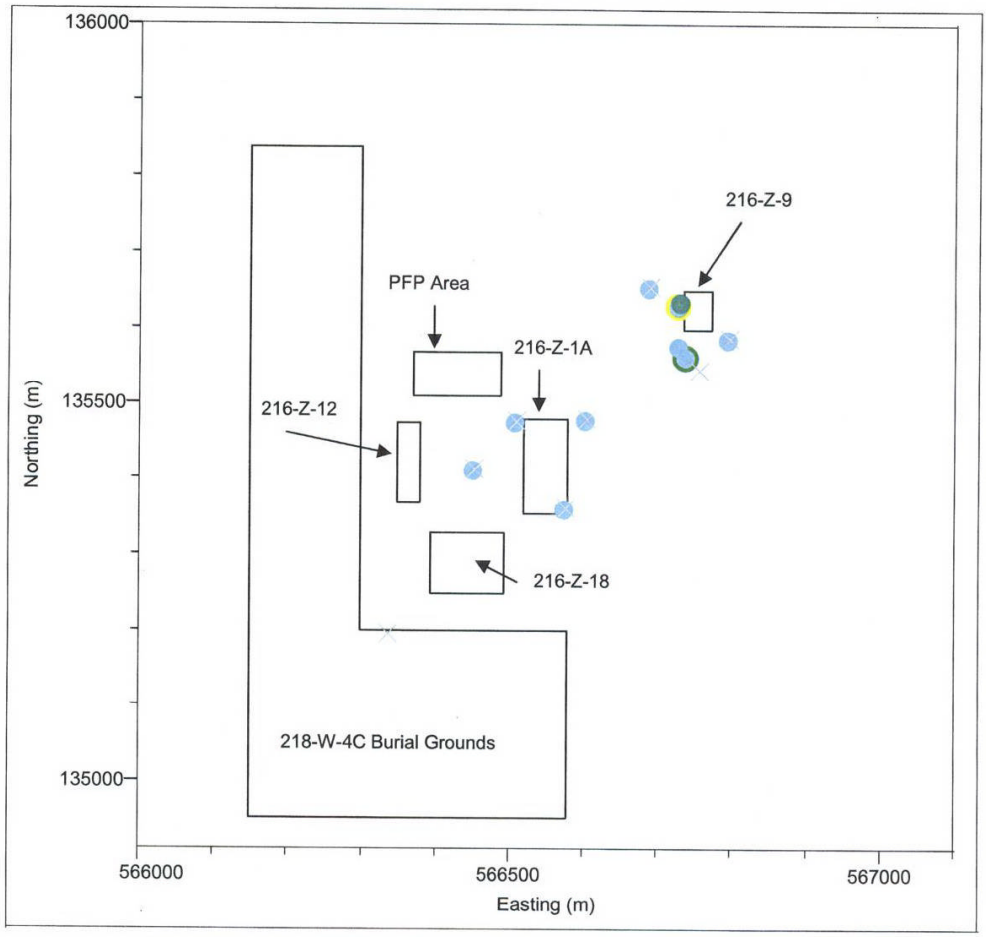
= Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-19. Carbon Tetrachloride Active Soil-Gas Concentrations – 1998.



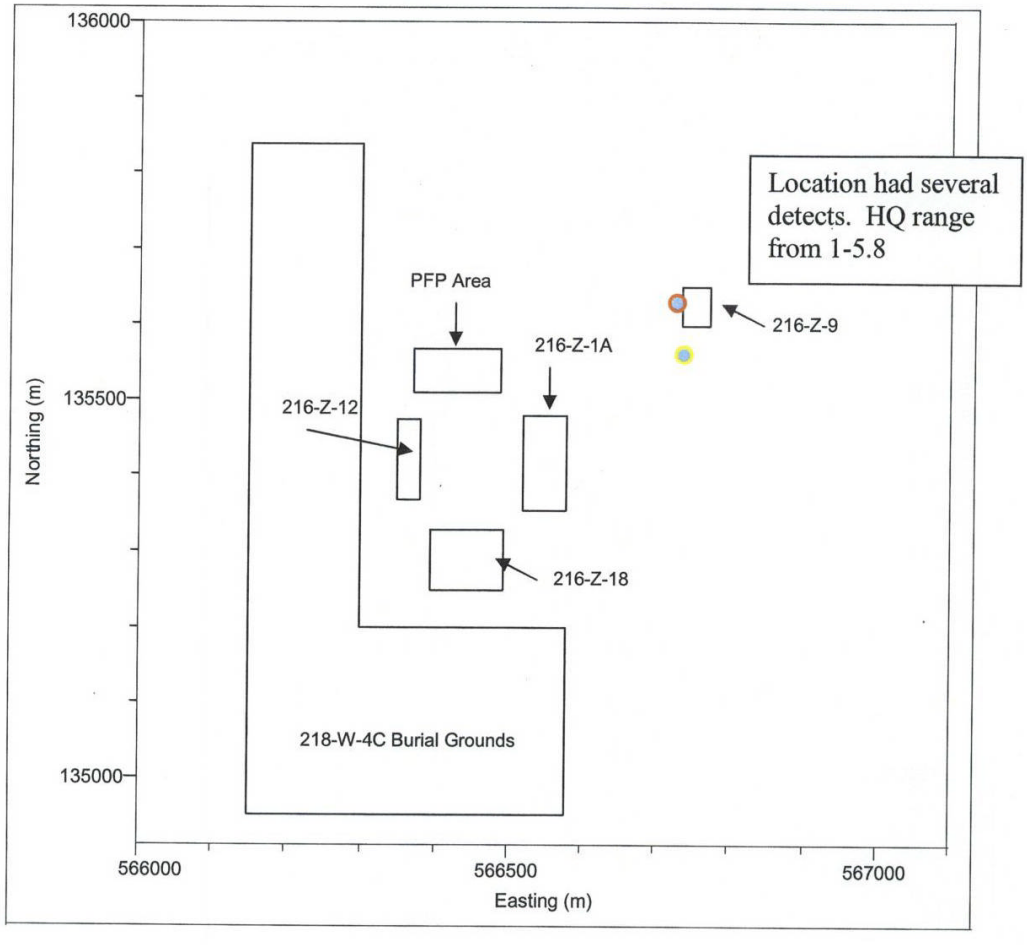
X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
Cyan = 1 < HQ < 2
Aqua = 2 < HQ < 3
Green = 3 < HQ < 4
Yellow = 4 < HQ < 5
Orange = 5 < HQ < 10
Red = 10 < HQ < 25
Pink = 25 < HQ < 50
Purple = HQ > 50

Figure D-20. Carbon Tetrachloride Active Soil-Gas Concentrations – 1999.



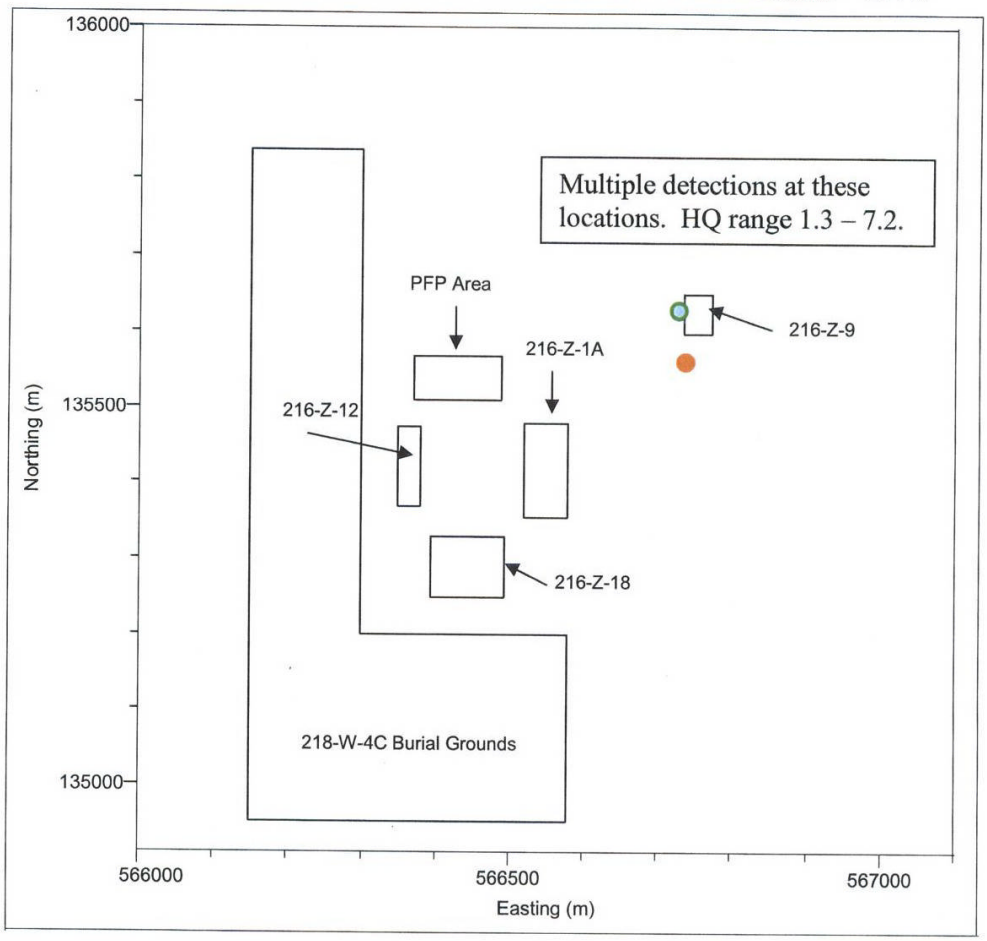
X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-21. Carbon Tetrachloride Active Soil-Gas Concentrations – 2000.



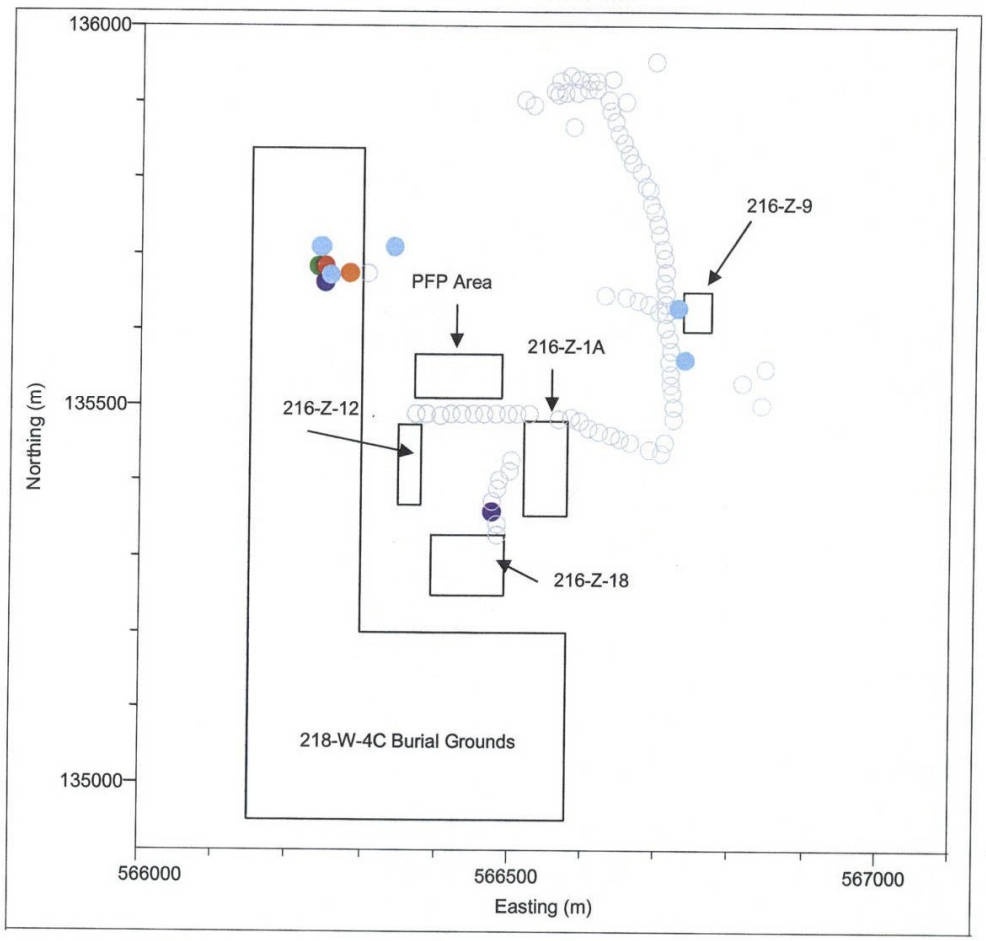
X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
Cyan = 1 < HQ < 2
Aqua = 2 < HQ < 3
Green = 3 < HQ < 4
Yellow = 4 < HQ < 5
Orange = 5 < HQ < 10
Red = 10 < HQ < 25
Pink = 25 < HQ < 50
Purple = HQ > 50

Figure D-22. Carbon Tetrachloride Active Soil-Gas Concentrations – 2001.



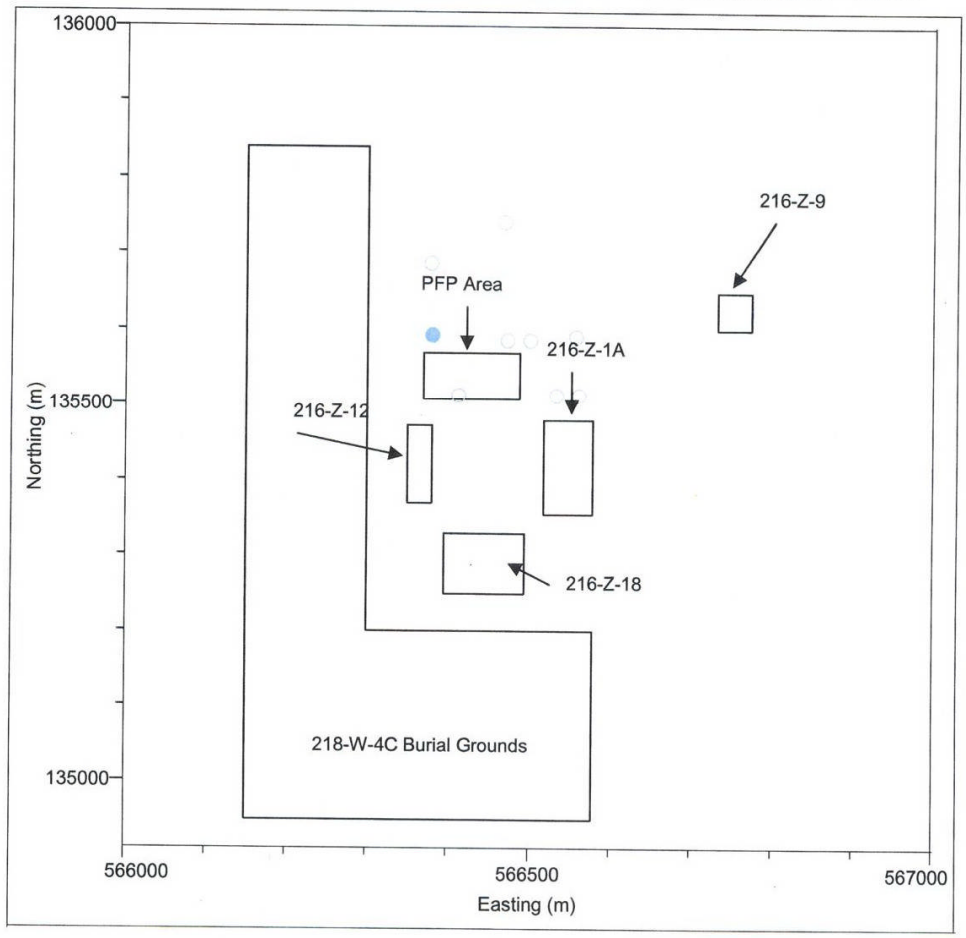
X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-23. Carbon Tetrachloride Active Soil-Gas Concentrations – 2002.



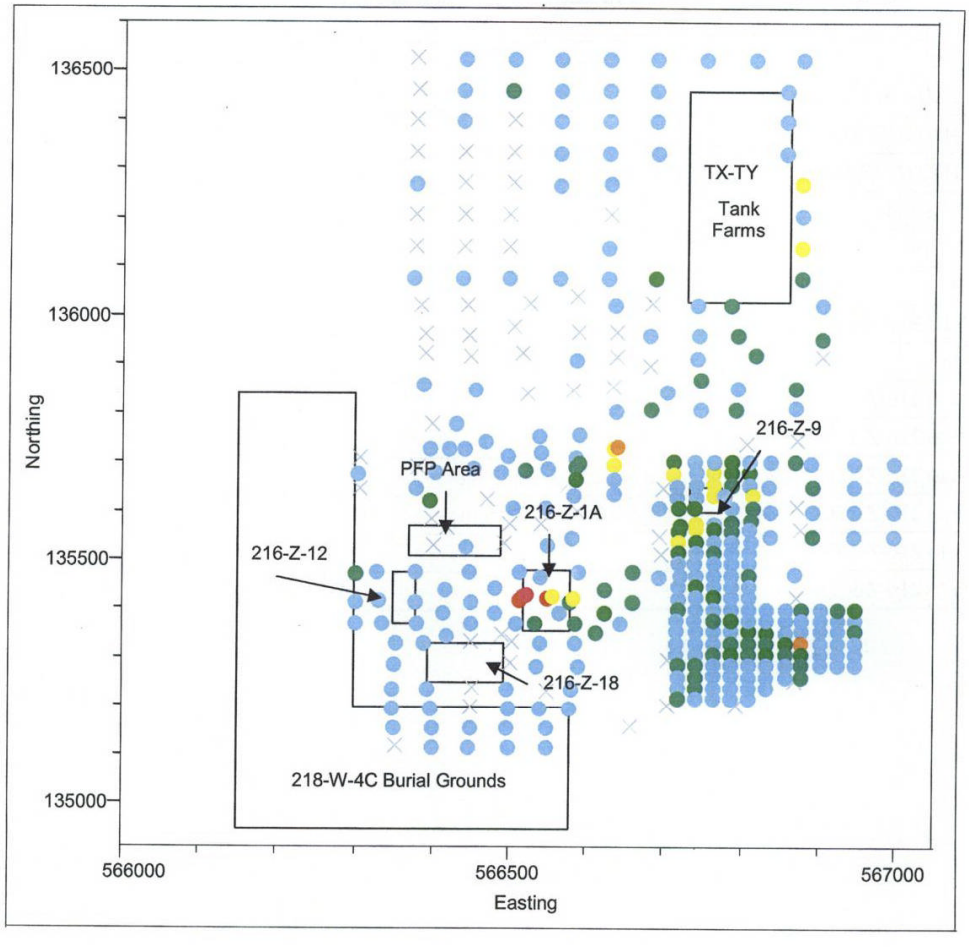
X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-24. Carbon Tetrachloride Active Soil-Gas Concentrations – 2003.



X = Value Reported as Nondetect
= Uncertainty - Value Reported as Nondetect > CCl_4 ESL
- Cyan = 1 < HQ < 2
- Aqua = 2 < HQ < 3
- Green = 3 < HQ < 4
- Yellow = 4 < HQ < 5
- Orange = 5 < HQ < 10
- Red = 10 < HQ < 25
- Pink = 25 < HQ < 50
- Purple = HQ > 50

Figure D-25. Carbon Tetrachloride Passive Soil-Gas Results (ng/sample).



- Gray = Value Reported as Nondetect
- Cyan = 1-50 ng
- Aqua = 50-100 ng
- Green = 100-200 ng
- Yellow = 200-400 ng
- Orange = 400-1000 ng
- Red = 1000-5000 ng
- Pink = > 5000 ng

Table D-1. Investigation Units for Data Grouping as Reported in Data Source Documents.

Investigation Unit Data Group
200-ZP-2
216-Z-1A
216-Z-1A/Z-18/Z-12 Site
216-Z-1D/11/19/20 Ditches
216-Z-1D/11/19/20 Ditches from 231-Z Building
216-Z-21 Pond
216-Z-7 Crib
216-Z-9
218-W-4C Burial Ground Trenches
Borehole
Pipeline to 216-Z-12 Crib
Pipeline to 216-Z-18 Crib
Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building
Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building
Pipeline to 216-Z-7 Crib
Pipeline to 216-Z-9 Trench

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
94-04	200-PW-1			1992	5/20/92 12:15		Carbon Tetrachloride	72.70	0.91	79.9	J	566744	135721	WHC-SD-EN-TI-063	
94-02	200-PW-1			1992	8/5/92 10:25		Carbon Tetrachloride	71.00	0.91	78.0	J	566689	135654	WHC-SD-EN-TI-063	
94-02	200-PW-1			1992	5/20/92 12:35		Carbon Tetrachloride	54.8#	0.91	60.2	J	566689	135654	WHC-SD-EN-TI-063	# - Dilution problem - could be higher
94-03	200-PW-1			1992	5/20/92 12:25		Carbon Tetrachloride	49.70	0.91	54.6	J	566716	135688	WHC-SD-EN-TI-063	
86-04	200-PW-1			1992	5/17/92 11:25		Carbon Tetrachloride	45.10	0.91	49.6	I	566728	135512	WHC-SD-EN-TI-063	
86-05-01	200-PW-1			1992	5/17/92 11:05		Carbon Tetrachloride	26.10	0.91	28.7	I	566772	135561	WHC-SD-EN-TI-063	
87-09	200-PW-1			1992	5/7/92 10:20		Carbon Tetrachloride	23.90	0.91	26.3	I	566876	135486	WHC-SD-EN-TI-063	
86-05	200-PW-1			1992	5/17/92 11:15		Carbon Tetrachloride	21.60	0.91	23.7	H	566754	135543	WHC-SD-EN-TI-063	
87-05	200-PW-1			1992	5/7/92 9:40		Carbon Tetrachloride	21.10	0.91	23.2	H	566509	135475	WHC-SD-EN-TI-063	
86-03	200-PW-1			1992	5/7/92 10:29		Carbon Tetrachloride	19.70	0.91	21.6	H	566702	135481	WHC-SD-EN-TI-063	
79-01	200-PW-1			1992	3/24/92 12:50		Carbon Tetrachloride	16.80	0.91	18.5	H	566332	135285	WHC-SD-EN-TI-063	
86-03	200-PW-1			1992	5/20/92 10:00		Carbon Tetrachloride	16.70	0.91	18.4	H	566702	135481	WHC-SD-EN-TI-063	
94-04	200-PW-1			1992	8/5/92 10:01		Carbon Tetrachloride	16.10	0.91	17.7	H	566744	135721	WHC-SD-EN-TI-063	
87-04	200-PW-1			1992	5/25/92 10:50		Carbon Tetrachloride	13.6@	0.91	14.9	H	566481	135443	WHC-SD-EN-TI-063	'@ - Overloaded
87-03	200-PW-1			1992	5/7/92 9:30		Carbon Tetrachloride	13.20	0.91	14.5	H	566419	135472	WHC-SD-EN-TI-063	
79-01	200-PW-1			1992	5/6/92 11:00		Carbon Tetrachloride	12.60	0.91	13.8	H	566332	135285	WHC-SD-EN-TI-063	
86-06	200-PW-1			1992	5/17/92 10:25		Carbon Tetrachloride	12.30	0.91	13.5	H	566795	135586	WHC-SD-EN-TI-063	
87-01	200-PW-1			1992	5/5/92 12:14		Carbon Tetrachloride	12.20	0.91	13.4	H	566326	135471	WHC-SD-EN-TI-063	
86-06	200-PW-1			1992	8/5/92 9:50		Carbon Tetrachloride	12.10	0.91	13.3	H	566795	135586	WHC-SD-EN-TI-063	
86-07	200-PW-1			1992	5/17/92 10:15		Carbon Tetrachloride	11.90	0.91	13.1	H	566821	135608	WHC-SD-EN-TI-063	
94-01	200-PW-1			1992	5/25/92 10:00		Carbon Tetrachloride	11.80	0.91	13.0	H	566670	135644	WHC-SD-EN-TI-063	
71-03	200-PW-1			1992	3/24/92 10:50		Carbon Tetrachloride	10.30	0.91	11.3	H	566335	135193	WHC-SD-EN-TI-063	
79-06	200-PW-1			1992	5/25/92 11:00		Carbon Tetrachloride	9.93	0.91	10.9	H	566451	135411	WHC-SD-EN-TI-063	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
94-07	200-PW-1			1992	5/26/92 11:59		Carbon Tetrachloride	9.89	0.91	10.9	H	566842	135636	WHC-SD-EN-TI-063	
71-03	200-PW-1			1992	5/6/92 11:12		Carbon Tetrachloride	9.81	0.91	10.8	H	566335	135193	WHC-SD-EN-TI-063	
94-08	200-PW-1			1992	5/17/92 10:05		Carbon Tetrachloride	9.71	0.91	10.7	H	566871	135688	WHC-SD-EN-TI-063	
94-05	200-PW-1			1992	5/10/92 12:22		Carbon Tetrachloride	9.39	0.91	10.3	H	566792	135773	WHC-SD-EN-TI-063	
79-02	200-PW-1			1992	3/24/92 13:15		Carbon Tetrachloride	9.06	0.91	10.0	H	566330	135377	WHC-SD-EN-TI-063	
79-02	200-PW-1			1992	5/5/92 13:25		Carbon Tetrachloride	8.34	0.91	9.2	G	566330	135377	WHC-SD-EN-TI-063	
94-09	200-PW-1			1992	5/10/92 13:04		Carbon Tetrachloride	7.80	0.91	8.6	G	566904	135702	WHC-SD-EN-TI-063	
87-02	200-PW-1			1992	5/5/92 12:00		Carbon Tetrachloride	6.86	0.91	7.5	G	566324	135561	WHC-SD-EN-TI-063	
79-04	200-PW-1			1992	5/25/92 11:20		Carbon Tetrachloride	5.83	0.91	6.4	G	566392	135348	WHC-SD-EN-TI-063	
RST-4-4-2	200-PW-1			1994	2/23/1994		Carbon tetrachloride	5.63	0.91	6.2	G	566809	135945	PNL, 1994	
79-11	200-PW-1			1992	5/20/92 11:10		Carbon Tetrachloride	5.32	0.91	5.8	G	566576	135360	WHC-SD-EN-TI-063	
RST-4-4-3	200-PW-1			1994	2/28/1994		Carbon tetrachloride	5.08	0.91	5.6	G	566810	135970	PNL, 1994	
79-05	200-PW-1			1992	5/25/92 11:10		Carbon Tetrachloride	5.07	0.91	5.6	G	566422	135379	WHC-SD-EN-TI-063	
RST-4-4-1	200-PW-1			1994	2/18/1994		Carbon tetrachloride	5.06	0.91	5.6	G	566809	135920	PNL, 1994	
79-03	200-PW-1			1992	5/25/92 11:50		Carbon Tetrachloride	4.49	0.91	4.9	F	566335	135193	WHC-SD-EN-TI-063	
79-12	200-PW-1			1992	5/20/92 11:01		Carbon Tetrachloride	4.25	0.91	4.7	F	566602	135385	WHC-SD-EN-TI-063	
79-10	200-PW-1			1992	5/26/92 9:53		Carbon Tetrachloride	4.18	0.91	4.6	F	566549	135325	WHC-SD-EN-TI-063	
71-05	200-PW-1			1992	5/26/92 11:12		Carbon Tetrachloride	4.00	0.91	4.4	F	566397	135164	WHC-SD-EN-TI-063	
87-06	200-PW-1			1992	5/25/92 10:15		Carbon Tetrachloride	3.96	0.91	4.4	F	566533	135489	WHC-SD-EN-TI-063	
N-9	200-PW-1			1994	8/29/1994		Carbon tetrachloride	3.8	0.91	4.2	F	566392	135400	CCN 003804	
86-02	200-PW-1			1992	5/20/92 10:15		Carbon Tetrachloride	3.60	0.91	4.0	F	566665	135448	WHC-SD-EN-TI-063	
79-09	200-PW-1			1992	5/26/92 10:08		Carbon Tetrachloride	3.33	0.91	3.7	E	566518	135387	WHC-SD-EN-TI-063	
71-02	200-PW-1			1992	3/24/92 10:32		Carbon Tetrachloride	3.22	0.91	3.5	E	566339	135101	WHC-SD-EN-TI-063	
RST1-1-1	200-PW-1			1994	2/18/1994		Carbon tetrachloride	3.15	0.91	3.5	E	566425	135425	PNL, 1994	
94-10	200-PW-1			1992	5/10/92 13:18		Carbon Tetrachloride	3.07	0.91	3.4	E	566934	135733	WHC-SD-EN-TI-063	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
71-06	200-PW-1			1992	5/26/92 11:00		Carbon Tetrachloride	2.77	0.91	3.0	E	566427	135196	WHC-SD-EN-TI-063	
71-02	200-PW-1			1992	5/6/92 12:20		Carbon Tetrachloride	2.67	0.91	2.9	D	566339	135101	WHC-SD-EN-TI-063	
71-04	200-PW-1			1992	5/26/92 11:42		Carbon Tetrachloride	2.58	0.91	2.8	D	566386	135133	WHC-SD-EN-TI-063	
RST1-1-1	200-PW-1			1994	2/23/1994		Carbon tetrachloride	2.49	0.91	2.7	D	566425	135425	PNL, 1994	
79-07	200-PW-1			1992	5/26/92 10:46		Carbon Tetrachloride	2.19	0.91	2.4	D	566455	135225	WHC-SD-EN-TI-063	
RST1-1-1	200-PW-1			1994	2/28/1994		Carbon tetrachloride	2.1	0.91	2.3	D	566425	135425	PNL, 1994	
79-13	200-PW-1			1992	5/20/92 10:45		Carbon Tetrachloride	1.95	0.91	2.1	D	566635	135417	WHC-SD-EN-TI-063	
94-05	200-PW-1			1994	8/31/1994		Carbon tetrachloride	1.7	0.91	1.9	C	566792	135773	CCN 003804	
88-02	200-PW-1			1992	5/7/92 9:15		Carbon Tetrachloride	1.54	0.91	1.7	C	NR	NR	WHC-SD-EN-TI-063	
79-08	200-PW-1			1992	5/26/92 10:22		Carbon Tetrachloride	1.51	0.91	1.7	C	566487	135259	WHC-SD-EN-TI-063	
79-02	200-PW-1			1994	8/30/1994		Carbon tetrachloride	1.5	0.91	1.6	C	566330	135377	CCN 003804	
94-02	200-PW-1			1994	8/31/1994		Carbon tetrachloride	1.3	0.91	1.4	C	566689	135654	CCN 003804	
W-2	200-PW-1			1994	8/29/1994		Carbon tetrachloride	1.2	0.91	1.3	C	566367	135325	CCN 003804	
87-07	200-PW-1			1992	6/22/92 10:39		Carbon Tetrachloride	>1	0.91	1.1	C	NR	NR	WHC-SD-EN-TI-063	
RST-2-2-2	200-PW-1			1994	2/23/1994		Carbon tetrachloride	0.99	0.91	1.1	C	566525	135125	PNL, 1994	
N-11	200-PW-1			1994	8/29/1994		Carbon tetrachloride	0.98	0.91	1.1	C	566440	135478	CCN 003804	
RST-2-1-1	200-PW-1			1994	2/18/1994		Carbon tetrachloride	0.98	0.91	1.1	C	566510	135575	PNL, 1994	
RST-2-2-1	200-PW-1			1994	2/18/1994		Carbon tetrachloride	0.97	0.91	1.1	C	566525	135575	PNL, 1994	
94-07	200-PW-1			1994	9/1/1994		Carbon tetrachloride	0.96	0.91	1.1	C	566842	135636	CCN 003804	
71-01	200-PW-1			1992	3/24/92 10:20		Carbon Tetrachloride	0.82	0.91	0.9	B	566341	135009	WHC-SD-EN-TI-063	
93-01	200-PW-1			1992	5/10/92 12:09		Carbon Tetrachloride	0.78	0.91	0.9	B	NR	NR	WHC-SD-EN-TI-063	
86-08	200-PW-1			1992	5/10/92 10:15		Carbon Tetrachloride	0.74	0.91	0.8	B	566787	135483	WHC-SD-EN-TI-063	
86-08	200-PW-1			1992	5/7/92 10:40		Carbon Tetrachloride	0.64	0.91	0.7	B	566787	135483	WHC-SD-EN-TI-063	
71-01	200-PW-1			1992	5/6/92 12:30		Carbon Tetrachloride	0.58	0.91	0.6	B	566341	135009	WHC-SD-EN-TI-063	
86-09	200-PW-1			1992	5/10/92 10:24		Carbon Tetrachloride	0.58	0.91	0.6	B	566876	135486	WHC-SD-EN-TI-063	
85-01	200-PW-1			1992	5/10/92 10:55		Carbon Tetrachloride	0.42	0.91	0.5	B	566970	135480	WHC-SD-EN-TI-063	
95-01	200-PW-1			1992	5/4/92 13:25		Carbon Tetrachloride	0.27	0.91	0.3	B	566322	135653	WHC-SD-EN-TI-063	
85-02	200-PW-1			1992	5/10/92 11:07		Carbon Tetrachloride	0.11	0.91	0.1	B	566665	135448	WHC-SD-EN-TI-063	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
d 94-03R	200-PW-1			1995	9/19/1995		Carbon tetrachloride	0.08	0.91	0.1	B	566716	135688	CCN 022328	
d RST 4-1	200-PW-1			1995	9/20/1995		Carbon tetrachloride	0.079	0.91	0.1	B	566809	135920	CCN 022328	
91-03R	200-PW-1			1995	9/18/1995		Carbon tetrachloride	0.072	0.91	0.1	B	566716	135688	CCN 022328	
79-03	200-PW-1			1995	9/21/1995		Carbon tetrachloride	0.059	0.91	0.1	B	566362	135317	CCN 022328	
85-01R	200-PW-1			1995	9/20/1995		Carbon tetrachloride	0.056	0.91	0.1	B	566970	135480	CCN 022328	
d 94-03R	200-PW-1			1995	9/20/1995		Carbon tetrachloride	0.047	0.91	0.1	B	566716	135688	CCN 022328	
95-02	200-PW-1			1992	5/4/92 13:15		Carbon Tetrachloride	0.04	0.91	0.0	B	566319	135745	WHC-SD-EN-TI-063	
95-09	200-PW-1			1995	9/18/1995		Carbon tetrachloride	0.036	0.91	0.0	B	566940	135830	CCN 022328	
RST 4-2	200-PW-1			1995	9/19/1995		Carbon tetrachloride	0.035	0.91	0.0	B	566809	135945	CCN 022328	
86-04	200-PW-1			1995	9/20/1995		Carbon tetrachloride	0.033	0.91	0.0	B	566728	135512	CCN 022328	
103-01	200-PW-1			1992	5/4/92 11:05		Carbon Tetrachloride	0.03	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
95-01	200-PW-1			1995	9/21/1995		Carbon tetrachloride	0.029	0.91	0.0	B	566322	135653	CCN 022328	
d 95-09	200-PW-1			1995	9/20/1995		Carbon tetrachloride	0.028	0.91	0.0	B	566940	135830	CCN 022328	
71-04	200-PW-1			1995	9/18/1995		Carbon tetrachloride	0.024	0.91	0.0	B	566368	135133	CCN 022328	
71-03	200-PW-1			1995	9/21/1995		Carbon tetrachloride	0.022	0.91	0.0	B	566335	135193	CCN 022328	
103-02	200-PW-1			1992	5/4/92 10:50		Carbon Tetrachloride	0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
111-01	200-PW-1			1992	5/4/92 10:35		Carbon Tetrachloride	<0.02*	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	*Observed, but below low-end linear detection limit.
111-02	200-PW-1			1992	5/4/92 10:17		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
111-03	200-PW-1			1992	5/4/92 10:10		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
119-01	200-PW-1			1992	5/3/92 13:30		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
119-02	200-PW-1			1992	5/3/92 13:20		Carbon Tetrachloride	<0.02*	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	*Observed, but below low-end linear detection limit.
87-08	200-PW-1			1992	6/22/92 10:49		Carbon Tetrachloride	<0.02	0.91	0.0	B	566603	135477	WHC-SD-EN-TI-063	
88-01	200-PW-1			1992	5/7/92 11:00		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
88-1 (BKGRND)	200-PW-1			1992	5/3/92 13:45		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
88-1 (BKGRND)	200-PW-1			1992	5/4/92 12:40		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
88-1 (BKGRND)	200-PW-1			1992	5/6/92 13:20		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
88-1 (BKGRND)	200-PW-1			1992	5/7/92 11:00		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
88-1 (BKGRND)	200-PW-1			1992	5/10/92 11:35		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
88-1 (BKGRND)	200-PW-1			1992	5/17/92 12:15		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
88-1 (BKGRND)	200-PW-1			1992	5/20/92 13:00		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
88-1 (BKGRND)	200-PW-1			1992	5/25/92 12:45		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
88-1 (BKGRND)	200-PW-1			1992	5/26/92 12:50		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
88-1 (BKGRND)	200-PW-1			1992	8/5/92 10:50		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
88-1 (BKGRND)	200-PW-1			1992	5/6/92 1300		Carbon Tetrachloride	<0.02	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	
94-05	200-PW-1			1995	9/18/1995		Carbon tetrachloride	0.017	0.91	0.0	B	566792	135773	CCN 022328	
94-09	200-PW-1			1995	9/19/1995		Carbon tetrachloride	0.016	0.91	0.0	B	566904	135702	CCN 022328	
d 94-03R	200-PW-1			1995	9/21/1995		Carbon tetrachloride	0.008	0.91	0.0	B	566716	135688	CCN 022328	
88-1 (BKGRND)	200-PW-1			1992	3/24/92 11:20		Carbon Tetrachloride	0.007*	0.91	0.0	B	NR	NR	WHC-SD-EN-TI-063	*Observed, but below low-end linear detection limit.
103-01	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566316	135837	CCN 022328	
71-01	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566341	135009	CCN 022328	
71-02	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566339	135101	CCN 022328	
71-05	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566397	135164	CCN 022328	
71-06	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566427	135196	CCN 022328	
79-01	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566332	135285	CCN 022328	
79-02	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566330	135377	CCN 022328	
79-04	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566392	135348	CCN 022328	
79-05	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566422	135379	CCN 022328	
79-06	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566451	135411	CCN 022328	
79-07	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566455	135225	CCN 022328	
79-08	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566487	135259	CCN 022328	
79-09R	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566518	135287	CCN 022328	
79-10	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566549	135325	CCN 022328	
79-11	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566576	135360	CCN 022328	
79-12	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566602	135385	CCN 022328	
79-13	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566635	135417	CCN 022328	
85-02	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	567064	135491	CCN 022328	
86-02	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566665	135448	CCN 022328	
86-02	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566702	135481	CCN 022328	
86-05	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566754	135543	CCN 022328	
86-05-01	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566772	135561	CCN 022328	
86-06	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566795	135586	CCN 022328	
86-07R	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566821	135608	CCN 022328	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
86-08	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566787	135583	CCN 022328	
86-09	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566876	135486	CCN 022328	
87-01R	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566326	135471	CCN 022328	
87-02	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566324	135561	CCN 022328	
87-03	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566419	135472	CCN 022328	
87-04	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566481	135443	CCN 022328	
87-05	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566509	135475	CCN 022328	
87-06	200-PW-1			1995	9/20/1995		Carbon tetrachloride	ND	0.91	0.0	B	566533	135498	CCN 022328	
87-09	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566603	135477	CCN 022328	
93-01	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566963	135765	CCN 022328	
94-01	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566670	135644	CCN 022328	
94-02	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566689	135654	CCN 022328	
94-04	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566744	135721	CCN 022328	
94-07	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566842	135636	CCN 022328	
94-08	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566871	135688	CCN 022328	
94-10	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566934	135733	CCN 022328	
95-02	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566319	135745	CCN 022328	
95-05	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566703	135830	CCN 022328	
95-06	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566750	135830	CCN 022328	
95-07	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566794	135830	CCN 022328	
95-08	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566845	135830	CCN 022328	
95-10	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566925	135580	CCN 022328	
95-11	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566732	135635	CCN 022328	
95-12	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566730	135575	CCN 022328	
95-13	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566815	135525	CCN 022328	
95-14	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566805	135663	CCN 022328	
95-15	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566875	135585	CCN 022328	
N-2	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566485	135341	CCN 022328	
N-5	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566486	135370	CCN 022328	
N-6	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566515	135371	CCN 022328	
N-7	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566441	135415	CCN 022328	
N-9	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566392	135400	CCN 022328	
RST 2-2	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566525	135125	CCN 022328	
RST 2-3	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566525	135150	CCN 022328	
RST 2-4	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566525	135175	CCN 022328	
RST 4-3	200-PW-1			1995	9/19/1995		Carbon tetrachloride	ND	0.91	0.0	B	566810	135970	CCN 022328	
W-1	200-PW-1			1995	9/21/1995		Carbon tetrachloride	ND	0.91	0.0	B	566391	135285	CCN 022328	
W-5	200-PW-1			1995	9/18/1995		Carbon tetrachloride	ND	0.91	0.0	B	566363	135368	CCN 022328	
95-01	216-Z-1A	1.5	1	1997	5/8/1997 10:13		Carbon tetrachloride	4.4	0.91	4.8	F	566322	135653	BHI 01105	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
87-01R	216-Z-1A	1.5	1	1997	6/9/1997 10:43		Carbon tetrachloride	3.5	0.91	3.8	E	566326	135471	BHI 01105	
95-01	216-Z-1A	1.5	1	1997	7/10/1997 9:00		Carbon tetrachloride	0.8	0.91	0.9	B	566322	135653	BHI 01105	
87-04	216-Z-1A	1.5	1	1997	5/8/1997 11:16		Carbon tetrachloride	0.7	0.91	0.8	B	566481	135443	BHI 01105	
N-5	216-Z-1A	1.5	1	1996	12/10/1996 10:09		Carbon tetrachloride	0.7	0.91	0.8	B	566486	135370	BHI 01105	
79-02	216-Z-1A	1.5	1	1997	6/9/1997 10:49		Carbon tetrachloride	0.7	0.91	0.7	B	566330	135377	BHI 01105	
87-04	216-Z-1A	1.5	1	1997	7/10/1997 9:37		Carbon tetrachloride	0.7	0.91	0.7	B	566481	135443	BHI 01105	
79-02	216-Z-1A	1.5	1	1997	5/8/1997 10:29		Carbon tetrachloride	0.6	0.91	0.7	B	566330	135377	BHI 01105	
95-01	216-Z-1A	1.5	1	1997	6/9/1997 11:35		Carbon tetrachloride	0.6	0.91	0.6	B	566322	135653	BHI 01105	
87-03	216-Z-1A	1.5	1	1997	5/8/1997 11:09		Carbon tetrachloride	0.5	0.91	0.6	B	566419	135472	BHI 01105	
87-04	216-Z-1A	1.5	1	1997	6/9/1997 11:31		Carbon tetrachloride	0.5	0.91	0.6	B	566481	135443	BHI 01105	
79-02	216-Z-1A	1.5	1	1997	7/10/1997 9:09		Carbon tetrachloride	0.5	0.91	0.5	B	566330	135377	BHI 01105	
71-04	216-Z-1A	1.5	1	1997	5/8/1997 10:41		Carbon tetrachloride	0.5	0.91	0.5	B	566386	135133	BHI 01105	
95-01	216-Z-1A	1.5	1	1996	12/10/1996 10:33		Carbon tetrachloride	0.4	0.91	0.4	B	566322	135653	BHI 01105	
N-5	216-Z-1A	1.5	1	1997	7/10/1997 9:41		Carbon tetrachloride	0.4	0.91	0.4	B	566486	135370	BHI 01105	
87-04	216-Z-1A	1.5	1	1996	11/22/1996 10:25		Carbon tetrachloride	0.4	0.91	0.4	B	566481	135443	BHI 01105	
N-9	216-Z-1A	1.5	1	1997	7/10/1997 9:25		Carbon tetrachloride	0.4	0.91	0.4	B	566392	135400	BHI 01105	
N-9	216-Z-1A	1.5	1	1997	5/8/1997 10:58		Carbon tetrachloride	0.3	0.91	0.4	B	566392	135400	BHI 01105	
79-11	216-Z-1A	1.5	1	1997	5/8/1997 11:26		Carbon tetrachloride	0.3	0.91	0.4	B	566576	135360	BHI 01105	
87-01R	216-Z-1A	1.5	1	1997	7/10/1997 9:05		Carbon tetrachloride	0.3	0.91	0.4	B	566326	135471	BHI 01105	
87-03	216-Z-1A	1.5	1	1997	1/24/1997 10:52		Carbon tetrachloride	0.3	0.91	0.3	B	566419	135472	BHI 01105	
87-04	216-Z-1A	1.5	1	1997	4/8/1997 12:55		Carbon tetrachloride	0.3	0.91	0.3	B	566481	135443	BHI 01105	
95-01	216-Z-1A	1.5	1	1997	1/24/1997 10:43		Carbon tetrachloride	0.3	0.91	0.3	B	566322	135653	BHI 01105	
79-03	216-Z-1A	1.5	1	1996	12/10/1996 10:46		Carbon tetrachloride	0.3	0.91	0.3	B	566335	135193	BHI 01105	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
87-04	216-Z-1A	1.5	1	1997	3/4/1997 12:32		Carbon tetrachloride	0.3	0.91	0.3	B	566481	135443	BHI 01105	
N-5	216-Z-1A	1.5	1	1997	6/9/1997 11:36		Carbon tetrachloride	0.3	0.91	0.3	B	566486	135370	BHI 01105	
79-03	216-Z-1A	1.5	1	1997	5/8/1997 10:25		Carbon tetrachloride	0.3	0.91	0.3	B	566335	135193	BHI 01105	
N-5	216-Z-1A	1.5	1	1997	5/8/1997 11:21		Carbon tetrachloride	0.3	0.91	0.3	B	566486	135370	BHI 01105	
79-03	216-Z-1A	1.5	1	1997	6/9/1997 10:57		Carbon tetrachloride	0.3	0.91	0.3	B	566335	135193	BHI 01105	
79-13	216-Z-1A	1.5	1	1997	6/9/1997 11:48		Carbon tetrachloride	0.3	0.91	0.3	B	566635	135417	BHI 01105	
71-04	216-Z-1A	1.5	1	1997	4/8/1997 11:25		Carbon tetrachloride	0.2	0.91	0.3	B	566386	135133	BHI 01105	
95-01	216-Z-1A	1.5	1	1997	4/8/1997 13:23		Carbon tetrachloride	0.2	0.91	0.2	B	566322	135653	BHI 01105	
95-01	216-Z-1A	1.5	1	1997	3/4/1997 13:05		Carbon tetrachloride	0.2	0.91	0.2	B	566322	135653	BHI 01105	
87-03	216-Z-1A	1.5	1	1997	4/8/1997 12:48		Carbon tetrachloride	0.2	0.91	0.2	B	566419	135472	BHI 01105	
N-9	216-Z-1A	1.5	1	1997	4/8/1997 13:17		Carbon tetrachloride	0.2	0.91	0.2	B	566392	135400	BHI 01105	
79-03	216-Z-1A	1.5	1	1997	1/24/1997 12:40		Carbon tetrachloride	0.2	0.91	0.2	B	566335	135193	BHI 01105	
N-5	216-Z-1A	1.5	1	1997	4/8/1997 13:10		Carbon tetrachloride	0.2	0.91	0.2	B	566486	135370	BHI 01105	
71-04	216-Z-1A	1.5	1	1997	3/4/1997 12:49		Carbon tetrachloride	0.2	0.91	0.2	B	566386	135133	BHI 01105	
N-9	216-Z-1A	1.5	1	1997	3/4/1997 12:43		Carbon tetrachloride	0.2	0.91	0.2	B	566392	135400	BHI 01105	
79-13	216-Z-1A	1.5	1	1997	7/10/1997 9:53		Carbon tetrachloride	0.2	0.91	0.2	B	566635	135417	BHI 01105	
87-03	216-Z-1A	1.5	1	1997	3/4/1997 12:36		Carbon tetrachloride	0.2	0.91	0.2	B	566419	135472	BHI 01105	
N-5	216-Z-1A	1.5	1	1997	3/4/1997 12:28		Carbon tetrachloride	0.2	0.91	0.2	B	566486	135370	BHI 01105	
79-13	216-Z-1A	1.5	1	1997	5/8/1997 11:32		Carbon tetrachloride	0.2	0.91	0.2	B	566635	135417	BHI 01105	
79-13	216-Z-1A	1.5	1	1997	1/24/1997 11:15		Carbon tetrachloride	0.2	0.91	0.2	B	566635	135417	BHI 01105	
C-1	216-Z-1A	1.5	1	1997	4/8/1997 13:02		Carbon tetrachloride	0.2	0.91	0.2	B	NR	NR	BHI 01105	
C-1	216-Z-1A	1.5	1	1997	3/4/1997 12:20		Carbon tetrachloride	0.2	0.91	0.2	B	NR	NR	BHI 01105	
71-04	216-Z-1A	1.5	1	1997	6/9/1997 11:05		Carbon tetrachloride	0.2	0.91	0.2	B	566386	135133	BHI 01105	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
87-03	216-Z-1A	1.5	1	1996	12/10/1996 10:22		Carbon tetrachloride	0.2	0.91	0.2	B	566419	135472	BHI 01105	
79-02	216-Z-1A	1.5	1	1997	4/8/1997 11:33		Carbon tetrachloride	0.2	0.91	0.2	B	566330	135377	BHI 01105	
C-1	216-Z-1A	1.5	1	1997	1/24/1997 11:05		Carbon tetrachloride	0.2	0.91	0.2	B	NR	NR	BHI 01105	
79-11	216-Z-1A	1.5	1	1997	4/8/1997 11:46		Carbon tetrachloride	0.2	0.91	0.2	B	566576	135360	BHI 01105	
87-04	216-Z-1A	1.5	1	1997	1/24/1997 10:56		Carbon tetrachloride	0.1	0.91	0.2	B	566481	135443	BHI 01105	
79-02	216-Z-1A	1.5	1	1997	3/4/1997 12:54		Carbon tetrachloride	0.1	0.91	0.2	B	566330	135377	BHI 01105	
87-04	216-Z-1A	1.5	1	1996	12/10/1996 10:13		Carbon tetrachloride	0.1	0.91	0.2	B	566481	135443	BHI 01105	
79-11	216-Z-1A	1.5	1	1997	3/4/1997 12:08		Carbon tetrachloride	0.1	0.91	0.2	B	566576	135360	BHI 01105	
N-9	216-Z-1A	1.5	1	1997	1/24/1997 10:47		Carbon tetrachloride	0.1	0.91	0.2	B	566392	135400	BHI 01105	
79-13	216-Z-1A	1.5	1	1997	4/8/1997 11:53		Carbon tetrachloride	0.1	0.91	0.2	B	566635	135417	BHI 01105	
C-1	216-Z-1A	1.5	1	1997	5/8/1997 10:49		Carbon tetrachloride	0.1	0.91	0.1	B	NR	NR	BHI 01105	
79-03	216-Z-1A	1.5	1	1997	4/8/1997 11:39		Carbon tetrachloride	0.1	0.91	0.1	B	566335	135193	BHI 01105	
87-03	216-Z-1A	1.5	1	1997	7/10/1997 9:28		Carbon tetrachloride	0.1	0.91	0.1	B	566419	135472	BHI 01105	
79-13	216-Z-1A	1.5	1	1997	3/4/1997 12:03		Carbon tetrachloride	0.1	0.91	0.1	B	566635	135417	BHI 01105	
79-02	216-Z-1A	1.5	1	1996	12/10/1996 10:43		Carbon tetrachloride	0.1	0.91	0.1	B	566330	135377	BHI 01105	
87-03	216-Z-1A	1.5	1	1997	6/9/1997 11:25		Carbon tetrachloride	0.1	0.91	0.1	B	566419	135472	BHI 01105	
79-03	216-Z-1A	1.5	1	1997	3/4/1997 12:58		Carbon tetrachloride	0.1	0.91	0.1	B	566335	135193	BHI 01105	
79-11	216-Z-1A	1.5	1	1997	7/10/1997 9:47		Carbon tetrachloride	0.1	0.91	0.1	B	566576	135360	BHI 01105	
79-03	216-Z-1A	1.5	1	1997	7/10/1997 9:12		Carbon tetrachloride	0.1	0.91	0.1	B	566335	135193	BHI 01105	
79-13	216-Z-1A	1.5	1	1996	12/10/1996 11:00		Carbon tetrachloride	0.1	0.91	0.1	B	566635	135417	BHI 01105	
79-11	216-Z-1A	1.5	1	1996	12/10/1996 10:55		Carbon tetrachloride	0.1	0.91	0.1	B	566576	135360	BHI 01105	
N-9	216-Z-1A	1.5	1	1997	6/9/1997 11:18		Carbon tetrachloride	0.1	0.91	0.1	B	566392	135400	BHI 01105	
71-04	216-Z-1A	1.5	1	1996	12/10/1996 10:50		Carbon tetrachloride	0.1	0.91	0.1	B	566386	135133	BHI 01105	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
N-5	216-Z-1A	1.5	1	1997	1/24/1997 10:59		Carbon tetrachloride	0.1	0.91	0.1	B	566486	135370	BHI 01105	
71-04	216-Z-1A	1.5	1	1997	7/10/1997 9:20		Carbon tetrachloride	0.1	0.91	0.1	B	566386	135133	BHI 01105	
C-1	216-Z-1A	1.5	1	1996	12/10/1996 9:57		Carbon tetrachloride	0.1	0.91	0.1	B	NR	NR	BHI 01105	
79-02	216-Z-1A	1.5	1	1997	1/24/1997 10:35		Carbon tetrachloride	0.1	0.91	0.1	B	566330	135377	BHI 01105	
79-11	216-Z-1A	1.5	1	1997	1/24/1997 11:10		Carbon tetrachloride	0.1	0.91	0.1	B	566576	135360	BHI 01105	
C-1	216-Z-1A	1.5	1	1997	7/10/1997 11:10		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI 01105	
C-1	216-Z-1A	1.5	1	1997	6/9/1997 11:12		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI 01105	
79-11	216-Z-1A	1.5	1	1997	6/9/1997 11:41		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI 01105	
71-04	216-Z-1A	1.5	1	1997	1/24/1997 10:30		Carbon tetrachloride	0.0	0.91	0.0	B	566386	135133	BHI 01105	
71-04	216-Z-1A	1.5	1	1996	11/14/1996 12:00		Carbon tetrachloride	0.0	0.91	0.0	B	566386	135133	BHI 01105	
71-04	216-Z-1A	1.5	1	1996	5/13/1996 10:27		Carbon tetrachloride	<0.045	0.91	0.0	B	566386	135133	BHI 01105	
79-02	216-Z-1A	1.5	1	1996	11/14/1996 12:00		Carbon tetrachloride	0.0	0.91	0.0	B	566330	135377	BHI 01105	
79-02	216-Z-1A	1.5	1	1996	5/13/1996 11:19		Carbon tetrachloride	<0.045	0.91	0.0	B	566330	135377	BHI 01105	
79-03	216-Z-1A	1.5	1	1996	11/27/1996 12:00		Carbon tetrachloride	0.0	0.91	0.0	B	566335	135193	BHI 01105	
79-03	216-Z-1A	1.5	1	1996	11/14/1996 12:00		Carbon tetrachloride	0.0	0.91	0.0	B	566335	135193	BHI 01105	
79-03	216-Z-1A	1.5	1	1996	5/13/1996 10:48		Carbon tetrachloride	<0.045	0.91	0.0	B	566335	135193	BHI 01105	
79-11	216-Z-1A	1.5	1	1996	11/27/1996 11:38		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI 01105	
79-11	216-Z-1A	1.5	1	1996	5/13/1996 13:57		Carbon tetrachloride	<0.045	0.91	0.0	B	566576	135360	BHI 01105	
79-13	216-Z-1A	1.5	1	1996	11/27/1996 11:34		Carbon tetrachloride	0.0	0.91	0.0	B	566635	135417	BHI 01105	
87-01R	216-Z-1A	1.5	1	1997	5/8/1997 10:20		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI 01105	
87-01R	216-Z-1A	1.5	1	1997	4/8/1997 12:41		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI 01105	
87-01R	216-Z-1A	1.5	1	1997	3/4/1997 13:01		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI 01105	
87-01R	216-Z-1A	1.5	1	1997	1/24/1997 10:40		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI 01105	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
87-01R	216-Z-1A	1.5	1	1996	12/10/1996 10:37		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI 01105	
87-01R	216-Z-1A	1.5	1	1996	11/14/1996 12:00		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI 01105	
87-01R	216-Z-1A	1.5	1	1996	5/13/1996 11:27		Carbon tetrachloride	<0.045	0.91	0.0	B	566326	135471	BHI 01105	
87-03	216-Z-1A	1.5	1	1996	11/27/1996 11:54		Carbon tetrachloride	0.0	0.91	0.0	B	566419	135472	BHI 01105	
87-03	216-Z-1A	1.5	1	1996	5/13/1996 13:26		Carbon tetrachloride	<0.045	0.91	0.0	B	566419	135472	BHI 01105	
87-04	216-Z-1A	1.5	1	1996	11/27/1996 11:49		Carbon tetrachloride	0.0	0.91	0.0	B	566481	135443	BHI 01105	
87-04	216-Z-1A	1.5	1	1996	5/13/1996 13:35		Carbon tetrachloride	<0.045	0.91	0.0	B	566481	135443	BHI 01105	
C-1	216-Z-1A	1.5	1	1996	11/14/1996 12:00		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI 01105	
C-1	216-Z-1A	1.5	1	1996	5/13/1996 10:55		Carbon tetrachloride	<0.045	0.91	0.0	B	NR	NR	BHI 01105	
N-5	216-Z-1A	1.5	1	1996	5/13/1996 11:44		Carbon tetrachloride	<0.045	0.91	0.0	B	566486	135370	BHI 01105	
N-9	216-Z-1A	1.5	1	1996	12/10/1996 10:28		Carbon tetrachloride	0.0	0.91	0.0	B	566392	135400	BHI 01105	
N-9	216-Z-1A	1.5	1	1996	11/14/1996 12:00		Carbon tetrachloride	0.0	0.91	0.0	B	566392	135400	BHI 01105	
N-9	216-Z-1A	1.5	1	1996	5/13/1996 13:13		Carbon tetrachloride	<0.045	0.91	0.0	B	566392	135400	BHI 01105	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	12/31/1998 8:23		Carbon tetrachloride	2.9	0.91	3.1	E	566576	135360	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	11/5/1998 9:02		Carbon tetrachloride	2.8	0.91	3.1	E	566576	135360	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	4/26/1999 11:26		Carbon tetrachloride	2.6	0.91	2.8	D	566603	135477	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	3/22/1999 9:30		Carbon tetrachloride	2.5	0.91	2.8	D	566576	135360	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	5/25/1999 11:20		Carbon tetrachloride	2.4	0.91	2.6	D	566603	135477	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	6/28/1999 9:53		Carbon tetrachloride	2.3	0.91	2.5	D	566603	135477	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	1/26/1999 8:17		Carbon tetrachloride	1.9	0.91	2.1	D	566576	135360	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	2/23/1999 9:30		Carbon tetrachloride	1.6	0.91	1.8	C	566576	135360	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	9/29/1998 11:17		Carbon tetrachloride	1.5	0.91	1.6	C	566603	135477	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	4/26/1999 11:04		Carbon tetrachloride	1.5	0.91	1.6	C	566576	135360	BHI-00720	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
79-06/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	5/25/1999 9:40		Carbon tetrachloride	1.4	0.91	1.5	C	566451	135411	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	5/25/1999 11:00		Carbon tetrachloride	1.4	0.91	1.5	C	566576	135360	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	3/22/1999 9:55		Carbon tetrachloride	1.2	0.91	1.4	C	566603	135477	BHI-00720	
79-06/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	6/28/1999 9:14		Carbon tetrachloride	1.2	0.91	1.3	C	566451	135411	BHI-00720	
79-06/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	2/23/1999 9:09		Carbon tetrachloride	1.2	0.91	1.3	C	566451	135411	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	12/31/1998 8:46		Carbon tetrachloride	1.1	0.91	1.2	C	566603	135477	BHI-00720	
87-05/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	5/25/1999 10:47		Carbon tetrachloride	1.0	0.91	1.1	C	566509	135475	BHI-00720	
87-05/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	4/26/1999 10:48		Carbon tetrachloride	1.0	0.91	1.1	C	566509	135475	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1999	5/25/1999 11:04		Carbon tetrachloride	1.0	0.91	1.1	C	NR	NR	BHI-00720	
79-03/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	6/28/1999 7:44		Carbon tetrachloride	0.0	0.91	0.0	B	566335	135193	BHI-00720	
79-03/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	5/25/1999 8:03		Carbon tetrachloride	0.0	0.91	0.0	B	566335	135193	BHI-00720	
79-03/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	4/26/1999 8:36		Carbon tetrachloride	0.0	0.91	0.0	B	566335	135193	BHI-00720	
79-03/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	9/29/1998 8:00		Carbon tetrachloride	0.0	0.91	0.0	B	566335	135193	BHI-00720	
79-06/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	4/26/1999 10:38		Carbon tetrachloride	0.0	0.91	0.0	B	566451	135411	BHI-00720	
79-06/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	3/22/1999 8:39		Carbon tetrachloride	0.0	0.91	0.0	B	566451	135411	BHI-00720	
79-06/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	1/26/1999 7:51		Carbon tetrachloride	0.0	0.91	0.0	B	566451	135411	BHI-00720	
79-06/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	12/31/1998 8:05		Carbon tetrachloride	0.0	0.91	0.0	B	566451	135411	BHI-00720	
79-06/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	12/1/1998 8:07		Carbon tetrachloride	0.0	0.91	0.0	B	566451	135411	BHI-00720	
79-06/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	11/5/1998 8:30		Carbon tetrachloride	0.0	0.91	0.0	B	566451	135411	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	6/28/1999 9:32		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	12/1/1998 8:38		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	9/29/1998 10:53		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	8/14/1998 10:47		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI-00720	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	3/24/1998 8:06		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	2/26/1998 11:44		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	1/29/1998 10:16		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	1/10/1998 12:08		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI-00720	
79-11/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1997	12/1/1997 13:55		Carbon tetrachloride	0.0	0.91	0.0	B	566576	135360	BHI-00720	
87-01R/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	8/14/1998 7:34		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI-00720	
87-01R/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	3/24/1998 10:23		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI-00720	
87-01R/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	2/26/1998 13:01		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI-00720	
87-01R/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	1/29/1998 11:46		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI-00720	
87-01R/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	1/10/1998 14:40		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI-00720	
87-01R/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1997	12/1/1997 13:18		Carbon tetrachloride	0.0	0.91	0.0	B	566326	135471	BHI-00720	
87-03/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	9/29/1998 10:03		Carbon tetrachloride	0.0	0.91	0.0	B	566419	135472	BHI-00720	
87-05/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	6/28/1999 9:25		Carbon tetrachloride	0.0	0.91	0.0	B	566509	135475	BHI-00720	
87-05/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	9/29/1998 10:09		Carbon tetrachloride	0.0	0.91	0.0	B	566509	135475	BHI-00720	
87-05/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	8/14/1998 10:04		Carbon tetrachloride	0.0	0.91	0.0	B	566509	135475	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	2/23/1999 9:49		Carbon tetrachloride	0.0	0.91	0.0	B	566603	135477	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1999	1/26/1999 8:45		Carbon tetrachloride	0.0	0.91	0.0	B	566603	135477	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	12/1/1998 9:11		Carbon tetrachloride	0.0	0.91	0.0	B	566603	135477	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	11/5/1998 9:29		Carbon tetrachloride	0.0	0.91	0.0	B	566603	135477	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	8/14/1998 11:27		Carbon tetrachloride	0.0	0.91	0.0	B	566603	135477	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	3/24/1998 7:53		Carbon tetrachloride	0.0	0.91	0.0	B	566603	135477	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	2/26/1998 11:17		Carbon tetrachloride	0.0	0.91	0.0	B	566603	135477	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	1/29/1998 10:00		Carbon tetrachloride	0.0	0.91	0.0	B	566603	135477	BHI-00720	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	1/10/1998 12:00		Carbon tetrachloride	0.0	0.91	0.0	B	566603	135477	BHI-00720	
87-09/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1997	12/1/1997 13:44		Carbon tetrachloride	0.0	0.91	0.0	B	566603	135477	BHI-00720	
N-6/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1998	3/24/1998 12:25		Carbon tetrachloride	0.0	0.91	0.0	B	566515	135371	BHI-00720	
N-6/5 ft	216-Z-1A/Z-18/Z-12 Site	2	1	1997	12/1/1997 14:20		Carbon tetrachloride	0.0	0.91	0.0	B	566515	135371	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1999	6/28/1999 9:37		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1999	4/26/1999 11:10		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1998	9/29/1998 10:59		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1998	8/14/1998 10:55		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1998	6/29/1998 7:16		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1998	5/26/1998 6:47		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1998	4/30/1998 7:41		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1998	3/24/1998 12:15		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1998	2/26/1998 11:36		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1998	1/29/1998 10:23		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1998	1/10/1998 12:15		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-13A/9 ft	216-Z-1A/Z-18/Z-12 Site	3	2	1997	12/1/1997 14:00		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
C3848	216-Z-1D/11/19/20 Ditches	2.743 - 3.048		2002	9/9/2002 14:53	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566713.46	135452.12	CP-13514	U, detection limit insufficient for comparison to ESL
C3856	216-Z-1D/11/19/20 Ditches	3.658 - 3.962		2002	9/12/2002 11:45	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566585.17	135866.97	CP-13514	U, detection limit insufficient for comparison to ESL
C3852	216-Z-21 Pond	1.219 - 1.524		2002	9/11/2002 8:35	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566847.46	135551.1	CP-13514	U, detection limit insufficient for comparison to ESL
C3853	216-Z-21 Pond	2.134 - 2.438		2002	9/11/2002 10:44	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566843.54	135500.19	CP-13514	U, detection limit insufficient for comparison to ESL
C3855	216-Z-21 Pond	1.524 - 1.829		2002	9/12/2002 6:53	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566816.85	135531.07	CP-13514	U, detection limit insufficient for comparison to ESL

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
C3860	216-Z-7 Crib	1.524 - 1.829		2002	9/13/2002 11:57	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566696.24	135954.02	CP-13514	U, detection limit insufficient for comparison to ESL
CPT-17/10 ft	216-Z-9	3.00	2	2001	4/30/2001 8:45		Carbon tetrachloride	6.6	0.91	7.2	G	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2001	2/28/2001 9:55		Carbon tetrachloride	5.7	0.91	6.2	G	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2001	3/20/2001 9:35		Carbon tetrachloride	5.3	0.91	5.8	G	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2000	12/29/2000 8:08		Carbon tetrachloride	5.2	0.91	5.7	G	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2000	6/2/2000 10:50		Carbon tetrachloride	5.2	0.91	5.7	G	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2001	5/30/2001 8:40		Carbon tetrachloride	5.1	0.91	5.6	G	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2000	6/2/2000 10:40		Carbon tetrachloride	5.1	0.91	5.6	G	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1999	3/23/1999 10:28		Carbon tetrachloride	5.1	0.91	5.5	G	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2001	2/12/2001 10:30		Carbon tetrachloride	4.8	0.91	5.3	G	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2001	6/29/2001 9:18		Carbon tetrachloride	4.7	0.91	5.2	G	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2000	8/29/2000 9:20		Carbon tetrachloride	4.6	0.91	5.0	G	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2000	9/25/2000 9:45		Carbon tetrachloride	4.4	0.91	4.8	F	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	1999	12/29/1999 10:17		Carbon tetrachloride	4.3	0.91	4.8	F	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2000	10/31/2000 10:44		Carbon tetrachloride	4.3	0.91	4.7	F	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1998	5/26/1998 7:17		Carbon tetrachloride	4.2	0.91	4.7	F	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2000	7/24/2000 10:05		Carbon tetrachloride	4.2	0.91	4.6	F	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1998	6/29/1998 7:41		Carbon tetrachloride	4.1	0.91	4.5	F	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2000	8/29/2000 9:42		Carbon tetrachloride	4.1	0.91	4.5	F	566729	135631	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2000	6/27/2000 9:55		Carbon tetrachloride	3.8	0.91	4.2	F	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	1999	1/26/1999 9:33		Carbon tetrachloride	3.7	0.91	4.1	F	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2000	11/28/2000 10:22		Carbon tetrachloride	3.7	0.91	4.0	F	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1998	4/30/1998 8:21		Carbon tetrachloride	3.6	0.91	3.9	E	566739	135563	BHI-00720	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
CPT-17/10 ft	216-Z-9	3.00	2	2000	6/27/2000 9:25		Carbon tetrachloride	3.4	0.91	3.8	E	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	1999	2/23/1999 10:13		Carbon tetrachloride	3.4	0.91	3.8	E	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2001	4/30/2001 8:59		Carbon tetrachloride	3.2	0.91	3.5	E	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	2001	12/6/2001 10:39		Carbon tetrachloride	3.17	0.91	3.5	E	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1998	12/31/1998 9:10		Carbon tetrachloride	3.2	0.91	3.5	E	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1998	11/5/1998 10:31		Carbon tetrachloride	3.2	0.91	3.5	E	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2000	9/25/2000 9:54		Carbon tetrachloride	3.2	0.91	3.5	E	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	1999	11/30/1999 12:40		Carbon tetrachloride	3.1	0.91	3.4	E	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	2002	2/26/2002 10:43		Carbon tetrachloride	3.08	0.91	3.4	E	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	2002	2/4/2002 10:57		Carbon tetrachloride	2.99	0.91	3.3	E	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2000	12/29/2000 8:18		Carbon tetrachloride	3.0	0.91	3.3	E	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2000	1/25/2000 10:09		Carbon tetrachloride	2.9	0.91	3.2	E	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	2002	1/9/2002 10:11		Carbon tetrachloride	2.82	0.91	3.1	E	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2000	1/25/2000 10:36		Carbon tetrachloride	2.8	0.91	3.1	E	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	1999	12/29/1999 9:54		Carbon tetrachloride	2.6	0.91	2.8	D	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1999	9/14/1999 9:35		Carbon tetrachloride	2.6	0.91	2.8	D	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2000	3/7/2000 10:11		Carbon tetrachloride	2.6	0.91	2.8	D	566729	135631	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2001	6/29/2001 9:27		Carbon tetrachloride	2.5	0.91	2.7	D	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	2001	11/5/2001 11:28		Carbon tetrachloride	2.48	0.91	2.7	D	566739	135563	BHI-00720	
95-11/5 ft	216-Z-9	1.52	1	1999	1/26/1999 9:53		Carbon tetrachloride	2.5	0.91	2.7	D	566732	135635	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2001	2/12/2001 10:49		Carbon tetrachloride	2.3	0.91	2.5	D	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1999	9/28/1999 9:22		Carbon tetrachloride	2.3	0.91	2.5	D	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2000	11/28/2000 10:39		Carbon tetrachloride	2.1	0.91	2.3	D	566729	135631	BHI-00720	

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Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
95-11/5 ft	216-Z-9	1.52	1	1998	5/26/1998 7:36		Carbon tetrachloride	2.1	0.91	2.3	D	566732	135635	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	2002	4/8/2002 9:45		Carbon tetrachloride	2.08	0.91	2.3	D	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1999	7/30/1999 8:08		Carbon tetrachloride	2.1	0.91	2.3	D	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2000	7/24/2000 10:13		Carbon tetrachloride	2.0	0.91	2.2	D	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	2002	10/4/2002 8:59		Carbon tetrachloride	1.95	0.91	2.1	D	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2001	5/30/2001 8:51		Carbon tetrachloride	2.0	0.91	2.1	D	566729	135631	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1999	3/22/1999 10:36		Carbon tetrachloride	1.9	0.91	2.1	D	566795	135586	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	1999	10/26/1999 9:25		Carbon tetrachloride	1.8	0.91	2.0	D	566729	135631	BHI-00720	
95-11/5 ft	216-Z-9	1.52	1	1998	6/29/1998 7:59		Carbon tetrachloride	1.8	0.91	1.9	C	566732	135635	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	1999	10/26/1999 9:10		Carbon tetrachloride	1.7	0.91	1.9	C	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2000	10/31/2000 10:54		Carbon tetrachloride	1.7	0.91	1.9	C	566729	135631	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1998	12/1/1998 9:41		Carbon tetrachloride	1.7	0.91	1.8	C	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.00	2	2000	3/7/2000 10:02		Carbon tetrachloride	1.7	0.91	1.8	C	566739	135563	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	2002	7/30/2002 10:17		Carbon tetrachloride	1.63	0.91	1.8	C	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	1999	11/30/1999 12:49		Carbon tetrachloride	1.6	0.91	1.8	C	566729	135631	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	5/26/1998 7:20		Carbon tetrachloride	1.5	0.91	1.7	C	566730	135575	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	5/26/1998 7:20		Carbon tetrachloride	1.5	0.91	1.7	C	566730	135575	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1999	2/23/1999 11:38		Carbon tetrachloride	1.5	0.91	1.7	C	566795	135586	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	1999	11/30/1999 12:49		Carbon tetrachloride	1.5	0.91	1.6	C	566729	135631	BHI-00720	
95-11/5 ft	216-Z-9	1.52	1	1998	12/31/1998 9:29		Carbon tetrachloride	1.5	0.91	1.6	C	566732	135635	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2001	3/20/2001 9:47		Carbon tetrachloride	1.5	0.91	1.6	C	566729	135631	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2001	2/28/2001 10:24		Carbon tetrachloride	1.5	0.91	1.6	C	566729	135631	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1998	11/5/1998 11:34		Carbon tetrachloride	1.5	0.91	1.6	C	NR	NR	BHI-00720	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
CPT-17/10 ft	216-Z-9	3.05	2	2002	8/26/2002 9:30		Carbon tetrachloride	1.43	0.91	1.6	C	566739	135563	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	4/30/1998 8:25		Carbon tetrachloride	1.4	0.91	1.6	C	566730	135575	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	4/30/1998 8:25		Carbon tetrachloride	1.4	0.91	1.6	C	566730	135575	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2002	2/26/2002 10:56		Carbon tetrachloride	1.41	0.91	1.5	C	566729	135631	BHI-00720	
94-09	216-Z-9	1.50	1	1997	4/8/1997 10:45		Carbon tetrachloride	1.4	0.91	1.5	C	566904	135702	BHI 01105	
94-02/5 ft	216-Z-9	1.52	1	1999	7/30/1999 8:32		Carbon tetrachloride	1.4	0.91	1.5	C	566689	135654	BHI-00720	
CPT-18/15 ft	216-Z-9	4.60	2	2001	12/6/2001 10:50		Carbon tetrachloride	1.33	0.91	1.5	C	566729	135631	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1999	1/26/1999 9:37		Carbon tetrachloride	1.3	0.91	1.4	C	566730	135575	BHI-00720	
86-06	216-Z-9	1.50	1	1997	5/8/1997 12:52		Carbon tetrachloride	1.3	0.91	1.4	C	566795	135586	BHI 01105	
94-09/5 ft	216-Z-9	1.52	1	1998	2/26/1998 9:02		Carbon tetrachloride	1.3	0.91	1.4	C	566904	135702	BHI-00720	
94-09/5 ft	216-Z-9	1.52	1	1997	12/1/1997 12:35		Carbon tetrachloride	1.3	0.91	1.4	C	566904	135702	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1999	2/23/1999 10:17		Carbon tetrachloride	1.2	0.91	1.4	C	566730	135575	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	6/29/1998 7:45		Carbon tetrachloride	1.2	0.91	1.4	C	566730	135575	BHI-00720	
CPT-18/15 ft	216-Z-9	4.57	2	2002	10/4/2002 9:14		Carbon tetrachloride	1.23	0.91	1.4	C	566729	135631	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	12/31/1998 9:14		Carbon tetrachloride	1.2	0.91	1.3	C	566730	135575	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	11/5/1998 10:38		Carbon tetrachloride	1.2	0.91	1.3	C	566730	135575	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1998	3/24/1998 11:13		Carbon tetrachloride	1.2	0.91	1.3	C	566739	135563	BHI-00720	
CPT-18/15 ft	216-Z-9	4.57	2	2001	11/5/2001 11:16		Carbon tetrachloride	1.16	0.91	1.3	C	566729	135631	BHI-00720	
95-11/5 ft	216-Z-9	1.52	1	1998	3/24/1998 11:27		Carbon tetrachloride	1.2	0.91	1.3	C	566732	135635	BHI-00720	
94-05	216-Z-9	1.50	1	1997	7/10/1997 10:40		Carbon tetrachloride	1.1	0.91	1.2	C	566762	135773	BHI 01105	
94-09	216-Z-9	1.50	1	1997	3/4/1997 11:05		Carbon tetrachloride	1.1	0.91	1.2	C	566904	135702	BHI 01105	
95-12	216-Z-9	1.50	1	1997	7/10/1997 10:32		Carbon tetrachloride	1.1	0.91	1.2	C	566730	135575	BHI 01105	
95-12	216-Z-9	1.50	1	1997	6/9/1997 12:02		Carbon tetrachloride	1.1	0.91	1.2	C	566730	135575	BHI 01105	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
CPT-16/10 ft	216-Z-9	3.00	2	1999	2/23/1999 11:43		Carbon tetrachloride	1.0	0.91	1.1	C	NR	NR	BHI-00720	
86-03	216-Z-9	1.50	1	1997	4/8/1997 10:30		Carbon tetrachloride	0.8	0.91	0.8	B	566702	135481	BHI 01105	
94-02	216-Z-9	1.50	1	1997	7/10/1997 10:08		Carbon tetrachloride	0.7	0.91	0.8	B	566689	135654	BHI 01105	
95-05	216-Z-9	1.50	1	1997	1/27/1997 11:18		Carbon tetrachloride	0.7	0.91	0.8	B	566703	135830	BHI 01105	
94-09	216-Z-9	1.50	1	1997	7/10/1997 10:49		Carbon tetrachloride	0.7	0.91	0.7	B	566904	135702	BHI 01105	
86-03	216-Z-9	1.50	1	1997	3/4/1997 11:30		Carbon tetrachloride	0.6	0.91	0.7	B	566702	135481	BHI 01105	
86-03	216-Z-9	1.50	1	1997	5/8/1997 11:40		Carbon tetrachloride	0.6	0.91	0.7	B	566702	135481	BHI 01105	
94-05	216-Z-9	1.50	1	1997	5/8/1997 13:22		Carbon tetrachloride	0.6	0.91	0.6	B	566792	135773	BHI 01105	
95-12	216-Z-9	1.50	1	1997	5/8/1997 13:05		Carbon tetrachloride	0.5	0.91	0.6	B	566730	135575	BHI 01105	
86-04	216-Z-9	1.50	1	1997	4/8/1997 10:34		Carbon tetrachloride	0.5	0.91	0.6	B	566728	135512	BHI 01105	
86-04	216-Z-9	1.50	1	1997	5/8/1997 11:48		Carbon tetrachloride	0.5	0.91	0.5	B	566728	135512	BHI 01105	
86-03	216-Z-9	1.50	1	1997	1/24/1997 11:20		Carbon tetrachloride	0.5	0.91	0.5	B	566702	135481	BHI 01105	
86-04	216-Z-9	1.50	1	1997	3/4/1997 11:35		Carbon tetrachloride	0.4	0.91	0.5	B	566728	135512	BHI 01105	
94-03R	216-Z-9	1.50	1	1997	6/9/1997 12:13		Carbon tetrachloride	0.4	0.91	0.5	B	566716	135688	BHI 01105	
86-04	216-Z-9	1.50	1	1997	6/9/1997 11:58		Carbon tetrachloride	0.4	0.91	0.4	B	566728	135512	BHI 01105	
94-03R	216-Z-9	1.50	1	1997	7/10/1997 10:24		Carbon tetrachloride	0.4	0.91	0.4	B	566716	135688	BHI 01105	
94-03R	216-Z-9	1.50	1	1996	12/10/1996 11:43		Carbon tetrachloride	0.4	0.91	0.4	B	566716	135688	BHI 01105	
94-09	216-Z-9	1.50	1	1997	5/8/1997 14:13		Carbon tetrachloride	0.4	0.91	0.4	B	566904	135702	BHI 01105	
94-03R	216-Z-9	1.50	1	1997	5/8/1997 13:16		Carbon tetrachloride	0.3	0.91	0.4	B	566716	135688	BHI 01105	
95-12	216-Z-9	1.50	1	1997	4/8/1997 11:09		Carbon tetrachloride	0.3	0.91	0.4	B	566730	135575	BHI 01105	
86-04	216-Z-9	1.50	1	1997	7/10/1997 11:05		Carbon tetrachloride	0.3	0.91	0.4	B	566728	135512	BHI 01105	
95-06	216-Z-9	1.50	1	1997	4/8/1997 10:58		Carbon tetrachloride	0.3	0.91	0.4	B	566750	135830	BHI 01105	
95-12	216-Z-9	1.50	1	1997	3/4/1997 11:40		Carbon tetrachloride	0.3	0.91	0.4	B	566730	135575	BHI 01105	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
95-11	216-Z-9	1.50	1	1997	7/10/1997 10:28		Carbon tetrachloride	0.3	0.91	0.4	B	566732	135635	BHI 01105	
85-01R	216-Z-9	1.50	1	1997	7/10/1997 10:53		Carbon tetrachloride	0.3	0.91	0.3	B	566970	135480	BHI 01105	
95-06	216-Z-9	1.50	1	1997	3/4/1997 10:50		Carbon tetrachloride	0.3	0.91	0.3	B	566750	135830	BHI 01105	
95-07	216-Z-9	1.50	1	1997	6/9/1997 12:36		Carbon tetrachloride	0.3	0.91	0.3	B	566794	135830	BHI 01105	
95-11	216-Z-9	1.50	1	1997	4/8/1997 11:14		Carbon tetrachloride	0.3	0.91	0.3	B	566732	135635	BHI 01105	
94-05	216-Z-9	1.50	1	1997	6/9/1997 12:26		Carbon tetrachloride	0.3	0.91	0.3	B	566792	135773	BHI 01105	
94-09	216-Z-9	1.50	1	1997	6/9/1997 12:47		Carbon tetrachloride	0.3	0.91	0.3	B	566904	135702	BHI 01105	
94-04	216-Z-9	1.50	1	1997	3/4/1997 10:59		Carbon tetrachloride	0.3	0.91	0.3	B	566744	135721	BHI 01105	
86-03	216-Z-9	1.50	1	1997	7/10/1997 9:58		Carbon tetrachloride	0.3	0.91	0.3	B	566702	135481	BHI 01105	
94-02	216-Z-9	1.50	1	1997	4/8/1997 12:02		Carbon tetrachloride	0.3	0.91	0.3	B	566689	135654	BHI 01105	
95-11	216-Z-9	1.50	1	1997	6/9/1997 12:06		Carbon tetrachloride	0.3	0.91	0.3	B	566732	135635	BHI 01105	
95-11	216-Z-9	1.50	1	1997	3/4/1997 11:55		Carbon tetrachloride	0.3	0.91	0.3	B	566732	135635	BHI 01105	
95-11	216-Z-9	1.50	1	1997	5/8/1997 13:00		Carbon tetrachloride	0.2	0.91	0.3	B	566732	135635	BHI 01105	
94-05	216-Z-9	1.50	1	1997	4/8/1997 12:30		Carbon tetrachloride	0.2	0.91	0.3	B	566792	135773	BHI 01105	
94-02	216-Z-9	1.50	1	1997	5/8/1997 13:10		Carbon tetrachloride	0.2	0.91	0.3	B	566689	135654	BHI 01105	
95-07	216-Z-9	1.50	1	1996	12/10/1996 12:18		Carbon tetrachloride	0.2	0.91	0.3	B	566794	135830	BHI 01105	
94-05	216-Z-9	1.50	1	1997	3/4/1997 10:57		Carbon tetrachloride	0.2	0.91	0.2	B	566792	135773	BHI 01105	
86-06	216-Z-9	1.50	1	1997	3/4/1997 11:15		Carbon tetrachloride	0.2	0.91	0.2	B	566795	135586	BHI 01105	
94-02	216-Z-9	1.50	1	1997	3/4/1997 11:25		Carbon tetrachloride	0.2	0.91	0.2	B	566689	135654	BHI 01105	
85-01R	216-Z-9	1.50	1	1997	6/9/1997 12:42		Carbon tetrachloride	0.2	0.91	0.2	B	566970	135480	BHI 01105	
94-02	216-Z-9	1.50	1	1997	1/24/1997 11:36		Carbon tetrachloride	0.2	0.91	0.2	B	566689	135654	BHI 01105	
86-06	216-Z-9	1.50	1	1997	4/8/1997 12:14		Carbon tetrachloride	0.2	0.91	0.2	B	566795	135586	BHI 01105	
94-03R	216-Z-9	1.50	1	1997	1/24/1997 11:40		Carbon tetrachloride	0.2	0.91	0.2	B	566716	135688	BHI 01105	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
95-07	216-Z-9	1.50	1	1997	1/24/1997 12:09		Carbon tetrachloride	0.2	0.91	0.2	B	566794	135830	BHI 01105	
95-07	216-Z-9	1.50	1	1997	7/10/1997 11:22		Carbon tetrachloride	0.2	0.91	0.2	B	566794	135830	BHI 01105	
85-01R	216-Z-9	1.50	1	1997	1/24/1997 11:28		Carbon tetrachloride	0.2	0.91	0.2	B	566970	135480	BHI 01105	
86-03	216-Z-9	1.50	1	1997	6/9/1997 11:52		Carbon tetrachloride	0.2	0.91	0.2	B	566702	135481	BHI 01105	
85-01R	216-Z-9	1.50	1	1997	4/8/1997 10:38		Carbon tetrachloride	0.2	0.91	0.2	B	566970	135480	BHI 01105	
86-04	216-Z-9	1.50	1	1996	12/10/1996 11:22		Carbon tetrachloride	0.2	0.91	0.2	B	566728	135512	BHI 01105	
94-09	216-Z-9	1.50	1	1996	12/10/1996 12:11		Carbon tetrachloride	0.2	0.91	0.2	B	566904	135702	BHI 01105	
95-07	216-Z-9	1.50	1	1997	4/8/1997 11:03		Carbon tetrachloride	0.2	0.91	0.2	B	566794	135830	BHI 01105	
85-01R	216-Z-9	1.50	1	1997	3/4/1997 11:10		Carbon tetrachloride	0.2	0.91	0.2	B	566970	135480	BHI 01105	
94-09	216-Z-9	1.50	1	1997	1/24/1997 11:58		Carbon tetrachloride	0.2	0.91	0.2	B	566904	135702	BHI 01105	
94-03R	216-Z-9	1.50	1	1996	5/16/1996 14:38		Carbon tetrachloride	0.2	0.91	0.2	B	566716	135688	BHI 01105	
95-07	216-Z-9	1.50	1	1997	3/4/1997 10:45		Carbon tetrachloride	0.1	0.91	0.2	B	566794	135830	BHI 01105	
86-06	216-Z-9	1.50	1	1996	12/10/1996 11:35		Carbon tetrachloride	0.1	0.91	0.2	B	566795	135586	BHI 01105	
94-02	216-Z-9	1.50	1	1997	6/9/1997 12:09		Carbon tetrachloride	0.1	0.91	0.2	B	566689	135654	BHI 01105	
95-11	216-Z-9	1.50	1	1996	12/10/1996 11:45		Carbon tetrachloride	0.1	0.91	0.2	B	566732	135635	BHI 01105	
86-08	216-Z-9	1.50	1	1997	1/24/1997 11:32		Carbon tetrachloride	0.1	0.91	0.2	B	566787	135483	BHI 01105	
85-01R	216-Z-9	1.50	1	1996	12/10/1996 11:17		Carbon tetrachloride	0.1	0.91	0.1	B	566970	135480	BHI 01105	
95-08	216-Z-9	1.50	1	1997	4/8/1997 11:08		Carbon tetrachloride	0.1	0.91	0.1	B	566845	135830	BHI 01105	
94-02	216-Z-9	1.50	1	1996	12/10/1996 12:08		Carbon tetrachloride	0.1	0.91	0.1	B	566689	135654	BHI 01105	
95-07	216-Z-9	1.50	1	1996	5/16/1996 12:13		Carbon tetrachloride	0.1	0.91	0.1	B	566794	135830	BHI 01105	
95-08	216-Z-9	1.50	1	1997	3/4/1997 10:40		Carbon tetrachloride	0.1	0.91	0.1	B	566845	135830	BHI 01105	
86-04	216-Z-9	1.50	1	1997	1/24/1997 11:24		Carbon tetrachloride	0.1	0.91	0.1	B	566728	135512	BHI 01105	
94-05	216-Z-9	1.50	1	1997	1/24/1997 12:20		Carbon tetrachloride	0.1	0.91	0.1	B	566792	135773	BHI 01105	

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Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
85-01R	216-Z-9	1.50	1	1997	5/8/1997 14:30		Carbon tetrachloride	0.1	0.91	0.1	B	566970	135480	BHI 01105	
94-03R	216-Z-9	1.50	1	1997	4/8/1997 12:09		Carbon tetrachloride	0.1	0.91	0.1	B	566716	135688	BHI 01105	
94-05	216-Z-9	1.50	1	1996	12/10/1996 12:33		Carbon tetrachloride	0.1	0.91	0.1	B	566792	135773	BHI 01105	
94-03R	216-Z-9	1.50	1	1997	3/4/1997 11:45		Carbon tetrachloride	0.1	0.91	0.1	B	566716	135688	BHI 01105	
95-12	216-Z-9	1.50	1	1997	1/24/1997 12:25		Carbon tetrachloride	0.1	0.91	0.1	B	566730	135575	BHI 01105	
86-06	216-Z-9	1.50	1	1997	1/24/1997 11:51		Carbon tetrachloride	0.1	0.91	0.1	B	566795	135586	BHI 01105	
86-06	216-Z-9	1.50	1	1997	7/10/1997 11:00		Carbon tetrachloride	0.1	0.91	0.1	B	566795	135586	BHI 01105	
95-07	216-Z-9	1.50	1	1997	5/8/1997 14:39		Carbon tetrachloride	0.1	0.91	0.1	B	566794	135830	BHI 01105	
86-03	216-Z-9	1.50	1	1996	12/10/1996 11:08		Carbon tetrachloride	0.0	0.91	0.0	B	566702	135481	BHI 01105	
85-01R	216-Z-9	1.50	1	1996	5/16/1996 13:41		Carbon tetrachloride	<0.045	0.91	0.0	B	566970	135480	BHI 01105	
86-03	216-Z-9	1.50	1	1996	5/16/1996 13:20		Carbon tetrachloride	<0.045	0.91	0.0	B	566702	135481	BHI 01105	
86-04	216-Z-9	1.50	1	1996	11/27/1996 10:11		Carbon tetrachloride	0.0	0.91	0.0	B	566728	135512	BHI 01105	
86-04	216-Z-9	1.50	1	1996	5/16/1996 13:27		Carbon tetrachloride	<0.045	0.91	0.0	B	566728	135512	BHI 01105	
86-06	216-Z-9	1.50	1	1997	6/9/1997 12:19		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI 01105	
86-06	216-Z-9	1.50	1	1996	5/16/1996 13:57		Carbon tetrachloride	<0.045	0.91	0.0	B	566795	135586	BHI 01105	
86-08	216-Z-9	1.50	1	1996	11/27/1996 10:17		Carbon tetrachloride	0.0	0.91	0.0	B	566787	135483	BHI 01105	
94-02	216-Z-9	1.50	1	1996	11/27/1996 10:32		Carbon tetrachloride	0.0	0.91	0.0	B	566689	135654	BHI 01105	
94-02	216-Z-9	1.50	1	1996	5/16/1996 14:29		Carbon tetrachloride	<0.045	0.91	0.0	B	566689	135654	BHI 01105	
94-05	216-Z-9	1.50	1	1996	5/16/1996 15:02		Carbon tetrachloride	<0.045	0.91	0.0	B	566792	135773	BHI 01105	
94-09	216-Z-9	1.50	1	1996	11/27/1996 10:51		Carbon tetrachloride	0.0	0.91	0.0	B	566904	135702	BHI 01105	
94-09	216-Z-9	1.50	1	1996	5/16/1996 15:12		Carbon tetrachloride	<0.045	0.91	0.0	B	566904	135702	BHI 01105	
95-08	216-Z-9	1.50	1	1997	1/24/1997 12:15		Carbon tetrachloride	0.0	0.91	0.0	B	566845	135830	BHI 01105	
95-08	216-Z-9	1.50	1	1996	11/27/1996 11:14		Carbon tetrachloride	0.0	0.91	0.0	B	566845	135830	BHI 01105	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
95-09	216-Z-9	1.50	1	1997	4/8/1997 10:52		Carbon tetrachloride	0.0	0.91	0.0	B	566940	135830	BHI 01105	
95-09	216-Z-9	1.50	1	1997	3/4/1997 10:55		Carbon tetrachloride	0.0	0.91	0.0	B	566940	135830	BHI 01105	
95-09	216-Z-9	1.50	1	1997	1/24/1997 12:03		Carbon tetrachloride	0.0	0.91	0.0	B	566940	135830	BHI 01105	
95-09	216-Z-9	1.50	1	1996	12/10/1996 12:14		Carbon tetrachloride	0.0	0.91	0.0	B	566940	135830	BHI 01105	
95-09	216-Z-9	1.50	1	1996	11/27/1996 10:58		Carbon tetrachloride	0.0	0.91	0.0	B	566940	135830	BHI 01105	
95-09	216-Z-9	1.50	1	1996	5/16/1996 15:18		Carbon tetrachloride	<0.045	0.91	0.0	B	566940	135830	BHI 01105	
95-11	216-Z-9	1.50	1	1997	1/24/1997 12:28		Carbon tetrachloride	0.0	0.91	0.0	B	566732	135635	BHI 01105	
95-11	216-Z-9	1.50	1	1996	11/27/1996 10:23		Carbon tetrachloride	0.0	0.91	0.0	B	566732	135635	BHI 01105	
95-11	216-Z-9	1.50	1	1996	5/16/1996 14:16		Carbon tetrachloride	<0.045	0.91	0.0	B	566732	135635	BHI 01105	
95-12	216-Z-9	1.50	1	1996	12/10/1996 11:27		Carbon tetrachloride	0.0	0.91	0.0	B	566730	135575	BHI 01105	
95-12	216-Z-9	1.50	1	1996	5/16/1996 13:36		Carbon tetrachloride	<0.045	0.91	0.0	B	566730	135575	BHI 01105	
86-06/5 ft	216-Z-9	1.52	1	1998	6/29/1998 11:42		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1998	5/26/1998 9:10		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1998	4/30/1998 11:06		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1998	3/24/1998 13:00		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1998	2/26/1998 8:42		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1998	1/29/1998 8:20		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1998	1/10/1998 9:08		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1997	12/1/1997 12:07		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
94-09/5 ft	216-Z-9	1.52	1	1998	9/29/1998 11:35		Carbon tetrachloride	0.0	0.91	0.0	B	566904	135702	BHI-00720	
94-09/5 ft	216-Z-9	1.52	1	1998	8/14/1998 12:08		Carbon tetrachloride	0.0	0.91	0.0	B	566904	135702	BHI-00720	
94-09/5 ft	216-Z-9	1.52	1	1998	6/29/1998 9:23		Carbon tetrachloride	0.0	0.91	0.0	B	566904	135702	BHI-00720	
94-09/5 ft	216-Z-9	1.52	1	1998	5/26/1998 9:17		Carbon tetrachloride	0.0	0.91	0.0	B	566904	135702	BHI-00720	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
94-09/5 ft	216-Z-9	1.52	1	1998	4/30/1998 11:12		Carbon tetrachloride	0.0	0.91	0.0	B	566904	135702	BHI-00720	
94-09/5 ft	216-Z-9	1.52	1	1998	3/24/1998 11:51		Carbon tetrachloride	0.0	0.91	0.0	B	566904	135702	BHI-00720	
94-09/5 ft	216-Z-9	1.52	1	1998	1/29/1998 8:40		Carbon tetrachloride	0.0	0.91	0.0	B	566904	135702	BHI-00720	
94-09/5 ft	216-Z-9	1.52	1	1998	1/10/1998 9:22		Carbon tetrachloride	0.0	0.91	0.0	B	566904	135702	BHI-00720	
95-11/5 ft	216-Z-9	1.52	1	1998	4/30/1998 9:09		Carbon tetrachloride	0.0	0.91	0.0	B	566732	135635	BHI-00720	
95-11/5 ft	216-Z-9	1.52	1	1998	2/26/1998 10:22		Carbon tetrachloride	0.0	0.91	0.0	B	566732	135635	BHI-00720	
95-11/5 ft	216-Z-9	1.52	1	1998	1/29/1998 9:08		Carbon tetrachloride	0.0	0.91	0.0	B	566732	135635	BHI-00720	
95-11/5 ft	216-Z-9	1.52	1	1998	1/10/1998 10:07		Carbon tetrachloride	0.0	0.91	0.0	B	566732	135635	BHI-00720	
95-11/5 ft	216-Z-9	1.52	1	1997	12/1/1997 12:57		Carbon tetrachloride	0.0	0.91	0.0	B	566732	135635	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	3/24/1998 11:16		Carbon tetrachloride	0.0	0.91	0.0	B	566730	135575	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	2/26/1998 10:27		Carbon tetrachloride	0.0	0.91	0.0	B	566730	135575	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	1/29/1998 9:17		Carbon tetrachloride	0.0	0.91	0.0	B	566730	135575	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	1/10/1998 11:25		Carbon tetrachloride	0.0	0.91	0.0	B	566730	135575	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1997	12/1/1997 13:10		Carbon tetrachloride	0.0	0.91	0.0	B	566730	135575	BHI-00720	
86-05/5 ft	216-Z-9	1.52	1	1999	9/28/1999 9:33		Carbon tetrachloride	0.0	0.91	0.0	B	566754	135543	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1999	9/28/1999 11:28		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1999	9/14/1999 11:31		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1999	1/26/1999 10:34		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1998	12/31/1998 10:15		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
86-06/5 ft	216-Z-9	1.52	1	1998	12/1/1998 10:52		Carbon tetrachloride	0.0	0.91	0.0	B	566795	135586	BHI-00720	
94-02/5 ft	216-Z-9	1.52	1	1999	9/28/1999 10:31		Carbon tetrachloride	0.0	0.91	0.0	B	566689	135654	BHI-00720	
94-02/5 ft	216-Z-9	1.52	1	1999	9/14/1999 10:37		Carbon tetrachloride	0.0	0.91	0.0	B	566689	135654	BHI-00720	
95-11/5 ft	216-Z-9	1.52	1	1998	12/1/1998 10:07		Carbon tetrachloride	0.0	0.91	0.0	B	566732	135635	BHI-00720	

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
95-11/5 ft	216-Z-9	1.52	1	1998	11/5/1998 10:48		Carbon tetrachloride	0.0	0.91	0.0	B	566732	135635	BHI-00720	
95-12/5 ft	216-Z-9	1.52	1	1998	12/1/1998 9:47		Carbon tetrachloride	0.0	0.91	0.0	B	566730	135575	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1999	9/28/1999 11:57		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1999	9/14/1999 12:09		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1999	3/22/1999 11:17		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1999	1/26/1999 10:40		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1998	12/31/1998 10:21		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1998	12/1/1998 10:59		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1998	6/29/1998 9:11		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1998	5/26/1998 8:40		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1998	4/30/1998 10:41		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1998	3/24/1998 11:46		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1998	2/26/1998 9:09		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1998	1/29/1998 8:46		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1998	1/10/1998 9:32		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-16/10 ft	216-Z-9	3.05	2	1997	12/1/1997 12:50		Carbon tetrachloride	0.0	0.91	0.0	B	NR	NR	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1998	2/26/1998 10:33		Carbon tetrachloride	0.0	0.91	0.0	B	566739.28	135563.42	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1998	1/29/1998 9:22		Carbon tetrachloride	0.0	0.91	0.0	B	566739.28	135563.42	BHI-00720	
CPT-17/10 ft	216-Z-9	3.05	2	1998	1/10/1998 11:32		Carbon tetrachloride	0.0	0.91	0.0	B	566739.28	135563.42	BHI-00720	
C4048	216-Z-D1/11/19/20 Ditches from 231-Z Building	1.585 - 2.073		2002	9/25/2002 11:53	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566529.91	135894.44	CP-13514	U, detection limit insufficient for comparison to ESL
C4048	216-Z-D1/11/19/20 Ditches from 231-Z Building	1.585 - 2.073		2002	9/25/2002 11:53	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566529.91	135894.44	CP-13514	U, detection limit insufficient for comparison to ESL
T1-03	218-W-4C Burial Ground Trenches	2.591 - 2.743		2002	5/8/2002 10:41	VOA_B&K_FLD	Carbon tetrachloride	1.55	0.91	1.7	C	566245.32	135708.95	CP-13514	

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Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
T1-04	218-W-4C Burial Ground Trenches	2.59		2002	5/8/2002 10:54	VOA_B&K_FLD	Carbon tetrachloride	1.48	0.91	1.6	C	566343.56	135709.12	CP-13514	
C3867	218-W-4C Burial Ground Trenches	4.6		2002	9/17/2002		Carbon tetrachloride	14.9	0.91	16.4	H	566478	135359	CP-13514	
C3867	218-W-4C Burial Ground Trenches	3.9		2002	9/17/2002		Carbon tetrachloride	7.34	0.91	8.1	G	566478	135359	CP-13514	
C3867	218-W-4C Burial Ground Trenches	3		2002	9/17/2002		Carbon tetrachloride	47.6	0.91	52.3	J	566478	135359	CP-13514	
C3867	218-W-4C Burial Ground Trenches	3		2002	9/17/2002		Carbon tetrachloride	45.8	0.91	50.3	J	566478	135359	CP-13514	
C3868	218-W-4C Burial Ground Trenches	4.6		2002	9/17/2002		Carbon tetrachloride	3.95	0.91	4.3	F	566284	135675	CP-13514	
C3868	218-W-4C Burial Ground Trenches	2.1		2002	9/17/2002		Carbon tetrachloride	5.23	0.91	5.7	G	566284	135675	CP-13514	
C3869	218-W-4C Burial Ground Trenches	4.6		2002	9/18/2002		Carbon tetrachloride	16	0.91	17.6	H	566249	135684	CP-13514	
C3869	218-W-4C Burial Ground Trenches	3		2002	9/18/2002		Carbon tetrachloride	9.61	0.91	10.6	H	566249	135684	CP-13514	
C3870	218-W-4C Burial Ground Trenches	4.6		2002	9/18/2002		Carbon tetrachloride	5.13	0.91	5.6	G	566241	135684	CP-13514	
C3870	218-W-4C Burial Ground Trenches	3.4		2002	9/18/2002		Carbon tetrachloride	3.58	0.91	3.9	E	566241	135684	CP-13514	
T1-03	218-W-4C Burial Ground Trenches	1.6		2002	5/8/2002		Carbon tetrachloride	1.55	0.91	1.7	C	566257	135672	CP-13514	
T1-04	218-W-4C Burial Ground Trenches	1.5		2002	5/8/2002		Carbon tetrachloride	1.48	0.91	1.6	C	566242	135709	CP-13514	
C3876	Borehole	14.0' - 14.5'		2003	8/19/2003		Carbon tetrachloride	<1.1	0.91	?	A	566561.95	135512.92	DOE/RL-2006-51	Detection limit insufficient for comparison to ESL
C3879	Borehole	13.1' - 13.8'		2003	8/19/2003		Carbon tetrachloride	<1.0	0.91	?	A	566559.6	135591.04	DOE/RL-2006-51	Detection limit insufficient for comparison to ESL
C4060	Borehole	13.5'-14.0'		2003	8/22/2003		Carbon tetrachloride	<1.0	0.91	?	A	566533.96	135514.87	DOE/RL-2006-51	Detection limit insufficient for comparison to ESL
C4062	Borehole	14.0'-14.7'		2003	8/26/2003		Carbon tetrachloride	<1.0	0.91	?	A	566413.85	135513.91	DOE/RL-2006-51	Detection limit insufficient for comparison to ESL
C4064	Borehole	14.0' - 14.5'		2003	8/21/2003		Carbon tetrachloride	<1.0	0.91	?	A	566501.78	135586.96	DOE/RL-2006-51	Detection limit insufficient for comparison to ESL
C4066	Borehole	14.5' - 15'		2003	8/21/2003		Carbon tetrachloride	<1.0	0.91	?	A	566475.05	135587.1	DOE/RL-2006-51	Detection limit insufficient for comparison to ESL
C4068	Borehole	14.3'-14.8'		2003	8/26/2003		Carbon tetrachloride	<1.0	0.91	?	A	566377.59	135688.96	DOE/RL-2006-51	Detection limit insufficient for comparison to ESL
C4137	Borehole	14.0' - 14.5'		2003	8/27/2003		Carbon tetrachloride	<1.0	0.91	?	A	566468.61	135741.13	DOE/RL-2006-51	Detection limit insufficient for comparison to ESL
C4012	Pipeline to 216-Z-12 Crib	3.658 - 4.084		2002	8/22/2002 14:55	VOA_B&K_FLD	Carbon tetrachloride	62.1	0.91	68.2	J	566250.4	135662.63	CP-13514	
C3965	Pipeline to 216-Z-18 Crib	4.12		2002	8/5/2002 9:20	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566483.99	135329.62	CP-13514	U, detection limit insufficient for comparison to ESL
C3965	Pipeline to 216-Z-18 Crib	1.52		2002	8/5/2002 10:05	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566483.99	135329.62	CP-13514	U, detection limit insufficient for comparison to ESL

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Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
C3966	Pipeline to 216-Z-18 Crib	1.62		2002	8/5/2002 12:10	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566484.52	135344.32	CP-13514	U, detection limit insufficient for comparison to ESL
C3967	Pipeline to 216-Z-18 Crib	1.676 - 2.286		2002	8/5/2002 14:38	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566478.49	135359.19	CP-13514	U, detection limit insufficient for comparison to ESL
C3967	Pipeline to 216-Z-18 Crib	1.676 - 2.286		2002	8/5/2002 14:38	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566478.49	135359.19	CP-13514	U, detection limit insufficient for comparison to ESL
C3968	Pipeline to 216-Z-18 Crib	1.55		2002	8/6/2002 8:05	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566478.45	135373.74	CP-13514	U, detection limit insufficient for comparison to ESL
C3969	Pipeline to 216-Z-18 Crib	1.067 - 1.494		2002	8/6/2002 10:05	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566484.46	135389.44	CP-13514	U, detection limit insufficient for comparison to ESL
C3970	Pipeline to 216-Z-18 Crib	1.494 - 1.981		2002	8/6/2002 11:47	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566487.43	135401.09	CP-13514	U, detection limit insufficient for comparison to ESL
C3971	Pipeline to 216-Z-18 Crib	1.494 - 1.951		2002	8/6/2002 13:58	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566500.31	135414.1	CP-13514	U, detection limit insufficient for comparison to ESL
C3972	Pipeline to 216-Z-18 Crib	1.494 - 1.89		2002	8/6/2002 15:05	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566504.58	135427.73	CP-13514	U, detection limit insufficient for comparison to ESL
C4036	Pipeline to 216-Z-18 Crib	3.109 - 5.09		2002	8/29/2002 10:39	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566526.87	135488.77	CP-13514	U, detection limit insufficient for comparison to ESL
C4037	Pipeline to 216-Z-18 Crib	3.109 - 3.353		2002	8/29/2002 11:59	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566510.21	135488.71	CP-13514	U, detection limit insufficient for comparison to ESL
C4038	Pipeline to 216-Z-18 Crib	3.109 - 3.353		2002	9/24/2002 7:53	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566374.44	135488.51	CP-13514	U, detection limit insufficient for comparison to ESL
C4039	Pipeline to 216-Z-18 Crib	3.109 - 3.414		2002	9/24/2002 8:57	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566388.24	135488.42	CP-13514	U, detection limit insufficient for comparison to ESL
C4040	Pipeline to 216-Z-18 Crib	3.109 - 3.414		2002	9/24/2002 9:59	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566406.62	135487	CP-13514	U, detection limit insufficient for comparison to ESL
C4041	Pipeline to 216-Z-18 Crib	3.109 - 3.2		2002	9/24/2002 11:05	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566419.92	135488.8	CP-13514	U, detection limit insufficient for comparison to ESL
C4042	Pipeline to 216-Z-18 Crib	3.0815 - 3.109		2002	9/24/2002 12:15	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566435.46	135488.59	CP-13514	U, detection limit insufficient for comparison to ESL
C4043	Pipeline to 216-Z-18 Crib	3.109 - 3.383		2002	9/24/2002 13:44	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566450.62	135488.83	CP-13514	U, detection limit insufficient for comparison to ESL

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
C4044	Pipeline to 216-Z-18 Crib	3.109 - 3.505		2002	9/24/2002 15:15	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566464.67	135488.71	CP-13514	U, detection limit insufficient for comparison to ESL
C4045	Pipeline to 216-Z-18 Crib	3.109 - 3.444		2002	9/25/2002 7:51	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566482.71	135488.69	CP-13514	U, detection limit insufficient for comparison to ESL
C4046	Pipeline to 216-Z-18 Crib	3.109 - 3.353		2002	9/25/2002 8:56	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566499.8	135488.8	CP-13514	U, detection limit insufficient for comparison to ESL
C3990	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.981		2002	8/13/2002 8:45	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566724.95	135481.01	CP-13514	U, detection limit insufficient for comparison to ESL
C3991	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.859		2002	8/14/2002 7:59	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566723.15	135499.19	CP-13514	U, detection limit insufficient for comparison to ESL
C3992	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.524 - 1.707		2002	8/13/2002 11:14	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566720.92	135516.97	CP-13514	U, detection limit insufficient for comparison to ESL
C3993	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.042		2002	8/14/2002 9:23	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566720.32	135529.69	CP-13514	U, detection limit insufficient for comparison to ESL
C3994	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.073		2002	8/14/2002 10:45	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566718.74	135543.65	CP-13514	U, detection limit insufficient for comparison to ESL
C3995	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.103		2002	8/13/2002 13:03	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566716.69	135559.93	CP-13514	U, detection limit insufficient for comparison to ESL
C3996	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.073		2002	8/14/2002 12:02	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566720.47	135574.32	CP-13514	U, detection limit insufficient for comparison to ESL
C3997	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.524 - 1.676		2002	8/13/2002 14:44	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566716.54	135589.23	CP-13514	U, detection limit insufficient for comparison to ESL
C3997	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.524 - 1.676		2002	8/13/2002 14:44	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566716.54	135589.23	CP-13514	U, detection limit insufficient for comparison to ESL
C3998	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.768		2002	8/14/2002 13:10	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566711.38	135605.31	CP-13514	U, detection limit insufficient for comparison to ESL
C3999	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.981		2002	8/14/2002 15:20	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566713.57	135635.08	CP-13514	U, detection limit insufficient for comparison to ESL
C3999	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.981		2002	8/14/2002 15:20	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566713.57	135635.08	CP-13514	U, detection limit insufficient for comparison to ESL
C4000	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.951		2002	8/19/2002 10:24	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566712.64	135649.61	CP-13514	U, detection limit insufficient for comparison to ESL

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
C4001	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.92		2002	8/19/2002 7:54	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566710.75	135663.86	CP-13514	U, detection limit insufficient for comparison to ESL
C4002	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.012		2002	8/19/2002 9:07	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566712.52	135676.93	CP-13514	U, detection limit insufficient for comparison to ESL
C4003	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.073		2002	8/27/2002 7:53	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566709.52	135696.33	CP-13514	U, detection limit insufficient for comparison to ESL
C4004	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.768		2002	8/15/2002 7:56	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566707.96	135706.91	CP-13514	U, detection limit insufficient for comparison to ESL
C4005	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.981		2002	8/15/2002 9:21	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566701.86	135725.76	CP-13514	U, detection limit insufficient for comparison to ESL
C4006	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.012		2002	8/15/2002 10:30	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566700.07	135740.72	CP-13514	U, detection limit insufficient for comparison to ESL
C4007	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.951		2002	8/15/2002 12:15	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566695.8	135755.99	CP-13514	U, detection limit insufficient for comparison to ESL
C4008	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.981		2002	8/19/2002 15:17	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566691.81	135766.07	CP-13514	U, detection limit insufficient for comparison to ESL
C4009	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.103		2002	8/19/2002 14:03	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566688.28	135784.14	CP-13514	U, detection limit insufficient for comparison to ESL
C4010	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.554 - 2.042		2002	8/19/2002 12:10	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566684.06	135790.78	CP-13514	U, detection limit insufficient for comparison to ESL
C4023	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.92		2002	8/26/2002 13:13	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566677.27	135808.26	CP-13514	U, detection limit insufficient for comparison to ESL
C4024	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.981		2002	8/26/2002 14:39	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566665.66	135820.6	CP-13514	U, detection limit insufficient for comparison to ESL
C4025	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.981		2002	8/27/2002 9:52	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566660.41	135831.64	CP-13514	U, detection limit insufficient for comparison to ESL
C4026	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.103		2002	8/27/2002 11:39	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566654.01	135845.59	CP-13514	U, detection limit insufficient for comparison to ESL
C4027	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.073		2002	8/27/2002 13:27	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566647.11	135858.55	CP-13514	U, detection limit insufficient for comparison to ESL
C4028	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.981		2002	8/27/2002 14:48	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566640.87	135873.24	CP-13514	U, detection limit insufficient for comparison to ESL

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
C4029	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 2.042		2002	8/28/2002 7:45	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566633.45	135887.36	CP-13514	U, detection limit insufficient for comparison to ESL
C4030	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.981		2002	8/28/2002 8:55	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566630.72	135901.72	CP-13514	U, detection limit insufficient for comparison to ESL
C4031	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.585 - 1.951		2002	8/28/2002 10:02	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566615.02	135915.52	CP-13514	U, detection limit insufficient for comparison to ESL
C4032	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.89 - 2.286		2002	8/28/2002 11:28	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566604.49	135916.75	CP-13514	U, detection limit insufficient for comparison to ESL
C4033	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	1.89 - 2.347		2002	8/28/2002 13:39	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566588.33	135912.32	CP-13514	U, detection limit insufficient for comparison to ESL
C4034	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	2.499 - 2.896		2002	8/28/2002 15:00	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566572.59	135911.88	CP-13514	U, detection limit insufficient for comparison to ESL
C4035	Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building	2.347 - 2.774		2002	8/29/2002 8:55	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566563.39	135908.89	CP-13514	U, detection limit insufficient for comparison to ESL
C3979	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	1.524 - 1.89		2002	8/8/2002 10:41	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566707.31	135437	CP-13514	U, detection limit insufficient for comparison to ESL
C3980	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	1.524 - 1.981		2002	8/8/2002 12:22	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566691.78	135441.82	CP-13514	U, detection limit insufficient for comparison to ESL
C3982	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	2.438 - 2.804		2002	8/8/2002 15:49	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566665.48	135450.67	CP-13514	U, detection limit insufficient for comparison to ESL
C3983	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	2.49 - 3.024		2002	8/9/2002 7:36	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566651.21	135455.93	CP-13514	U, detection limit insufficient for comparison to ESL
C3984	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	2.49 - 3.024		2002	8/9/2002 9:04	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566639.65	135459.74	CP-13514	U, detection limit insufficient for comparison to ESL
C3985	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	2.49 - 2.795		2002	8/9/2002 10:20	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566622.19	135465.93	CP-13514	U, detection limit insufficient for comparison to ESL
C3986	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	2.49 - 2.896		2002	8/9/2002 11:40	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566608.49	135471.06	CP-13514	U, detection limit insufficient for comparison to ESL
C3987	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	2.499 - 2.865		2002	8/12/2002 14:32	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566595.82	135480.16	CP-13514	U, detection limit insufficient for comparison to ESL
C3987	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	2.499 - 2.865		2002	8/12/2002 14:37	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566595.82	135480.16	CP-13514	U, detection limit insufficient for comparison to ESL

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
C3988	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	2.499 - 2.896		2002	8/12/2002 12:06	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566583.44	135483.7	CP-13514	U, detection limit insufficient for comparison to ESL
C3988	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	2.499 - 2.896		2002	8/12/2002 12:11	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566583.44	135483.7	CP-13514	U, detection limit insufficient for comparison to ESL
C3989	Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building	2.134 - 2.49		2002	8/12/2002 10:24	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566566.62	135483.14	CP-13514	U, detection limit insufficient for comparison to ESL
C3861	Pipeline to 216-Z-7 Crib	2.438 - 2.743		2002	9/13/2002 14:10	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566635.6	135929.72	CP-13514	U, detection limit insufficient for comparison to ESL
C4047	Pipeline to 216-Z-7 Crib	1.585 - 1.981		2002	9/25/2002 10:45	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566518.41	135903.18	CP-13514	U, detection limit insufficient for comparison to ESL
C4049	Pipeline to 216-Z-7 Crib	2.134 - 2.256		2002	9/26/2002 7:42	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566578.91	135934.73	CP-13514	U, detection limit insufficient for comparison to ESL
C4050	Pipeline to 216-Z-7 Crib	2.499 - 2.804		2002	9/26/2002 8:47	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566591.82	135930.19	CP-13514	U, detection limit insufficient for comparison to ESL
C4051	Pipeline to 216-Z-7 Crib	2.499 - 3.018		2002	9/26/2002 9:50	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566605.35	135928.51	CP-13514	U, detection limit insufficient for comparison to ESL
C4052	Pipeline to 216-Z-7 Crib	2.499 - 2.865		2002	9/26/2002 10:56	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566615.28	135928.54	CP-13514	U, detection limit insufficient for comparison to ESL
C4053	Pipeline to 216-Z-7 Crib	2.499 - 2.957		2002	9/26/2002 12:09	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566565.32	135928.03	CP-13514	U, detection limit insufficient for comparison to ESL
C4054	Pipeline to 216-Z-7 Crib	2.499 - 2.896		2002	9/26/2002 13:37	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566557.51	135914.7	CP-13514	U, detection limit insufficient for comparison to ESL
C4055	Pipeline to 216-Z-7 Crib	1.585 - 2.042		2002	9/26/2002 14:47	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566654.78	135900.56	CP-13514	U, detection limit insufficient for comparison to ESL
C3973	Pipeline to 216-Z-9 Trench	1.524 - 1.981		2002	8/7/2002 8:48	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566628.76	135646.5	CP-13514	U, detection limit insufficient for comparison to ESL
C3974	Pipeline to 216-Z-9 Trench	1.524 - 1.929		2002	8/7/2002 10:10	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566658.29	135643.07	CP-13514	U, detection limit insufficient for comparison to ESL
C3975	Pipeline to 216-Z-9 Trench	2.804 - 3.109		2002	8/8/2002 8:46	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566673.85	135639.64	CP-13514	U, detection limit insufficient for comparison to ESL
C3975	Pipeline to 216-Z-9 Trench	1.676 - 1.829		2002	8/7/2002 11:36	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566673.85	135639.64	CP-13514	U, detection limit insufficient for comparison to ESL

Table D-2. Active Soil-Gas Data. (32 Pages)

Site	Sample Location	Depth (m)	Zone	Sample Year	Sample Date	EPA Method	Analyte	Result (ppmv)	ESL (ppmv)	HQ	HQ Category	Easting (m)	Northing (m)	Data Source	Comments
C3976	Pipeline to 216-Z-9 Trench	3.048 - 3.505		2002	8/7/2002 13:34	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566689.29	135635.51	CP-13514	U, detection limit insufficient for comparison to ESL
C3977	Pipeline to 216-Z-9 Trench	3.048 - 3.566		2002	8/7/2002 14:50	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566701.95	135626.27	CP-13514	U, detection limit insufficient for comparison to ESL
C3977	Pipeline to 216-Z-9 Trench	3.048 - 3.566		2002	8/7/2002 14:50	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566701.95	135626.27	CP-13514	U, detection limit insufficient for comparison to ESL
C3978	Pipeline to 216-Z-9 Trench	3.048 - 3.536		2002	8/8/2002 8:15	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566713.56	135623.3	CP-13514	U, detection limit insufficient for comparison to ESL
C3865	Borehole	1.219 - 1.524		2002	9/16/2002 15:07	VOA_B&K_FLD	Carbon tetrachloride	1	0.91	?	A	566306.32	135674.35	CP-13514	U, detection limit insufficient for comparison to ESL
C4063	Borehole	13.5'-15.3'		2003	8/26/2003		Carbon tetrachloride	1.41	0.91	1.5	C	566381	135593	DOE/RL-2006-51	

NOTE: Shading indicates all HQs greater than 1 or those values for which HQs could not be calculated because reported nondetect values were greater than ESLs.

BHI 01105, Rebound Study for the Carbon Tetrachloride Soil Vapor Extraction Site, Fiscal Year 1997
BHI-00720, Performance Evaluation Report for Soil Vapor Extraction Operations at the Carbon Tetrachloride Site, Rev. 6, Appendices D, E, F, G, February 1992 - September 2001
CCN 003804, CH2M Hill Hanford, Inc. Interoffice Memo, 200-ZP-2 Soil Gas Survey, September 1994, D. Jacques, 10/17/1994
CCN 022328, ERC Team Interoffice Memorandum, Results of 200-ZP-2 Soil Gas Survey, September 1995, R. B. Kerkow, 10/18/1995
CP-13514, *200-PW-1 Operable Unit Report on Step I Sampling and Analysis of the Dispersed Carbon Tetrachloride Vadose Zone Plume.*
DOE/RL-2006-51, Draft A, *Remedial Investigation Report for the Plutonium/Organic-Rich Process Condensate/Process Waste Group Operable Unit: Includes the 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units*
PNL, 1994, Draft Results of VOC-Arid ID Site Preliminary Soil Carbon Tetrachloride Survey, M. Terry Dana
WHC-SD-EN-TI-063, *FY1992 Site Characterization Status Report and Data Package for Carbon Tetrachloride.*

EPA = U.S. Environmental Protection Agency.
ESL = ecological screening level.
HQ = hazard quotient.
ND = nondetect.
NR = not reported.

Hazard Category
A = HQ unknown; could not be calculated because detection limit > ESL
B = HQ < 1
C = 1< HQ < 2
D = 2 < HQ < 3
E = 3 < HQ < 4
F = 4 < HQ < 5
G = 5 < HQ < 10
H = 10 < HQ < 25
I = 25 < HQ < 50
J = 50 < HQ.

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON– Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A144	8260B	1	J	566904	135286	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A146	8260B	1	J	566950	135286	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B2	8260B	1	J	566440	136525	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B47	8260B	1	J	566375	136077	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A145	8260B	2	J	566927	135286	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B18	8260B	2	J	566438	136397	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B20	8260B	2	J	566564	136397	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B27	8260B	2	J	566564	136333	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B31	8260B	2	J	566376	136269	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B34	8260B	2	J	566565	136268	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B48	8260B	2	J	566438	136077	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B49	8260B	2	J	566498	136076	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B9	8260B	2	J	566877	136525	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B21	8260B	3	J	566627	136397	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B6	8260B	3	J	566690	136525	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A153	8260B	4	J	566858	135263	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A163	8260B	4	J	566766	135217	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B3	8260B	4	J	566503	136526	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B35	8260B	4	J	566631	136269	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B8	8260B	4	J	566816	136525	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A165	8260B	5	J	566812	135216	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B16	8260B	5	J	566856	136461	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B22	8260B	5	J	566690	136397	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B7	8260B	5	J	566753	136525	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C41	8260B	5	J	566582	135547	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D27	8260B	5	J	566451	135370	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D3	8260B	5	J	566379	135475	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D65	8260B	5	J	566551	135117	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A164	8260B	6	J	566789	135217	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C19	8260B	6	J	566552	135689	B

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C27	8260B	6	J	566506	135608	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C29	8260B	6	J	566584	135632	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C9	8260B	6	J	566499	135714	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D14	8260B	6	J	566380	135416	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D28	8260B	6	J	566511	135372	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D4	8260B	6	J	566450	135477	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D5	8260B	6	J	566515	135476	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D50	8260B	6	J	566583	135236	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D54	8260B	6	J	566501	135196	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D56	8260B	6	J	566581	135196	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D60	8260B	6	J	566551	135156	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A158	8260B	7	J	566789	135240	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A76	8260B	7	J	566720	135423	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A89	8260B	7	J	566904	135401	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A9	8260B	7	J	567000	135699	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B14	8260B	7	J	566627	136461	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D44	8260B	7	J	566591	135285	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D46	8260B	7	J	566395	135237	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D59	8260B	7	J	566451	135156	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A20	8260B	8	J	566837	135650	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A71	8260B	8	J	566720	135447	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D10	8260B	8	J	566483	135442	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D2	8260B	8	J	566330	135475	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D20	8260B	8	J	566416	135391	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D55	8260B	8	J	566541	135196	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D66	8260B	8	J	566591	135476	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A152	8260B	9	J	566835	135263	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A159	8260B	9	J	566812	135240	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A24	8260B	9	J	566719	135631	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A65	8260B	9	J	566812	135493	B

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A86	8260B	9	J	566835	135400	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B50	8260B	9	J	566564	136077	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C30	8260B	9	J	566638	135637	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D26	8260B	9	J	566381	135370	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	33	8021	10	J	566706	135846	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	73	8021	10	J	NR	NR	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A134	8260B	10	J	566927	135310	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A75	8260B	10	J	566811	135447	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A92	8260B	10	J	566719	135379	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C14	8260B	10	J	566405	135679	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C6	8260B	10	J	566397	135728	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D32	8260B	10	J	566419	135347	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D9	8260B	10	J	566417	135441	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	28	8021	11	J	566388	135858	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A141	8260B	11	J	566835	135286	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A157	8260B	11	J	566766	135241	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A23	8260B	11	J	567001	135650	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A97	8260B	11	J	566835	135378	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B5	8260B	11	J	566627	136525	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C28	8260B	11	J	566548	135607	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C38	8260B	11	J	566445	135527	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D63	8260B	11	J	566450	135116	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A110	8260B	12	J	566880	135355	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A111	8260B	12	J	566904	135356	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A61	8260B	12	J	566720	135493	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D21	8260B	12	J	566484	135391	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	25	8021	13	J	566743	135912	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A150	8260B	13	J	566789	135264	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A8	8260B	13	J	566946	135700	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B11	8260B	13	J	566438	136461	B

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C24	8260B	13	J	566379	135647	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D64	8260B	13	J	566501	135116	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	58	8021	14	J	566695	135607	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A35	8260B	14	J	566946	135600	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A59	8260B	14	J	566789	135517	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C2	8260B	14	J	566430	135777	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D39	8260B	14	J	566542	135330	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	53	8021	15	J	566305	135675	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	76	8021	15	J	NR	NR	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A100	8260B	15	J	566904	135378	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A27	8260B	15	J	566779	135632	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B13	8260B	15	J	566564	136461	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B28	8260B	15	J	566628	136332	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B29	8260B	15	J	566692	136334	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C16	8260B	15	J	566454	135688	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D45	8260B	15	J	566350	135237	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A115	8260B	16	J	566743	135332	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A126	8260B	16	J	566743	135309	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A66	8260B	16	J	566723	135470	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A69	8260B	16	J	566789	135470	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A84	8260B	16	J	566789	135401	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C11	8260B	16	J	566588	135710	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C3	8260B	16	J	566469	135743	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D62	8260B	16	J	566401	135116	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C7	8260B	17	J	566422	135727	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D57D	8260B	17	J	NR	NR	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	56	8021	18	J	NR	NR	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	59	8021	18	J	NR	NR	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	82	8021	18	J	NR	NR	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A135	8260B	18	J	566950	135309	B

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A82	8260B	18	J	566743	135401	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A98	8260B	18	J	566858	135378	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C40	8260B	18	J	566550	135530	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D24	8260B	18	J	566301	135372	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D36	8260B	18	J	566391	135330	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D41	8260B	18	J	566351	135286	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D58	8260B	18	J	566401	135156	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A57	8260B	19	J	566743	135516	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D15	8260B	19	J	566451	135416	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D48	8260B	19	J	566500	135236	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D7	8260B	19	J	NR	NR	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	15	8021	20	J	566683	135960	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	22	8021	20	J	566588	135911	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A50	8260B	20	J	566789	135539	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A68	8260B	20	J	566766	135470	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B30	8260B	20	J	566856	136334	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A104	8260B	21	J	566743	135355	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A162	8260B	21	J	566743	135217	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A54	8260B	21	J	566946	135550	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A62	8260B	21	J	566742	135493	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A85	8260B	21	J	566812	135401	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C10	8260B	21	J	566542	135719	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D40	8260B	21	J	566587	135331	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	7	8021	22	J	566743	136021	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A3	8260B	22	J	566765	135702	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A60	8260B	22	J	566812	135516	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A64	8260B	22	J	566789	135493	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D12	8260B	22	J	566302	135415	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	16	8021	23	J	566745	135959	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	49	8021	23	J	NR	NR	B

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	60	8021	23	J	NR	NR	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	70	8021	23	J	NR	NR	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	72	8021	23	J	566869	135472	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A114	8260B	23	J	566719	135332	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A160	8260B	23	J	566835	135240	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A46	8260B	23	J	566811	135562	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C17	8260B	23	J	566489	135680	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D22	8260B	23	J	566566	135392	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D25	8260B	23	J	566336	135371	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D35	8260B	23	J	566354	135331	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	69	8021	24	J	566696	135464	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A116	8260B	24	J	566766	135332	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A83	8260B	24	J	566766	135401	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D7F	8260B	24	J	NR	NR	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A109	8260B	25		566858	135354	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B23	8260B	25		566856	136397	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A151	8260B	25		566812	135263	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A15	8260B	25		566719	135653	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	29	8021	26		566455	135848	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C8	8260B	26		566443	135727	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D13	8260B	26		566331	135419	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A74	8260B	26		566789	135447	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A39	8260B	26		566766	135576	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A147	8260B	26		566720	135263	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A106	8260B	27		566789	135355	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	41	8021	27		566869	135810	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D52	8260B	27		566400	135196	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D5F	8260B	27		566541	135466	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A51	8260B	27		566813	135539	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A93	8260B	28		566742	135378	B

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B4	8260B	28		566564	136525	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A87	8260B	28		566858	135401	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A133	8260B	28		566904	135309	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A36	8260B	29		567000	135600	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	39	8021	29		566749	135808	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C23	8260B	29		566638	135667	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A96	8260B	29		566812	135378	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A140	8260B	29		566812	135286	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A52	8260B	30		566839	135550	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C4	8260B	30		566539	135755	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A80	8260B	30		566812	135425	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A77	8260B	30		566743	135424	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A79	8260B	31		566789	135424	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A34	8260B	31		566892	135600	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A102	8260B	31		566950	135378	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	77	8021	31		NR	NR	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D31	8260B	31		566645	135371	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A73	8260B	32		566767	135447	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A19	8260B	32		566812	135654	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B45	8260B	32		566627	136141	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	62	8021	32		NR	NR	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C5	8260B	32		566592	135756	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B15	8260B	32		566690	136461	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A67	8260B	33		566743	135470	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A33	8260B	33		566838	135600	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A99	8260B	33		566879	135379	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A63	8260B	33		566766	135494	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A16	8260B	33		566743	135654	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	50	8021	33		NR	NR	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A112	8260B	34		566927	135355	B

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A7	8260B	34		566891	135700	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A49	8260B	34		566766	135539	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A105	8260B	35		566766	135355	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D43	8260B	35		566538	135285	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D51	8260B	35		566350	135196	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D6	8260B	35		566500	135156	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A22	8260B	35		566946	135650	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	5	8021	36		566636	136022	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A5	8260B	37		566811	135702	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A6	8260B	38		566838	135702	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D4F	8260B	38		NR	NR	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A103	8260B	38		566719	135355	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B51	8260B	39		566627	136077	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A138	8260B	39		566766	135286	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A2	8260B	39		566742	135703	B
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B41	8260B	40		566876	136205	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A124	8260B	41		566950	135332	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A142	8260B	41		566858	135286	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A149	8260B	42		566766	135264	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A31	8260B	44		566789	135609	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A25	8260B	44		566744	135631	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A101	8260B	45		566927	135378	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	9	8021	45		566905	136024	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	37	8021	45		566639	135803	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A123	8260B	45		566927	135332	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A155	8260B	45		566720	135240	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A55	8260B	46		567000	135548	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A125	8260B	46		566719	135309	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	78	8021	46		NR	NR	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A11	8260B	47		566743	135680	B

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A122	8260B	47		566904	135332	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A139	8260B	48		566789	135286	B
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	35	8021	48		566795	135851	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D57	8260B	48		566351	135156	B
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A45	8260B	51		566789	135561	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C18	8260B	51		566522	135685	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A148	8260B	51		566743	135263	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A81	8260B	51		566720	135401	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A161	8260B	54		566720	135217	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A58	8260B	54		566766	135516	C
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A94	8260B	54		566766	135378	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	42	8021	56		NR	NR	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D1	8260B	56		566301	135474	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D19	8260B	56		566661	135415	C
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B53	8260B	57		566876	136077	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	18	8021	57		566905	135954	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D8	8260B	57		566661	135476	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A156	8260B	58		566743	135240	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A21	8260B	60		566892	135650	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	38	8021	60		566684	135808	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A70	8260B	61		566812	135470	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A136	8260B	62		566720	135286	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	87	8021	64		NR	NR	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C20D	8260B	64		NR	NR	C
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B12	8260B	64		566501	136461	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A53	8260B	65		566892	135551	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C20	8260B	66		566587	135693	C
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A90	8260B	67		566927	135401	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A129	8260B	70		566812	135309	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	36	8021	70		566870	135852	C

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	40	8021	**72**		566794	135808	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D18	8260B	**72**		566581	135416	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A88	8260B	**72**		566879	135400	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A137	8260B	**73**		566743	135286	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D34	8260B	**73**		566615	135351	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	34	8021	**74**		566748	135869	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A18	8260B	**75**		566789	135655	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	17	8021	**77**		566795	135962	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D11	8260B	**77**		566625	135441	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A143	8260B	**78**		566880	135286	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A41	8260B	**78**		566813	135581	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	26	8021	**78**		566818	135921	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	52	8021	**79**		566869	135701	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A127	8260B	**82**		566766	135309	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A40	8260B	**85**		566788	135578	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A117	8260B	**85**		566789	135332	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A154	8260B	**87**		566880	135263	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A118	8260B	**90**		566812	135332	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A32	8260B	**90**		566816	135609	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A113	8260B	**90**		566950	135355	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	48	8021	**92**		NR	NR	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A131	8260B	**93**		566858	135309	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D29	8260B	**94**		566535	135371	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	8	8021	**95**		566786	136022	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D30	8260B	**97**		566587	135370	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A119	8260B	**98**		566835	135332	C
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	81	8021	**99**		NR	NR	C
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A56	8260B	**107**		566720	135516	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A128	8260B	**109**		566789	135309	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A72	8260B	**110**		566743	135447	D

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	79	8021	**110**		NR	NR	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A37	8260B	**111**		566724	135571	D
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A95	8260B	**113**		566789	135378	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A132	8260B	**117**		566880	135309	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A108	8260B	**121**		566835	135354	D
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	28-Sep-04	A1	8260B	**126**		566714	135704	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D23	8260B	**129**		566625	135391	D
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B52	8260B	**130**		566690	136077	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A29	8260B	**130**		566720	135608	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A107	8260B	**135**		566812	135355	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A42	8260B	**138**		566721	135561	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C22	8260B	**145**		566588	135666	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A120	8260B	**146**		566858	135332	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C25	8260B	**147**		566397	135623	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A30	8260B	**149**		566741	135608	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A13	8260B	**149**		566789	135680	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A130	8260B	**156**		566835	135309	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A44	8260B	**165**		566766	135562	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A4	8260B	**168**		566788	135702	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A78	8260B	**174**		566766	135424	D
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	A91	8260B	**175**		566950	135401	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A14	8260B	**190**		566812	135679	D
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	64	8021	**190**		NR	NR	D
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A48	8260B	**191**		566744	135539	D
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	28-Sep-04	A10	8260B	**212**		566714	135677	E
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B36	8260B	**222**		566876	136269	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A43	8260B	**229**		566744	135562	E
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B46	8260B	**230**		566876	136141	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A12	8260B	**251**		566766	135680	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A47	8260B	**254**		566720	135539	E

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A17	8260B	**259**		566767	135654	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D18F	8260B	**262**		NR	NR	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A38	8260B	**273**		566743	135574	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C21	8260B	**280**		566637	135695	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A28	8260B	**310**		566816	135632	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D17D	8260B	**319**		NR	NR	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C12	8260B	**330**		566637	135727	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A26	8260B	**346**		566767	135632	E
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	28-Sep-04	A121	8260B	**449**		566880	135331	F
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C12D	8260B	**704**		NR	NR	F
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D17	8260B	**1,138**		566552	135420	G
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D16D	8260B	**1,216**		NR	NR	G
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D16	8260B	**2,175**		566514	135419	G
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D16F	8260B	**5,101**		NR	NR	H
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	1	8021	<25		566382	136018	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	2	8021	<25		566443	136020	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	3	8021	<25		566524	136022	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	4	8021	<25		566585	136038	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	6	8021	<25		566682	136021	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	10	8021	<25		566387	135962	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	11	8021	<25		566445	135958	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	12	8021	<25		566503	135975	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	13	8021	<25		566588	135964	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	14	8021	<25		566638	135963	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	19	8021	<25		566387	135921	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	20	8021	<25		566448	135915	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	21	8021	<25		566514	135919	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	23	8021	<25		566637	135912	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	24	8021	<25		566679	135895	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	27	8021	<25		566902	135914	A

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	30	8021	<25		566522	135837	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	31	8021	<25		566581	135845	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	32	8021	<25		566632	135850	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	45	8021	<25		566805	135736	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	46	8021	<25		566869	135744	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	47	8021	<25		566305	135705	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	51	8021	<25		NR	NR	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	54	8021	<25		566698	135643	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	55	8021	<25		NR	NR	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	57	8021	<25		566305	135643	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	61	8021	<25		566870	135607	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	63	8021	<25		566694	135546	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	65	8021	<25		NR	NR	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	66	8021	<25		566874	135561	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	67	8021	<25		566695	135510	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	68	8021	<25		NR	NR	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	71	8021	<25		NR	NR	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	74	8021	<25		NR	NR	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	75	8021	<25		566870	135423	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	80	8021	<25		566704	135293	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	83	8021	<25		566867	135249	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	84	8021	<25		566706	135201	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	85	8021	<25		566794	135200	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	86	8021	<25		566658	135157	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	87	8021	<25		NR	NR	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	88	8021	<25		NR	NR	A
EM1584 - EMFLUX Passive Soil-Gas Survey	200 West	12-Aug-03	88	8021	<25		NR	NR	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B1	8260B	<25		566375	136525	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B10	8260B	<25		566377	136461	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B17	8260B	<25		566375	136397	A

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B19	8260B	<25		566501	136397	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B24	8260B	<25		566375	136333	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B25	8260B	<25		566438	136333	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B26	8260B	<25		566501	136333	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B32	8260B	<25		566438	136269	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B33	8260B	<25		566502	136269	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B37	8260B	<25		566375	136205	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B38	8260B	<25		566438	136205	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B39	8260B	<25		566497	136205	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B40	8260B	<25		566627	136205	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B42	8260B	<25		566374	136141	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B43	8260B	<25		566438	136141	A
BEACON - Passive Soil-Gas Survey	200W, Site Z-9 and Site TX-TY	28-Sep-04	B44	8260B	<25		566497	136141	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C1	8260B	<25		566397	135776	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C13	8260B	<25		566378	135687	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C26	8260B	<25		566469	135621	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C31	8260B	<25		566397	135583	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C32	8260B	<25		566417	135562	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C33	8260B	<25		566498	135571	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C34	8260B	<25		566540	135570	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C36	8260B	<25		566587	135598	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C37	8260B	<25		566399	135529	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	C39	8260B	<25		566493	135532	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D33	8260B	<25		566489	135346	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D37	8260B	<25		566450	135331	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D38	8260B	<25		566503	135331	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D42	8260B	<25		566501	135286	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D47	8260B	<25		566451	135237	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D49	8260B	<25		566549	135227	A

Table D-3. Passive Soil-Gas Data for Carbon Tetrachloride. (15 Pages)

Reference	Sample Location	Sample Date	Sample No.	EPA Method	Result	Qualifier	Easting	Northing	Grouping
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D53	8260B	<25		566450	135197	A
BEACON - Passive Soil-Gas Survey	200 W, PFP Area and Z-1A Crib Area	22-Nov-04	D61	8260B	<25		566351	135115	A

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Table D-4. Carbon Tetrachloride Active Soil-Gas Summary by Location. (2 Pages)

	216-Z-1A	**216-Z-1A/Z-18/Z-12 Site**	**216-Z-1D/11/19/20 Ditches**	**216-Z-21 Pond**
Years sampled	1996, 1997	1997, 1998, 1999	2002	2002
Number of samples collected	106	72	2	3
Sampling depth range	1.5 m	2 m – 3 m	2.7 m – 3.9 m	1.2 m – 2.4 m
HQ range	0 – 4.8	0 – 3.1	Unknown*	Unknown*
Total frequency of exceedance (HQ > 1)	2 of 106 = 2%	19 of 72 = 26%	Unknown	Unknown
Frequency of exceedance (0-5 ft)	2%	N/A	N/A	N/A
Frequency of exceedance (5-15 ft)	N/A	26%	Unknown	Unknown
Maximum HQ (year)	4.8 (1997)	3.1 (1998)	N/A	N/A
Median HQ exceedance	4.3	1.6	N/A	N/A
Mean HQ exceedance	4.3	1.9	N/A	N/A
	218-W-4C Burial Ground Trenches	**Borehole (Waste Site Unknown)**	**200-ZP-2**	**216-Z-7 Crib**
Years sampled	2002	2002, 2003	1992, 1994, 1995	2002
Number of samples collected	14	10	176	1
Sampling depth range	1.5 m – 2.7 m	1.2 m – 4.6 m	Not reported	1.5m – 1.8 m
HQ range	1.6 – 52.3	Unknown to 1.5	0 – 79.9	Unknown*
Total frequency of exceedance (HQ > 1)	14 of 14 = 100%	10%, unknown for samples w/MDL<ESL	67 of 176 = 38.1%	Unknown
Frequency of exceedance (0-5 ft)	100%	Unknown	Depth not reported	N/A
Frequency of exceedance (5-15 ft)	100%	At least 10%	Depth not reported	Unknown
Maximum HQ (year)	52.3 (2002)	1.5 (2003)	79.9 (1992)	N/A
Median HQ exceedance	5.7	Unknown	5.8	N/A
Mean HQ exceedance	13.0	Unknown	12.3	N/A
	Pipeline to 216-Z-7 Crib	**Pipeline to 216-Z-9 Trench**	**216-Z-9**	**216-Z-1D/11/19/20 Ditches from 231-Z Building**
Years sampled	2002	2002	1996, 1997, 1998, 1999, 2000, 2001, 2002	2002
Number of samples collected	9	8	248	2
Sampling depth range	1.6 m – 2.9 m	1.5 m – 3.6 m	1.5 m – 4.6 m	1.5 m – 2 m
HQ range	Unknown*	Unknown*	0 – 7.2	Unknown*

Table D-4. Carbon Tetrachloride Active Soil-Gas Summary by Location. (2 Pages)

Total frequency of exceedance (HQ > 1)	Unknown	Unknown	92 of 248 = 40%	Unknown
Frequency of exceedance (0-5 ft)	N/A	N/A	25 of 164 = 15%	N/A
Frequency of exceedance (5-15 ft)	Unknown	Unknown	67 of 84 = 80%	Unknown
Maximum HQ (year)	N/A	N/A	7.2 (2002)	N/A
Median HQ exceedance	N/A	N/A	2.3	N/A
Mean HQ exceedance	N/A	N/A	2.8	N/A
	Pipeline to 216-Z-12 Crib	**Pipeline to 216-Z-18 Crib**	**Pipeline to 216-Z-1D/11/19/20 Ditches from 231-Z Building**	**Pipeline to 216-Z-1D/11/19/20 Ditches from 234-5Z Building**
Years sampled	2002	2002	2002	2002
Number of samples collected	1	21	36	12
Sampling depth range	3.6 – 4 m	1.1 m – 4.12 m	1.6 m – 2.8 m	1.5 m – 3.8 m
HQ range	68.2	Unknown*	Unknown*	Unknown*
Total frequency of exceedance (HQ > 1)	1 of 1 = 100%	Unknown	Unknown	Unknown
Frequency of exceedance (0-5 ft)	N/A	N/A	N/A	N/A
Frequency of exceedance (5-15 ft)	100%	Unknown	Unknown	Unknown
Maximum HQ (year)	68.2 (2002)	N/A	N/A	N/A
Median HQ exceedance	68.2	N/A	N/A	N/A
Mean HQ exceedance	68.2	N/A	N/A	N/A

*Nondetect value reported > ESL.

ESL = ecological screening level.
HQ = hazard quotient.
MDL = minimum detection level.
N/A = not available (i.e., sample depth not reported, no samples for sample depth range, HQs could not be calculated based on nondetect values, or HQs were less than 1).

Table D-5a. Carbon Tetrachloride Active Soil-Gas Sampling Summary by Year – 1992-2000.

	1992	**1994**	**1995**	**1996**
Number of samples collected	82	16	78	64
Sampling depth range	Not reported	Not reported	Not Reported	1.5 m
HQ range	0 – 79.9	1.1 – 6.2	0 – 0.1	0 – 0.8
Total frequency of exceedance	51 of 82 = 62%	16 of 16 = 100%	0 of 78	0 of 65
Frequency of exceedance (0-5 ft)	Not reported	Not reported	Not reported	N/A
Frequency of exceedance (5-15 ft)	Not reported	Not reported	Not reported	N/A
Maximum HQ (site)	79.9 (200-ZP-2)	6.2 (200-ZP-2)	0.1 (200-ZP-2)	0.8 (216-Z-1A)
Median HQ exceedance	10.7	1.8	N/A	N/A
Mean HQ exceedance	15.4	2.6	N/A	N/A
	1997	**1998**	**1999**	**2000**
Number of samples collected	159	100	57	20
Sampling depth range	1.5 m – 3 m	1.5 m – 3 m	1.5 m – 4.6 m	3 m – 4.6 m
HQ range	0 – 4.8	0 – 4.7	0 – 5.5	1.8 – 5.7
Total frequency of exceedance	9 of 159 = 6%	24 of 100 = 24%	35 of 57 = 61%	20 of 20 = 100%
Frequency of exceedance (0-5 ft)	9 of 153 = 6%	16 of 71 = 22%	20 of 36 = 56%	N/A
Frequency of exceedance (5-15 ft)	N/A	8 of 29 = 28%	15 of 20 = 75%	20 of 20 = 100%
Maximum HQ (site)	4.8 (216-Z-1A)	4.7 (216-Z-9)	5.5 (216-Z-9)	5.7 (216-Z-9)
Median HQ exceedance	1.4	1.7	1.9	3.9
Mean HQ exceedance	2.0	2.2	2.2	3.8

HQ = hazard quotient.
N/A = not available (i.e., sample depth not reported, no samples for sample depth range, HQs could not be calculated based on nondetect values, or HQs were less than 1).

Table D-5b. Carbon Tetrachloride Active Soil-Gas Sampling Summary by Year – 2001-2003.

	2001	2002	2003
Number of samples collected	16	119	9
Sampling depth range	3 m – 4.6 m	1.5 m – 4.6 m	3.9 m – 4.6 m
HQ range	1.3 – 7.2	1.4 – 68.2	1.5
Total frequency of exceedance	16 of 16 = 100%	24 of 119 = 20%*	1 of 9 = 11%*
Frequency of exceedance (0-5 ft)	N/A	2 of 58 = 3%*	N/A
Frequency of exceedance (5-15 ft)	16 of 16 = 100%	22 of 60 = 37%*	1 of 10 = 10%*
Maximum HQ (site)	7.2 (216-Z-9)	68.2 (Pipeline to 216-Z-12 Crib)	1.5 (Borehole C4063)
Median HQ exceedance	3.1	3.3	1.5
Mean HQ exceedance	3.7	11.3	1.5

*Remaining values ND > ESL, uncertain.

ESL = ecological screening level.
HQ = hazard quotient.
N/A = not available (i.e., sample depth not reported, no samples for sample depth range, HQs could not be calculated based on nondetect values, or HQs were less than 1).
ND = nondetect.

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APPENDIX E

SCREENING-LEVEL EVALUATION OF EXISTING WEST LAKE DATA

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TERMS

BCG	biota concentration guide (*A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*, DOE-STD-1153-2002)
CCC	criteria continuous concentration
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
COPC	contaminant of potential concern
COPEC	contaminant of potential ecological concern
DL	detection limit
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ERAGS	*Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final)*, EPA/540/R-97/006
HQ	hazard quotient
MCL	maximum contaminant level
N/A	not applicable
NOAA	National Oceanic and Atmospheric Administration
SQuiRT	*Screening Quick Reference Tables* (Buchman, 1999)

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APPENDIX E

SCREENING-LEVEL EVALUATION OF EXISTING WEST LAKE DATA

E1.0 INTRODUCTION

A screening-level ecological risk assessment (ERA) was conducted for analytes measured in sediment, surface water, and surface soil in and adjacent to West Lake, which is located to the north of the 200 East Area on the Hanford Site. A screening-level ERA is needed for West Lake because data for West Lake were not included in DOE/RL-2001-54, *Central Plateau Ecological Evaluation*. In addition, West Lake represents a unique ecological entity in that it primarily is an aquatic environment. This appendix on West Lake follows EPA/540/R-97/006, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final)* (ERAGS). Steps 1 and 2 of the 8-step U.S. Environmental Protection Agency (EPA) *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) guidance encompass the screening portion of the ERA. Step 1 of the ERAGS process is the screening-level problem formulation and ecological effects evaluation, which encompasses the description of the environmental setting, fate and transport mechanisms, identification of complete exposure pathways, and the selection of screening levels for media of concern. Step 2 of the ERAGS process is the screening-level exposure and risk calculations, where conservative exposure estimates are compared to the chemical-specific screening levels selected in Step 1 for each media of concern. The conceptual model refinement for West Lake encompasses Step 3 of the EPA guidance, which allows for the refinement of the contaminants of potential ecological concern (COPEC) by applying more site-specific information to the exposure assessment. The purpose of this screening assessment was to identify any data gaps in the knowledge of current conditions of West Lake and to determine whether additional investigation is needed.

E2.0 SCREENING-LEVEL PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION

This section presents information on the environmental setting of West Lake, environmental fate and transport mechanisms, and complete ecological exposure pathways. It also identifies appropriate screening values for potentially contaminated media at West Lake.

E2.1 ENVIRONMENTAL SETTING

West Lake is a saline and alkaline lake located southwest of Gable Mountain on the Hanford Site. Historically, West Lake was an intermittent pond that appeared in response to seasonal fluctuations in the water table (PNL-7662, *An Evaluation of the Chemical, Radiological, and Ecological Conditions of West Lake on the Hanford Site*). Water levels in West Lake have fluctuated greatly over the years. Discharges of large amounts of wastewater associated with the startup of the Plutonium-Uranium Extraction Plant in 1957 resulted in a rise of the water table and indirectly contributed to West Lake's expansion. PNL-7662 cites a 1978 report (PNL-2499, *Comparative Ecology of Nuclear Waste Ponds and Streams on the Hanford Site*) that shows

West Lake encompassing 19.2 acres. Contaminated effluent discharges to liquid waste sites ceased in 1995 (DOE/RL-2001-54), subsequently increasing the depth of the water table and disconnecting the recharge of lake waters from groundwater. In 2003, the lake covered less than 5 acres (DOE/RL-2001-54). An aerial photograph showing lake levels in 1989, when the lake was still connected to the water table, is shown in Figure E-1. A photo of West Lake from Gable Mountain taken in 2003 is shown in Figure E-2. Currently, the water table is approximately 1.5 m below the bottom of West Lake, and no recharge of lake waters from groundwater is occurring. Based on measured water quality parameters (e.g., total dissolved solids, conductivity, sodium, potassium, magnesium, chloride), PNL-7662 concluded that West Lake was a more saline environment than other saline lakes in eastern Washington. West Lake is likely to become increasingly saline over time, now that it is cut off from the water table; constituents dissolved in runoff will concentrate in the lake as the water evaporates.

PNL-7662 describes that, in August 1989, sediment and surface-water samples were collected from West Lake, and surface-soil samples were collected from a transect just to the north of West Lake and another transect just to the south of West Lake (hereafter referred to as North Transect and South Transect) Both transects were located within the zone of salt-influenced vegetation surrounding the lake. Sediment and soil samples were analyzed for radionuclides; surface-water samples were analyzed for radionuclides, trace metals, and select organic constituents. Radionuclides also were analyzed in vegetation samples collected around the lake and in eggshells of American coots (*Fulica americana*) that were breeding on West Lake. Results from the 1989 sampling were published in PNL-7662. Additional surface-water samples for radiological analysis have been collected yearly since 1990, and 10 additional sediment samples were collected for radiological analysis between June 2000 and October 2003.

Surveys of West Lake and its adjacent wetlands in 1997 concluded that native plant communities were substantially degraded and that much of the lake was infested with weedy species, primarily smotherweed (*Bassia hyssopifolia*). Wetland vegetation was limited to scattered patches of cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.) (DOE/RL-2001-54).

PNL-7662 reports that in a 1976 investigation of West Lake, an abundance of annelid and oligochaete worms and a variety of aquatic insects were observed. However, because the lake no longer experiences recharge from groundwater, and evaporation has reduced the area of the lake, rising salinities may have created conditions that are not suitable for many freshwater invertebrates. Brine flies of the Ephydridae family (*Paracoenia bisetosa*) have been commonly found at West Lake, and rarely seen were the Gymnomyzinae family (*Gymnoclasiopa argyrostoma*) (Zack 1998, "Shore Flies (Diptera: Ephydridae) of the Hanford Site, Washington"). *Paracoenia bisetosa* is common to the riparian areas of slightly to moderately alkaline ponds where the larvae feed on algal mats. *Gymnoclasiopa argyrostoma* was common at the time across the Hanford Site in aquatic and terrestrial environments, although rarely found at West Lake. Invertebrate surveys should be conducted to identify current invertebrate communities and current lake salinities. No fish have been observed in West Lake.

E2.2 CONTAMINANT FATE AND TRANSPORT

All of the sediment, surface water, and soil samples collected from 1989 to 2003 were used in this screening assessment. See the accompanying Central Plateau data CD for the West Lake spreadsheet (90-03 WEST LAKE.xls); data fields are defined in Table E-1.

E2.2.1 Impacted Media

The main text of this document identifies shallow soils as the primary impacted media of interest for ecological receptors over most of the Hanford Site. Because of the unique ecological conditions presented by West Lake, three additional media (surface water, sediment, and salt deposits) in addition to surface soils are being evaluated as part of the ecological screening assessment of West Lake. There is no evidence that direct releases of contaminants have occurred to any of the four media at West Lake, but rather these represent secondarily contaminated media from the historical groundwater discharges that formed West Lake. Data from groundwater monitoring wells suggest that groundwater in the West Lake area also has been impacted by operations at the Hanford Site, but groundwater is not being evaluated as part of this screening assessment because of the lack of ecological exposure pathways to groundwater (see Section 2.1 of the main text).

E2.2.2 Groundwater and Surface Water Transport

The primary source of chemical constituents observed in West Lake surface water and sediment is presumed to be historical fuel reprocessing activities in the 200 Areas on the Hanford Site. Discharge of wastewater from those activities resulted in a rise of the water table and the expansion of West Lake. Water table maps of the West Lake area show that unconfined groundwater passing West Lake flows from the 200 East Area north through the gap between Gable Butte and Gable Mountain (PNL-7662). The presence of tritium and Tc-99 in groundwater monitoring wells in the vicinity of West Lake provides evidence that 200 Area activities have impacted groundwater and likely are the source of chemical constituents in West Lake surface water and sediment. All contaminated wastewater discharges to the 200 Areas holding ponds ceased in 1995, so it is assumed that the 200 Areas are not a continuing source of chemical constituents to groundwater and West Lake. Because West Lake is no longer connected to the regional aquifer system, water levels will continue to drop if evaporation rates are greater than input from precipitation runoff or unless the groundwater connection is reestablished. As the lake level declines, chemical constituents in surface water likely are deposited in newly exposed surface soils and salt deposits. Because West Lake is a closed system with no outlet, surface water is not a mechanism for contaminants to be transported offsite.

E2.2.3 Airborne Transport

Airborne entrainment of dust particles or fine salt particles is the primary mechanism for contaminants at West Lake and adjacent areas to be transported offsite. Surface soils and salt deposits that are newly exposed by declining water levels are particularly susceptible to windborne transport because of the lack of vegetation or other suitable cover to hold the soil in place.

E2.3 COMPLETE EXPOSURE PATHWAYS

Several complete exposure pathways for flora and fauna at West Lake and its immediate environs are through contact with sediment, surface water, soil, and salts (Figure E-3). Each pathway is explained below for primary types of organisms living at or visiting West Lake

(aquatic invertebrates, aquatic plants, wading/swimming birds, terrestrial plants, terrestrial wildlife, and aerial insectivores).

Aquatic Invertebrates. Dermal contact with contaminants in sediment and surface water is the most important pathway for immersed aquatic organisms (i.e., aquatic invertebrates). Indeed, for these organisms it is difficult to differentiate exposures from various pathways, because the organism is immersed in or in direct contact with the medium of concern.

Aquatic and Terrestrial Plants. Root uptake is the primary exposure pathway for both aquatic and terrestrial plant species at the Hanford Site. As noted in Section 2.1 of the main text, the native plant community at West Lake is substantially degraded, with much of the area covered by weedy species and only scattered areas of emergent wetland vegetation. The species that do occur tend to be salt tolerant and thus can colonize soils exposed by falling water levels, potentially becoming exposed to contaminants in those soils.

Wading/Swimming Birds. Species of shorebirds that have been recorded at West Lake include American avocet and killdeer. Both of these species feed on benthic invertebrates around the lake margins and in shallow water.

Dermal contact with sediment and surface water is a complete exposure pathway for wildlife, especially wading birds and swimming birds, but as with dermal contact of wildlife with shallow soil, fur and feathers serve as an effective barrier to make these exposure pathways of less relative importance than ingestion pathways (see Section 2.1 of the main text). Preferential ingestion of surface water and salts; food-web transport of contaminants in sediment; and incidental ingestion of sediment and salts are ingestion-exposure pathways of interest. Many aquatic birds including American coots, which have nested on West Lake in the past, have glands in their bills that allow excess salt to be filtered out of drinking water and excreted through the bill or nostril. This allows the bird to drink water that is much higher in salt content than can be tolerated by other wildlife. For these species, ingestion of surface water is a complete exposure pathway.

Terrestrial Wildlife. Incidental ingestion of contaminated media (sediment and soil), and food-chain ingestion of contaminated foodstuffs, are likely to be the most important exposure pathways for wildlife at West Lake. During low-water periods, terrestrial mammals would be expected to use dry areas of the lakebed for foraging, and burrowing mammals could colonize the area as well. Incidental ingestion of sediment and surface water is likely in animals feeding on aquatic plants or invertebrates in West Lake. Ingestion of prey from the lake is expected to be limited to invertivores, because no fish occur in West Lake. Ingestion of surface water is likely not a significant pathway for terrestrial wildlife, because the salinity of West Lake eliminates it as a routine drinking water source for most terrestrial animals.

A unique exposure pathway for West Lake is the ingestion of salt deposits by wildlife. Many mammals use salt licks for nutritional purposes, and the mineral deposits concentrated by evaporation of West Lake water could be considered an attractive resource to area wildlife for this reason. Intake of salt in this manner is very difficult to quantify, and therefore this exposure pathway will be evaluated in a qualitative manner in the screening assessment.

While there is a potentially complete exposure pathway via inhalation of particulates, as discussed in the main document, inhalation of particulates is a minor exposure pathway for terrestrial receptors when compared to the ingestion pathways. Available data and knowledge of

site activities do not suggest the presence of volatile chemicals. However, tritium has been measured, so inhalation of vapors is a complete exposure pathway at least for tritium.

Aerial Insectivores. Several species of bats have been recorded on the Hanford Site. Representative aerial insectivore bats selected for exposure modeling include the little brown myotis (*Myotis lucifugus*). Dietary exposure is likely the primary exposure pathway for bats.

E2.4 SELECTION OF SCREENING LEVELS

Protective screening values for radionuclides were obtained as radionuclide-specific biota concentration guides (BCG) (DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*). The BCGs are not applicable or relevant and appropriate requirements but are "to-be-considered" values used for ecological screening. The BCGs were developed by a consortium of the U.S. Department of Energy, the EPA, and the U.S. Nuclear Regulatory Commission (DOE/EH-0676, *RESRAD-BIOTA: A Tool for Implementing a Graded Approach to Biota Dose Evaluation, User's Guide, Version 1*). These BCGs are based on prescribed dose limits that can be translated into radionuclide-specific concentrations (e.g., pCi/g) for a defined exposure scenario (DOE/EH-0676). Before development of the BCGs, no single set of screening criteria was agreed upon or applied consistently across different regions of the country. The intent of the consortium was to provide screening criteria for radionuclides that could be applied in a consistent manner across multiple contaminated sites. BCGs are intended to protect populations of ecological receptors.

Ecological screening values for chemical constituents in West Lake surface water were obtained from the Screening Quick Reference Tables (SQuiRT) developed by the National Oceanic and Atmospheric Administration (NOAA) (Buchman 1999, *Screening Quick Reference Tables*). A hierarchy was established to choose surface water screening values from SQuiRT. Chronic toxicity screening values for marine waters were chosen over acute toxicity screening values or freshwater screening values. Chronic criteria are more conservative than acute criteria, because chronic effects generally occur at lower concentrations than acute affects. Marine criteria are more appropriate than freshwater criteria because of the high salinity of West Lake. PNL-7662 previously screened the metals data using freshwater ambient water-quality criteria for wildlife. Of the detected metals in West Lake for which both freshwater and marine water chronic screening values are available (arsenic, chromium, copper, mercury, and zinc), marine values are more conservative for three metals (arsenic, copper, and zinc), whereas freshwater screening values are more conservative for the remaining two metals (chromium and mercury). PNL-7662 identified all five of these metals as COPECs.

Nonradionuclide screening values were chosen from SQuiRT in the following hierarchy:

1. Chronic marine criteria continuous concentrations (CCC)
2. Acute marine CCC
3. Chronic freshwater CCC
4. Acute freshwater CCC
5. Maximum contaminant level values for groundwater.

E3.0 SCREENING-LEVEL EXPOSURE ESTIMATION AND RISK CHARACTERIZATION

E3.1 EXPOSURE ESTIMATES

Screening-level risk assessments use protective assumptions to identify the potential for adverse ecological effects and to identify COPECs. In the West Lake ecological screening assessment, maximum concentrations of each analyte in each medium are used to represent the ecological exposure. Hazard quotients (HQ) are calculated by dividing the maximum concentration by the BCG. The hazard index is the sum of HQs for a medium. Use of maximum observed concentrations is a conservative assumption scenario representing the worst-case exposure scenario. Use of maximum concentrations also is more protective of individual ecological receptors, which generally have smaller exposure areas than populations of individuals.

E3.2 SCREENING RESULTS

In the initial screening, maximum radionuclide concentrations in sediment, surface water, and soil were compared to conservative screening values for each medium. Radionuclides with maximum concentrations exceeding their respective screening values were carried forward to the ERAGS COPEC-refinement step (Step 3a). If a BCG was not available for a radionuclide in a given medium and the radionuclide was detected in that medium, then that radionuclide also was carried forward for further evaluation in screening refinement.

Nonradionuclides with maximum concentrations exceeding their respective screening values were carried forward as COPECs. Detected constituents without ecological screening values also were identified as COPECs. Constituents that were not detected but that had detection limits exceeding ecological screening values were identified as potential data gaps.

E3.2.1 Radionuclides in West Lake Sediment

Screening results for radionuclides in West Lake sediment are presented in Table E-2. Four radionuclides (K-40, Pb-212, Pb-214, and Ru-106) were retained following initial screening because they were detected in one or more samples and no BCGs were available for comparison. These four constituents, highlighted in Table E-2, are evaluated further in COPEC refinement and the uncertainty discussion. Nine radionuclides (Cs-137, Eu-154, Eu-155, H-3, Tc-99, U-234, U-235, U-238, and Zr-95) were detected in at least one sediment sample, but at concentrations less than the BCG, and were eliminated from further consideration as sediment COPECs. Six radionuclides (Sb-125, Be-7, Co-60, Cs-134, Eu-152, and Sr-90) were not detected in any sediment samples and had maximum detection limits less than their respective BCGs (Sb-125, Co-60, Cs-134, Eu-152, Sr-90), or did not have BCGs (Be-7). These six radionuclides also were eliminated from further consideration as sediment COPECs.

E3.2.2 Radionuclides in West Lake Salt Deposits

Two salt deposit samples collected from the dry portion of the lakebed in 1989 showed levels of U-234 approximately five times higher than the maximum observed in sediment, and showed levels of concentrations of U-238 approximately three times the sediment maximum. Screened solely against sediment or soil BCGs, these concentrations are still well below levels of concern.

However, it is prudent to consider the potential for these deposits to be attractive resources, where wildlife would purposely and preferentially ingest these deposits by use as a salt lick. While soil and sediment BCGs for terrestrial animals are based mainly on food chain ingestion of radionuclides, and incidental ingestion of abiotic media, salt deposits around West Lake may be attractive to wildlife as a salt lick, leading to purposeful and preferential ingestion of the salt by terrestrial wildlife. In this case, sediment and soil BCGs may not be conservative enough, because they do not take into account preferential ingestion of abiotic media. This represents an uncertainty in the risk screening. Despite this uncertainty, because maximum HQs for all uranium isotopes are less than 1 for West Lake salt deposits, based on surrogate BCGs for incidental ingestion of sediment and soil, potential risks from uranium in salt deposits are likely to be minimal (U-234 HQ=0.035, U-235 HQ=0.0001, U-238 HQ=0.082).

E3.2.3 Radionuclides in West Lake Surface Water

Screening of West Lake surface water samples is presented in Table E-3. Two radionuclides (U-234 and U-238) were detected in West Lake surface water at concentrations exceeding their respective BCGs. Uranium-234 and U-238 had HQs of 14 and 21, respectively, accounting for 98 percent of the total hazard index summed across all radionuclides for which an HQ could be calculated. These uranium isotopes, highlighted in Table E-3, are retained for further evaluation in COPEC refinement. Uranium isotopes are listed on the Central Plateau list of contaminants of potential concern (COPC) based on facility processes (see Appendix B), so the potential exists for concentrations of these constituents in West Lake water to be related to operations at the Hanford Site. Two radionuclides (Be-7 and K-40) were detected in at least one surface water sample and had no BCGs for comparison, and these two constituents, highlighted in Table E-3, were retained for further evaluation in COPEC refinement. Twelve radionuclides (Sb-125, Co-60, Ce-144, Cs-134, Cs-137, Eu-154, Eu-155, Sr-90, Tc-99, H-3, U-235, and Zr-95) were detected in at least one surface water sample but at concentrations less than their respective BCGs and, therefore, are eliminated from further consideration as potential COPECs. Ruthenium-106 was not detected in any surface water samples and is not evaluated further.

E3.2.4 Radionuclides in West Lake Soil

Five radionuclides were identified as COPECs in soils along the North Transect, located to the north of West Lake, but within the zone of salt influenced vegetation. Cesium-137, highlighted in Table E-4, was identified as a COPEC and was carried forward to screening refinement because the maximum detected concentration of 57.4 pCi/g exceeds the BCG for soil (20.8 pCi/g). The maximum concentration of Cs-137 was located at the southernmost sampling location of the North Transect and greatly exceeded the next highest concentration observed in the North Transect (1.34 pCi/g). The other four radionuclides identified as COPECs in North Transect soils (Pb-212, Pb-214, K-40, Ru-106), highlighted in Table E-4, were carried forward because they were detected in at least one sample, and no BCGs are available for screening. Europium-155, Sr-90, U-235, and U-238 all were detected in at least one sample, but maximum concentrations were less than their respective BCGs. These radionuclides were eliminated from further evaluation as COPECs in North Transect soils. Cesium-134, Co-60, Eu-154, and Zr-95 were eliminated as COPECs because they were not detected in North Transect soils. North Transect soil screening is presented in Table E-4.

Three radionuclides were identified as COPECs in South Transect soils. Lead-212, Pb-214, and K-40, highlighted in Table E-5, were carried forward because they were detected in at least one sample, and no BCGs are available for screening. Cesium-134, Cs-137, Eu-154, Eu-155, Sr-90, U-235, and U-238 were detected in at least one sample of South Transect soil but at concentrations less than their respective BCGs; therefore, all were eliminated from further evaluation as COPECs in South Transect soils. Cobalt-60, Ru-106, and Zr-95 were eliminated as COPECs because they were not detected in samples of South Transect soil. South Transect soil screening is presented in Table E-5.

E3.2.5 Nonradionuclides in West Lake Surface Water

Trace metals and organic constituents were analyzed in at least one unfiltered surface water sample in 1989. PNL-7662 noted that arsenic, chromium, copper, and zinc exceeded EPA criteria for acute toxicity to freshwater organisms but stated "the levels are probably not toxic to organisms found in West Lake because of the lake's high salt content and alkaline state." The NOAA SQuiRTs (Buchman 1999) include screening criteria for chemical constituents in marine water. Marine water criteria are probably a better choice for screening West Lake surface water because of the high salinity of the lake. A comparison of marine water screening criteria to maximum detected trace metal concentrations is presented in Table E-6. Arsenic, chromium, copper, manganese, and zinc, highlighted in Table E-6, were detected at concentrations above screening values. In addition, cyanide and silver, highlighted in Table E-6, had detection limits exceeding marine screening values by an order of magnitude, and the detection limit for nickel (10 μg/L) was slightly above the screening value of 8.2 μg/L. Boron, molybdenum, silicon, and strontium, highlighted in Table E-6, were detected in surface water samples and do not have available surface water screening values. The 12 inorganic compounds highlighted in Table E-6 are retained as suspected COPECs for further evaluation in the next phase of surface water sampling, because current data are not sufficient to allow for further refinement of the inorganic nonradionuclide COPEC list.

Organic compounds analyzed included 59 volatile organic compounds and semivolatile organic compounds, 30 pesticides/herbicides, 7 Aroclors, and 7 thiourea compounds. Of this list, only hexachlorophene was detected. However, screening could not be conducted because detection limits for the organic compounds were universally above screening limits, often by several orders of magnitude. Based on the list of potential COPCs related to processes in the 200 East Area, organic constituents are not expected to be COPECs and no further evaluation of possible organic constituents in West Lake is recommended.

E4.0 REFINEMENT OF CONTAMINANT FATE AND TRANSPORT INFORMATION

Three radionuclides (K-40, Pb-212, and Pb-214) were identified as COPECs in South Transect soils in the initial screening. The same three radionuclides, along with Ru-106 and Cs-137, were identified as soil COPECs in North Transect soils. Only Cs-137 is a radionuclide on the COPC list that warrants further evaluation, but concentrations of Cs-137 in West Lake soils are much lower than those reported in the Central Plateau (see the main document and WMP-20570, Appendix G). Because soils in these areas are functionally and ecologically similar to other

Central Plateau soils, specific evaluation of West Lake soils and the terrestrial community associated with them is not required.

Because West Lake surface water and sediment represent unique media and exposure conditions on the Central Plateau, COPECs in these media will be further evaluated through COPEC refinement.

E5.0 REFINEMENT OF CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERNS

Two criteria were used in the COPEC refinement to focus the list of COPECs – regional background concentrations and detection frequency. Radionuclide concentrations in sediment and soil were compared to soil background concentrations developed for the Central Plateau of the Hanford Site. Radionuclide concentrations that appeared to represent regional background conditions were dropped from further evaluation as COPECs. No regional background concentrations for lake waters have been developed, but because radionuclides such as Pb-212, Pb-214, and K-40 are universally present in soils and waters, professional judgment was used in a qualitative evaluation of these constituents with respect to background. The second COPEC refinement criterion was an evaluation of the detection frequency of individual radionuclides. If a radionuclide was detected in less than 5 percent of the samples, detected concentrations were evaluated spatially to determine if they were potentially indicative of a hotspot or localized release. If they were not indicative of such, they were eliminated from further consideration as COPECs.

As mentioned in Section E3.2.5, data currently available for inorganic nonradionuclide compounds in surface water are not sufficient to allow for further refinement, so the 12 inorganic compounds identified as suspected COPECs in the screening will be further evaluated in the next phase of data collection.

E5.1 WEST LAKE SEDIMENT

Four radionuclides (Ru-106, Pb-212, Pb-214, and K-40) were carried forward to screening refinement from the initial screening. All were carried forward solely because they were detected in at least one sample and no BCGs were available against which to screen. Ruthenium-106 was detected in one of 19 samples. Although this exceeds the 5 percent rule generally used to evaluate frequency of detected samples for certain analyte classes (see Section 3.2 of the main document), Ru-106 was not detected in any other surface water, soil, or vegetation samples and has a 1-year half-life, and thus will not be further evaluated as a COPEC. Lead-212 and Pb-214 were detected in all nine samples that were analyzed for lead. Concentrations of both are fairly uniform across the sampling locations, with relative difference of approximately 50 percent between minimum and maximum concentrations of each. Lead-212 and Pb-214 are part of the uranium decay chain, and hence natural background concentrations of these isotopes exist. Because concentrations of radioactive lead isotopes are relatively low and relatively uniform across sampling locations, they likely represent natural background conditions.

Background concentrations of K-40 in soils at the Hanford Site have been derived, with a concentration of 16.6 pCi/g representing the 90th percentile upper confidence limit of background concentrations. The 19 sediment samples collected from West Lake had K-40 concentrations ranging from 13.8 to 21.9 pCi/g, with 11 of the 19 samples exceeding, albeit slightly, the 16.6 pCi/g concentration representing soil background at the Hanford Site. This can be explained by the saline nature of the lake. Potassium-40 occurs naturally with stable potassium, making up approximately 0.012 percent of total potassium in the environment. Because West Lake is a saline lake, total potassium concentrations are expected to be more concentrated in the lake sediments than in surrounding soils. Therefore, it follows that K-40 concentrations are also proportionately higher in saline systems than in freshwater or terrestrial systems, and the slightly higher concentrations of K-40 found in West Lake likely represent background conditions. Because of the low frequency of detect of Ru-106, and the fact that Pb-212, Pb-214, and K-40 likely represent local background conditions and are not on the list of potential process-oriented COPCs, these constituents will not be evaluated further as sediment COPECs.

The total dose to aquatic animals from radionuclides in West Lake sediment is estimated to be 0.0007 rad/day, substantially less than the aquatic animal dose limit of 1.0 rad/day. The total dose to riparian animals from radionuclides in West Lake sediment is 0.0013 rad/day. The dose limit for riparian animals is 0.1 rad/day. A comparison of total sediment dose to the different receptor types is presented in Figure E-4. As a result of this screening process, none of the radionuclides in sediment were retained as COPECs.

E5.2 WEST LAKE SURFACE WATER

Four radionuclides (Be-7, K-40, U-234, and U-238) were identified as surface water COPECs following initial screening. Beryllium-7 and K-40 were identified as COPECs because no BCGs were available against which to screen. Beryllium-7 was only detected in two of 44 surface water samples. The analysis used the frequency-of-detect rule, which states that constituents detected in less than 5 percent of samples can be eliminated as COPECs provided that the detected concentration(s) are not indicative of a localized "hotspot." In addition, Be-7 has an extremely short half-life of 53 days, and can be eliminated from further consideration as a COPEC. Potassium-40 is a naturally occurring isotope, and concentrations in salt water are expected to be higher than concentrations in freshwater because of higher naturally occurring potassium levels.

However, K-40 concentrations in surface water samples were much more variable than concentrations observed in sediment, ranging from 33.4 to 3970 pCi/L. Notes accompanying the data indicate that the sample containing the highest K-40 concentration also contained very high salt content, which may explain the high levels of K-40 noted in that sample. West Lake surface water samples collected during and after 2002 have higher concentrations of radionuclides than the water samples collected before 2002. This is because the water volume in West Lake decreased significantly over a period of several years, concentrating the suspended and dissolved solids. At times, the remaining water volume has resembled mud more than water. Therefore, the post-2001 samples were analyzed as if they were solids instead of liquids and are not representative of pure surface water concentrations. This likely greatly overestimates water concentrations of radionuclide COPECs. Even so, given that sediment and soil concentrations from West Lake are indicative of background conditions in the area, it also is likely that K-40 concentrations in water represent normal background conditions for a saline lake. For this

reason, and because of potassium's role as an essential nutrient in the environment, K-40 is eliminated from further consideration as a surface water COPEC in West Lake.

Uranium-234 and U-238 had maximum concentrations exceeding the BCG, with HQs of 14.2 and 20.6, respectively. Uranium-234 concentrations exceeded the BCG in 25 of 54 samples, and U-238 concentrations exceeded its BCG in 24 of 54 samples. All post-1989 samples contain much higher concentrations of uranium isotopes than observed in samples collected in 1989. As mentioned above, this is because of the high concentrations of suspended and dissolved solids in the post-1989 samples. The 1989 concentrations of U-234 and U-238 did not exceed the BCGs. Uranium-234 and U-238 cannot be eliminated as surface water COPECs based on frequency of detect, or by comparing to background conditions. Although surface water background conditions for the Hanford Site have not been documented, mean concentrations of uranium isotopes in West Lake water in the 1989 samples, which were less confounded by suspended particulate matter than later samples, were more than 700 times higher than concentration measured in the Columbia River at Priest Rapids Dam. The lack of water background data and BCGs for a number of naturally occurring radionuclides such as Pb-212, Pb-214, and K-40 represents an uncertainty in this screening assessment. Assessment of these radionuclides was based on professional judgment and review of the concentrations detected across the three abiotic media, and in the case of K-40, background concentration in soils at the Hanford Site. Although there is some uncertainty in eliminating these constituents as COPECs, there is no evidence pointing to non-natural sources of these constituents in West Lake.

Two uranium isotopes (U-234 and U-238) in West Lake surface water warrant further investigation following comparison to background conditions and the frequency of detect evaluation. The limiting organisms upon which the three uranium water BCG values are based are aquatic animals. In West Lake, these are represented by aquatic invertebrates. Evidence that aquatic invertebrates are being exposed to radionuclides in West Lake is provided by limited analysis of biotic tissue conducted by PNL-7662. The highest uranium concentrations in animals at West Lake were detected in larvae of aquatic ephydrid flies, which contained U-234 and U-238 concentrations of 0.59 and 0.55 pCi/g, respectively (based on a single composite sample). Although uranium and cesium isotopes were identified as surface-water COPECs, neither showed up in coot eggshells collected from nests at West Lake.

The dose limit for aquatic animals based on the Biota Dose Assessment Committee guidance (DOE/EH-0676) is 1 rad/day. Total dose to aquatic animals from all radionuclides in West Lake surface water is 35.4 rad/day. Uranium-234 accounts for approximately 40 percent of the total dose (14.2 rad/day), and U-238 is responsible for 57 percent of the total dose (20.6 rad/day). The only other radionuclides that contribute more than 1 percent of the total dose are U-235 and Cs-137 which together result in a total dose of 1.3 rad/day. All other radionuclides in West Lake water contribute a combined dose of less than 0.05 rad/day to aquatic animals. The dose limit for riparian animals based on the Biota Dose Assessment Committee guidance is 0.1 rad/day. The total dose to riparian animals from radionuclides in West Lake water is 1.13 rad/day, with U-234 responsible for 0.42 rad/day, U-238 accounting for 0.61 rad/day, and Cs-137 accounting for 0.073 rad/day. A comparison of total water doses to each of the limiting receptor types is presented in Figure E-5. Riparian animals are represented by mammals such as raccoon, mink, and muskrat. Dose to this category of receptors primarily is through ingestion of contaminated media and foodstuffs. Because no fish are present in West Lake and biota are limited to invertebrate fauna, foraging opportunities for riparian animals likely are limited. Because of this,

risk to riparian animals from radionuclides in West Lake likely are overestimated. A summary of media-specific radionuclide COPECs remaining after screening and refinement is presented in Table E-6.

Refinement of the list of nonradionuclide COPECs in West Lake water is not practical because of the very limited data set and the lack of regional background values for surface waters at the Hanford Site. It is worth noting that concentrations of trace metals in unfiltered West Lake water samples were compared to marine water screening values that are based on filtered water samples. This results in an overestimation of risk to organisms such as aquatic invertebrates that receive the bulk of their exposure from dissolved compounds in the water in which they live. Unfiltered water samples are appropriate for assessing doses to terrestrial and riparian wildlife that may use the lake as a source of drinking water, because they will be ingesting suspended particulate matter as well as water. The limited trace metals data were collected 15 years ago, and how well that data represent current conditions is unknown. Current, filtered water samples would reduce the uncertainties associated with these factors. Available data for organic chemical constituents were inadequate for ecological screening purposes because of unacceptably high detection limits. However, operational history of sites that may have affected West Lake does not suggest that volatile organic compounds, semivolatile organic compounds, pesticides, polychlorinated biphenyls, or thiourea compounds are of concern.

In summary, U-234 and U-238, highlighted in Table E-7, were retained for further evaluation as radionuclide COPECs. Arsenic, boron, chromium, copper, cyanide, manganese, molybdenum, nickel, silicon, silver, strontium, and zinc, highlighted in Table E-6, were retained for further evaluation as suspect nonradionuclide COPECs.

E5.3 CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN REFINEMENT SYNOPSIS

The refinement synopsis of COPECs is as follows.

- No radiological COPECs were identified in sediment following COPEC screening and refinement. No sediment data are available for organic and inorganic chemicals.
- The COPECs in surface water are radionuclides U-234 and U-238 and a list of metals. Historical data show arsenic, chromium, copper, manganese, and zinc detected at concentrations above screening values. Cyanide, silver, and nickel had detection limits exceeding screening values. Boron, molybdenum, silicon, and strontium were detected in surface-water samples and do not have screening values.
    - Internal dose dominates for the key radionuclides and is based on protective assumptions about diet and biological uptake of these radionuclides.
    - Only limited historical data were available to evaluate inorganic constituents in water.
    - These data were insufficient to conduct COPEC refinement of inorganics in water.
    - Detection limits for available organics surface-water data are not adequate for ecological screening; however, organic constituents are not expected based on knowledge of site operations.

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E6.0 REFERENCES

Buchman, M., 1999, *Screening Quick Reference Tables*, SQuiRT Cards, Coastal Protection and Restoration Division, Office of Response and Restoration, National Oceanic and Atmospheric Administration. Available on the Internet at: http://response.restoration.noaa.gov/cpr/sediment/squirt/squirt.html

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq.

DOE/EH-0676, 2004, *RESRAD-BIOTA: A Tool for Implementing a Graded Approach to Biota Dose Evaluation, User's Guide, Version 1*, ISCORS Technical Report 2004-02, U.S. Department of Energy, Washington, D.C. Available on the Internet at: http://web.ead.anl.gov/resrad/documents/RESRAD-BIOTA_Manual_Version_1.pdf

DOE/RL-2001-54, 2005, *Central Plateau Ecological Evaluation*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-STD-1153-2002, 2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*, DOE Technical Standard, U.S. Department of Energy, Washington, D.C. Available on the Internet at http://www.eh.doe.gov/techstds/standard/std1153/1153.htm .

EPA/540/R-97/006, 1997, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final)*, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

PNL-2499, 1978, *Comparative Ecology of Nuclear Waste Ponds and Streams on the Hanford Site*, Pacific Northwest Laboratory, Richland, Washington.

PNL-7662, 1991, *An Evaluation of the Chemical, Radiological, and Ecological Conditions of West Lake on the Hanford Site*, Pacific Northwest Laboratory, Richland, Washington.

Zack, R. S., 1998, "Shore Flies (Diptera: Ephydridae) of the Hanford Site, Washington," *Northwest Science* 72, pp. 127-141.

Figure E-1. Aerial Photograph of West Lake in 1989.

Figure E-2. Photograph of West Lake Taken from Gable Mountain in 2003.

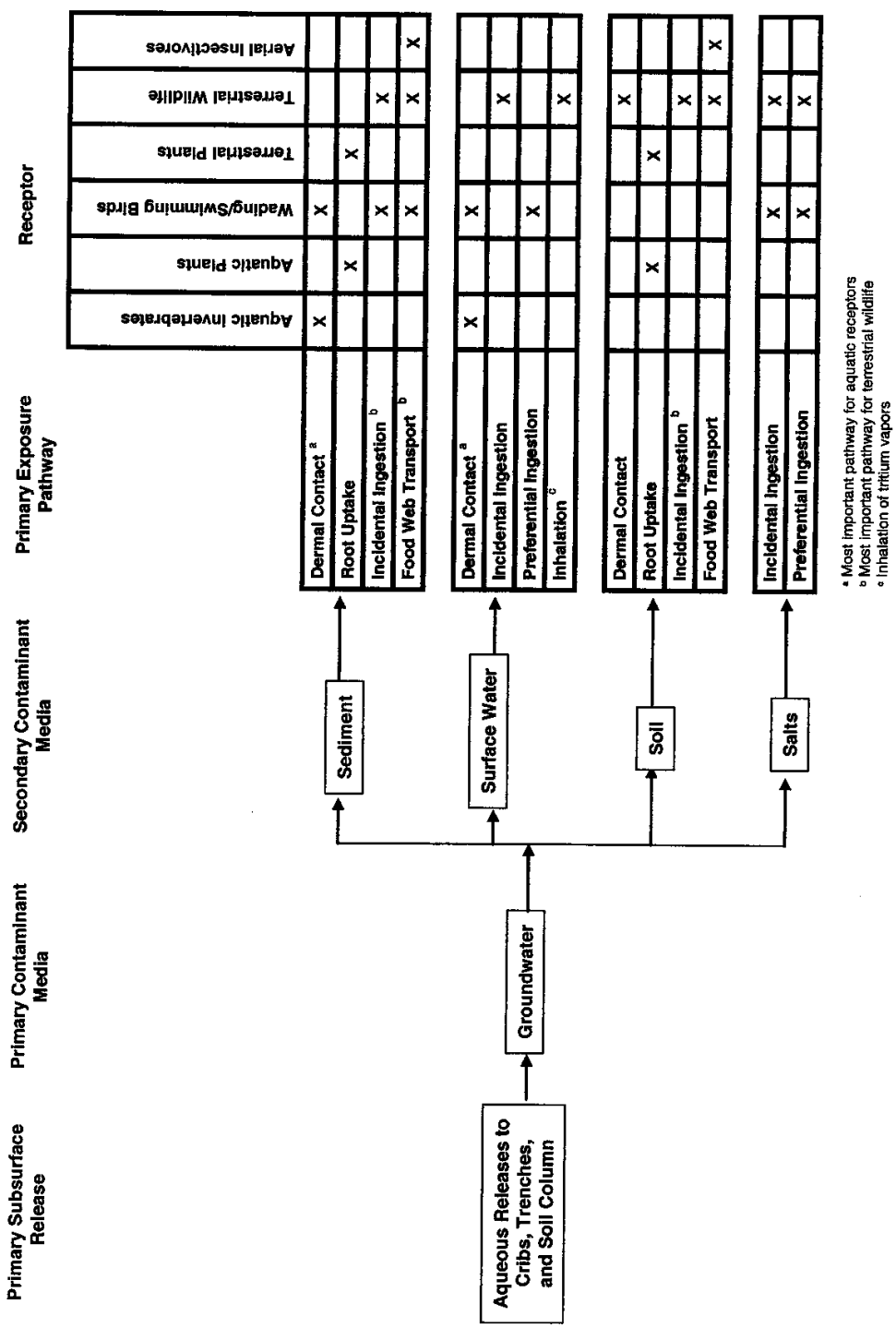

Figure E-3. West Lake Exposure Pathways.

Figure E-4. Total West Lake Sediment Dose Rate by Receptor Type.

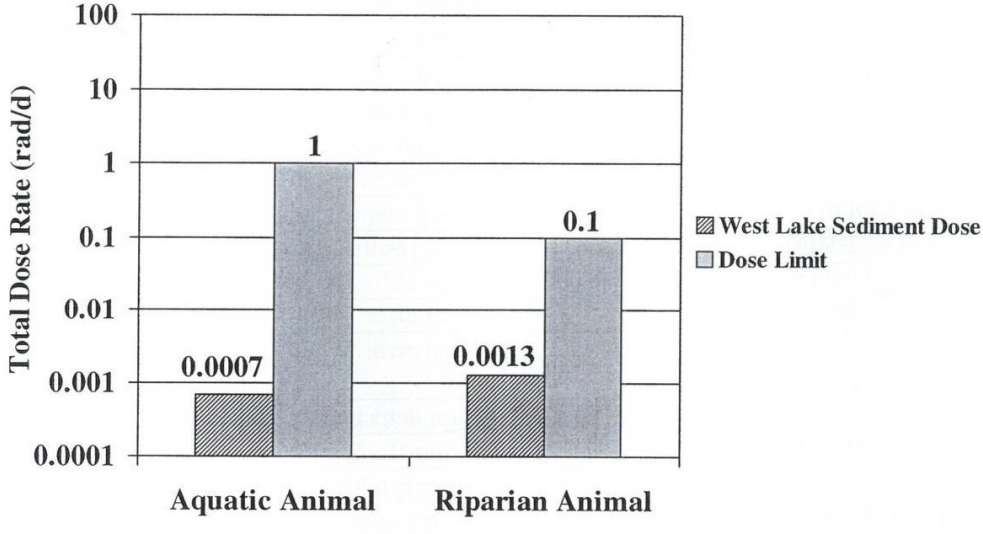

Figure E-5. West Lake Water Dose Rate by Receptor Type.

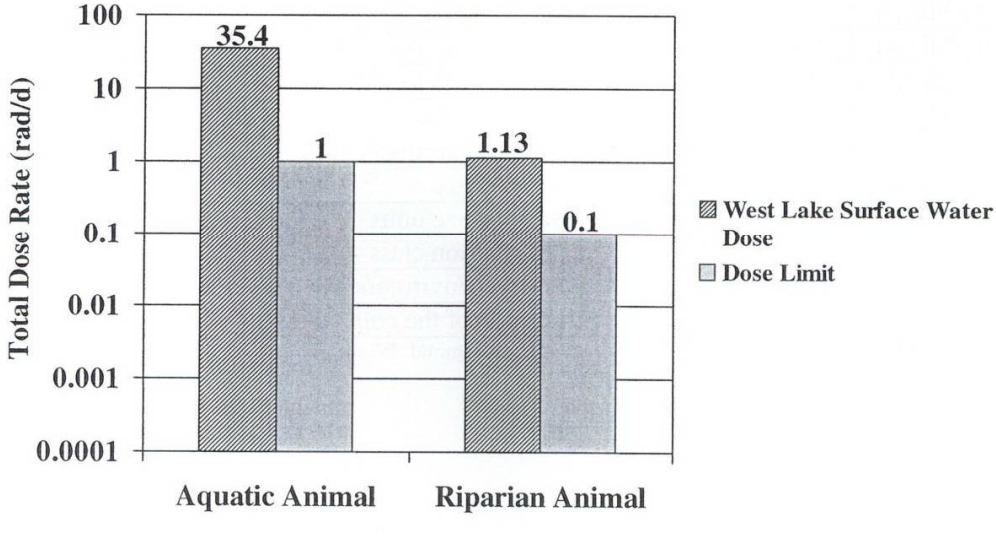

Table E-1. Definition of Data Fields for West Lake Spreadsheet. (See data CD.)

Excel Column Header	Definition
Codes below refer to data fields for all tabbed spreadsheets	
Media	Biological tissues
SAMP_NUM	Unique sample identification
SAMP_DATE_TIME	Sample date and time
SAMP_DATE_TIME_ON	Sample date and time
CON_ID	Contaminant identification
CON_SHORT_NAME	Contaminant code
METHOD_NAME	Analytical method
LAB_CODE	Laboratory identification
VALUE_RPTD	Analytical result
ANAL_UNITS_RPTD	Analytical units (pCi)
COUNTING_ERROR	Analytical error
TOTAL_ANAL_ERROR 2-SIGMA	Analytical error to 2 standard deviations
MIN_DETECTABLE_ACTIVITY	Minimum detectable activity
PCNT_MOISTURE	Percent moisture
LAB_QUALIFIER	Laboratory qualification
REVIEW_QUALIFIER	Data review qualification
SAMP_FROM	Description of sample (e.g., green-winged teal)
SAMP_ITEM	More detailed description (e.g., green-winged teal muscle)
SAMP_MTHD	Sampling method
COLL_MTHD	Collection method
SAMP_SITE_ID	Sampling site identification
SAMP_SITE_NAME	General site description
SAMPLE_LOCATION	General site location
SAMP_COMMENT	Notes regarding collection and processing
RESULT_COMMENT	Notes regarding or results
COLL_SAMP_SIZE	Sample size
COLL_SAMP_SIZE_UNITS	Sample size units
DIST_CLASS	Distribution class
OWNER_ID	Surface Environmental Surveillance Program
COLLECTION PURPOSE	Purpose of the collection (e.g., surveillance)

Excel is a trademark of Microsoft Corporation, Redmond, Washington.

Table E-2. Screening Results for Radionuclides in West Lake Sediment.

Radionuclide	Maximum Concentration (pCi/g)[a]	90th Percentile Soil Background (pCi/g)	BCG for Aquatic Sediment (pCi/g)	Maximum/ BCG Ratio	Sediment COPEC?	Justification
Antimony-125	[0.0419]	--	7030	<0.0001	No	Less than BCG
Beryllium-7	[0.25]	--	N/A	N/A	No	Not detected, no BCG
Cobalt-60	[0.015]	0.00842	1460	<0.0001	No	Less than BCG
Cesium-134	[0.0613]	--	1480	<0.0001	No	Max DL less than BCG
Cesium-137	2.45	1.05	3120	0.0008	No	Less than BCG
Europium-152	[0.0413]	--	3040	<0.0001	No	Max DL less than BCG
Europium-154	0.082	0.0334	2570	<0.0001	No	Less than BCG
Europium-155	0.085	0.0539	31600	<0.0001	No	Less than BCG
Lead-212	0.859	--	N/A	N/A	Yes	Detected, no background or BCG
Lead-214	0.743	--	N/A	N/A	Yes	Detected, no background or BCG
Potassium-40	21.9	16.6	N/A	N/A	Yes	Detected above background, no BCG
Ruthenium-106	0.166	--	N/A	N/A	Yes	Detected, no background or BCG
Strontium-90	[1.57]	0.178	582	0.0027	No	Max DL less than BCG
Technetium-99	0.956	--	42200	<0.0001	No	Less than BCG
Tritium	0.001	--	374000	<0.0001	No	Less than BCG
Uranium-234	9.1	1.1	5270	0.0017	No	Less than BCG
Uranium-235	0.86	0.109	4730	0.0002	No	Less than BCG
Uranium-238	8.53	1.06	2490	0.0034	No	Less than BCG
Zirconium-95	0.031	--	2330	<0.0001	No	Less than BCG
Hazard Index [sum of maximum/BCG] = 0.009						

[a] Numbers in brackets are non-detect values.
DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota.*

-- = not available.
BCG = biota concentration guide (DOE-STD-1153-2002).
COPEC = contaminant of potential ecological concern.
DL = detection limit.
N/A = not applicable.

Table E-3. Screening Results for Radionuclides in West Lake Surface Water.

Radionuclide	Maximum Concentration (pCi/L)[a]	Surface Water BCG	Maximum/ BCG Ratio	Surface Water COPEC?	Justification
Antimony-125	46.1	367000	0.0001	No	Less than BCG
Beryllium-7	52.1[b]	--	N/A	Yes	Detected, no BCG
Cobalt-60	14.8	3760	0.0039	No	Less than BCG
Cerium-144	11.2	1600	0.0070	No	Less than BCG
Cesium-134	1.6[c]	21.1	0.076	No	Less than BCG
Cesium-137	31.3	42.6	0.734	No	Less than BCG
Europium-154	28.6	21600	0.0013	No	Less than BCG
Europium-155	96.5	264000	0.0004	No	Less than BCG
Potassium-40	3970	--	N/A	Yes	Detected, no BCG
Ruthenium-106	[206]	--	N/A	No	Not detected
Strontium-90	26.2	278	0.094	No	Less than BCG
Technetium-99	1400	667000	0.0021	No	Less than BCG
Tritium	1300	2.65E+08	<0.0001	No	Less than BCG
Uranium-234	2860	202	14.2	Yes	Exceeds BCG
Uranium-235	132	217	0.61	No	Less than BCG
Uranium-238	4590	223	20.6	Yes	Exceeds BCG
Zirconium-95	20	7330	0.0022	No	Less than BCG
Hazard Index [sum of maximum/BCG] = 36					

[a] Numbers in brackets are non-detect values.
[b]Represents maximum detected concentration. Maximum nondetected sample result is 337 pCi/L.
[c]Represents only detected concentration. Maximum nondetected sample result is 9.39 pCi/L .

DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota.*

-- = not available.
BCG = biota concentration guide (DOE-STD-1153-2002).
COPEC = contaminant of potential ecological concern.
N/A = not applicable.

Table E-4. Screening of Radionuclides in Soil Along the North Transect.

Radionuclide	Maximum Concentration (pCi/g)[a]	90th Percentile Soil Background (pCi/g)	Soil BCG	Maximum/ BCG Ratio	Soil COPEC?	Justification
Cobalt-60	[0.013]	0.00842	700	<0.0001	No	Not detected, DL less than BCG
Cesium-134	[-0.003]	--	11.3	not calc.	No	Not detected, DL less than BCG
Cesium-137	57.4	1.05	20.8	2.76	Yes	Exceeds background and BCG
Europium-154	[0.052]	0.0334	1300	<0.0001	No	Not detected, DL less than BCG
Europium-155	0.12	0.0539	2000	<0.0001	No	Less than BCG/10
Lead-212	0.713	--	--	--	Yes	Detected, no background, no BCG
Lead-214	0.62	--	--	--	Yes	Detected, no background, no BCG
Potassium-40	18.3	16.6	--	--	Yes	Detected, above background, no BCG
Ruthenium-106	0.155	--	--	--	Yes	Detected, no background, no BCG
Strontium-90	0.35	0.178	22.5	0.016	No	Less than BCG
Uranium-235	8.2	0.109	2770	0.003	No	Less than BCG
Uranium-238	1.91	1.06	1580	0.0012	No	Less than BCG/10
Zirconium-95	[0.013]	--	1170	<0.0001	No	Not detected, DL less than BCG
Hazard Index [sum of maximum/BCG] = 2.8						

[a] Numbers in brackets are non-detect values
DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota.*

-- = not available.
BCG = biota concentration guide (DOE-STD-1153-2002).
COPEC = contaminant of potential ecological concern.
DL = detection limit.

Table E-5. Screening of Radionuclides in Soil Along the South Transect.

Radionuclide	Maximum Concentration (pCi/g)[a]	90th Percentile Soil Background (pCi/g)	Soil BCG	Maximum/ BCG Ratio	Soil COPEC?	Justification
Cobalt-60	[0.023]	0.00842	700	<0.0001	No	Not detected, DL less than BCG
Cesium-134	0.044	--	11.3	0.0039	No	Not detected, DL less than BCG
Cesium-137	1.52	1.05	20.8	0.073	No	Less than BCG
Europium-154	0.1	0.0334	1300	<0.0001	No	Less than BCG
Europium-155	0.075	0.0539	2000	<0.0001	No	Less than BCG
Lead-212	0.818	--	--	--	Yes	Detected, no background, no BCG
Lead-214	0.684	--	--	--	Yes	Detected, no background, no BCG
Potassium-40	16.9	16.6	--	--	Yes	Detected, above background, no BCG
Ruthenium-106	[0.092]	--	--	--	No	Not detected
Strontium-90	0.671	0.178	22.5	0.0030	No	Less than BCG
Uranium-235	0.122	0.109	2770	<0.0001	No	Less than BCG
Uranium-238	1.91	1.06	1580	0.0012	No	Less than BCG
Zirconium-95	[0.013]	--	1170	<0.0001	No	Not detected, DL less than BCG
Hazard Index [sum of maximum/BCG] = 0.11						

[a] Numbers in brackets are non-detect values

DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota.*

-- = not available.
BCG = biota concentration guide (DOE-STD-1153-2002).
COPEC = contaminant of potential ecological concern.
DL = detection limit.

Table E-6. Screening of Metals Concentrations in West Lake Surface Water. (2 Pages)

Analyte	Concentration (µg/L)[a]	Screening Value from SQuiRT	Source	COPEC	Rationale
Aluminum	[150]	--	--	No	Not detected
Antimony	[100]	--	--	No	Not detected
Arsenic	900	36	Chronic Marine CCC	Yes	Exceeds screening value
Barium	141	2000	Groundwater MCL	No	Less than screening value
Beryllium	[5]	5.3	Freshwater CCC	No	Less than screening value
Boron	6156	--	--	Yes	Detected, no screening value
Cadmium	[2]	9.3	Chronic Marine CCC	No	Not detected
Chromium	131	50	Chronic Marine CCC	Yes	Exceeds screening value
Cobalt	[20]	--	--	No	Not detected
Copper	30	3.1	Chronic Marine CCC	Yes	Exceeds screening value
Cyanide	[10]	1	Chronic Marine CCC	Yes	Detection Limit exceeds screening value
Iron	323	--	--	No	Detected, no screening value
Lead	[5]	8.1	Chronic Marine CCC	No	Not detected
Lithium	[10]	--	--	No	Not detected
Manganese	10749	50	Groundwater MCL	Yes	Exceeds screening value
Mercury	0.3	0.94	Chronic Marine CCC	No	Less than screening value
Molybdenum	2236	--	--	Yes	Detected, no screening value
Nickel	[10]	8.2	Chronic Marine CCC	Yes	Detection Limit exceeds screening value
Selenium	[5]	71	Chronic Marine CCC	No	Not detected
Silicon	4522	--	--	Yes	Detected, no screening value
Silver	[10]	0.95	Acute Marine CCC	Yes	Detection Limit exceeds screening value
Strontium	626	--	--	Yes	Detected, no screening value
Thallium	[5]	2130	Acute Marine CCC	No	Not detected
Tin	[30]	--	--	No	Not detected
Titanium	[60]	--	--	No	Not detected
Vanadium	[5]	--	--	No	Not detected
Zinc	119	81	Chronic Marine CCC	Yes	Exceeds screening value

Table E-6. Screening of Metals Concentrations in West Lake Surface Water. (2 Pages)

Analyte	Concentration (µg/L)[a]	Screening Value from SQuiRT	Source	COPEC	Rationale

[a] Numbers in brackets are non-detect values
DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota.*

-- = not available.
CCC = criteria continuous concentration.
COPEC = contaminant of potential ecological concern.
MCL = maximum contaminant level.
SQuiRT = Buchman, 1999, *Screening Quick Reference Tables.*

Table E-7. Summary of Contaminant of Potential Ecological Concern Refinement for Radionuclides in Sediment and Surface Water.

COPEC	Was the Constituent Detected in <5% of Samples?	Do Constituent Concentrations Appear to Represent Regional Background?	Retain as COPEC?
Sediment			
Lead-212	No	Yes	No
Lead-214	No	Yes	No
Potassium-40	No	Yes	No
Ruthenium-106	No[a]	Unknown	No
Surface Water			
Beryllium-7	Yes[b]	Unknown	No
Potassium-40	No	Yes	No
Uranium-234	No	No	Yes
Uranium-238	No	No	Yes

[a]Ruthenium-106 was detected in one soil sample and one sediment sample at low concentrations. When summed across media, Ru-106 was detected in only 2 of 78 samples. It is therefore eliminated as a COPEC based on the infrequency of detects across media, short half-life, and the low concentrations observed.
[b]Beryllium-7 was detected in 2 of 44 surface water samples, and was not detected in any sediment samples. It is therefore eliminated as a COPEC based on the infrequency of detects across media.

COPEC = contaminant of potential ecological concern.

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